Algorithmic Enforcement of Copyright Online and the Global Example of EU

Master of International and Comparative Law /Faculty of Law

Master's thesis

Author:

Farzam Sadegh Daghighi

1.6.2022

UNIVERSITY OF TURKU
Faculty of Law

Master's thesis

Subject: Master of International and Comparative Law — Law and Information Society
Author(s): Farzam Sadegh Daghighi
Title: Algorithmic Enforcement of Copyright Online and the Global Example of EU
Supervisor(s): Dhanay Cadillo Chandler, Tuomas Mylly
Number of pages: 70 pages
Date: 1.6.2022

Today algorithms are present virtually in all aspects of life, and protecting online copyrighted content against infringement is no exception. Through a legal dogmatic and critical analysis, this work studies how algorithms are used on online platforms to protect authors' rights. The essential legislative element in this work is Copyright in Digital Single Market Directive in the EU. The study assesses the impacts of the directive's article 17 on algorithmic enforcement of copyright by online content-sharing platforms. This includes understanding how already in-use algorithmic technologies and the voluntary ex ante enforcement of copyright, such as YouTube's Content ID, are affected. Human rights also are one of the primary concerns of this study. Hence, different levels of this work consider associated challenges and the ways it has been or should be remedied by the EU lawmaker. This work also provides the reader with a factual understanding of the techniques and technologies used in copyright algorithmic enforcement.

The findings of this work are that despite much criticism, the said directive is able to improve various problems, including those of human rights. Nevertheless, it is discovered that the directive also fails in certain points, such as achieving an all-works-licenced ideal. Furthermore, it is noticed that the practices of online content-sharing platforms do not fully comply with EU law. This study concludes by suggesting increased algorithmic transparency and accountability, ongoing dialogues and collaboration, expanding participation of the public and NGOs, as well as encouraging platforms to use more complex AI technologies, such as NLP, in enforcing copyright.

Key words: algorithmic enforcement of copyright, automated enforcement of copyright, algorithmic filtering and monitoring, algorithmic accountability, online platforms, content-sharing platforms, algorithm and platforms, YouTube and Content ID, directive on copyright in digital single market, Article 17 of directive 2019/790

Table of contents

REFERENCES

BIBLIOGRAPHY

Alpaydin, Ethem, *Introduction to Machine Learning* (3rd edn, The MIT Press 2014)

Angelopoulos, Christina, and Smet, Stijn, 'Notice-and-Fair-Balance: How to Reach a Compromise between Fundamental Rights in European Intermediary Liability' (2016) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2944917> accessed 20 April 2022

Balkin, Jack M, 'Old School/New School Speech Regulation' (2014) Harvard Law Review Forthcoming, Yale Law School Public Law Research Paper no. 491, <http://ssrn.com/abstract=2377526> accessed 20 April 2022

Balkin, Jack M, 'The Three Laws of Robotics in the Age of Big Data' (2017) 78 Ohio State Law Journal <ssrn.com/abstract=2890965> accessed 20 April 2022

Benkler, Yochai, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (Yale University Press 2006)

Black, Julia, 'Critical Reflection on Regulation' (2002) 27 Australian Journal of Legal Philosophy <www.researchgate.net/publication/265568938_Critical_Reflection_on_Regulation> accessed 20 April 2022

Blázquez, Francisco Javier Cabrera and others, 'Exceptions and Limitations to Copyright' (2017) European Audiovisual Observatory <http://rm.coe.int/168078348b> accessed 20 April 2022

Bridy, Annemarie, and Keller, Daphne, 'U.S. Copyright Office Section 512 Study: Comments in Response to Notice of Inquiry' (2016) SSRN Electronic Journal, <https://doi.org/10.2139/ssrn.2757197> accessed 20 April 2022

Carpou, Zoe, 'Robots, Pirates, and the Rise of the Automated Takedown Regime' (2016) 39(551) COLUM. J.L. & ARTS <http://ssrn.com/abstract=2591187> accessed 20 April 2022

Castets-Renard, Céline, 'Algorithmic Content Moderation on Social Media in EU Law: Illusion of Perfect Enforcement' (2020) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3535107> accessed 20 April 2022

Chynoweth, Paul, 'Legal Research' in Andrew Knight and Les Ruddock (eds) *Advanced Research Methods in the Built Environment* (Wiley-Blackwell 2008)

Citron, Danielle Keats, 'Technological Due Process' (2008) 85(6) Washington University Law Review 1249 <http://openscholarship.wustl.edu/law_lawreview/vol85/iss6/2> accessed 20 April 2022

Cobbe, Jennifer, 'Legal Singularity and the Reflexivity of Law' in Simon Deakin and Christopher Markou (eds), *Is Law Computable?: Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing 2020)

Cormen, Thomas and others, *Introduction to Algorithms* (3rd ed. The MIT Press 2009)

DeLisa, Nicholas T, 'You(Tube), Me, and Content ID: Paving the Way for Compulsory Synchronization Licensing on User-Generated Content Platforms' (2016) Brooklyn Law Review <http://brooklynworks.brooklaw.edu/blr/vol81/iss3/8> accessed 20 April 2022

Depoorter, Ben and Walker, Robert, 'Copyright False Positives' (2013) 89(319) Notre Dame Law Review <http://ssrn.com/abstract=2337684> accessed 20 April 2022

Elkin-Koren, Niva, 'Fair Use by Design' (2017) 64(22) UCLA Law Review <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=3217839> accessed 20 April 2022

Elkin-Koren, Niva, and Perel, Maayan, 'Guarding the Guardians: Content Moderation by Online Intermediaries and the Rule of Law' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Erickson, Kristofer and Kretschmer, Martin, 'Empirical Approaches to Intermediary Liability' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

European Union Agency for Fundamental Rights 'Challenges Facing Civil Society Organisations Working on Human Rights in the EU' (2017)

<fra.europa.eu/sites/default/files/fra_uploads/fra-2018-challenges-facing-civil-society_en.pdf> accessed 20 April 2022

Farrand, Benjamin, "From a 'Digital Agenda for Europe', to a 'Digital Single Market', to a 'Europe Fit for the Digital Age': A Decade of European Union Copyright Policy in the Shadow of Crises' EU Copyright Law: A Commentary (Elgar Commentaries Series), edited by Irini Stamatoudi and Paul Torremans, 2nd ed., Edward Elgar Publishing, 2021, pp. 967–88.

Felten, Edward W, "A Skeptical View of DRM and Fair Use' Communications of the ACM, vol. 46, no. 4, 2003, pp. 56–59. Crossref, https://doi.org/10.1145/641205.641232.

Frosio, Giancarlo and Kuczerawy, Aleksandra, 'From "Notice and Takedown' to "Notice and Stay Down': Risks and Safeguards for Freedom of Expression' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Frosio, Giancarlo and Mendis, Sunimal, 'Monitoring and Filtering: European Reform or Global Trend?' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Frosio, Giancarlo, 'Editor's Note: A Dialogue on the Role of Online Intermediaries' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Frosio, Giancarlo, 'Mapping Online Intermediary Liability' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Frosio, Giancarlo, 'The Death of "No Monitoring Obligations': A Story of Untameable Monsters' (2017) 8(3) Journal of Intellectual Property, Information Technology and E-Commerce Law <http://ssrn.com/abstract=2980786> accessed 20 April 2022

Ginsburg, Jane C, 'A United States Perspective on Digital Single Market Directive Article 17' in Irini Stamatoudi and Paul Torremans (eds) *EU Copyright Law: A Commentary* (Edward Elgar Publishing 2021)

Grimmelmann, James, 'The Virtues of Moderation' (2015) 17(42) Yale Journal of Law & Technology <http://scholarship.law.cornell.edu/facpub/1486> accessed 20 April 2022

Grisse, Karina, 'After the Storm—Examining the Final Version of Article 17 of the New Directive (EU) 2019/790' (2019) 14(11) Journal of Intellectual Property Law & Practice <https://doi.org/10.1093/jiplp/jpz122> accessed 20 April 2022

Husovec, Martin, 'The Promises of Algorithmic Copyright Enforcement: Takedown or Staydown? Which Is Superior? And Why?' (2018) Columbia Journal of Law & the Arts <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=3239040> accessed 20 April 2022

Juncker, Jean-Claude, 'A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change' (2014) Political Guidelines for the next European Commission, < https://ec.europa.eu/info/sites/default/files/juncker-political-guidelines-speech_en.pdf> accessed 20 April 2022

Karapapa, Stavroula, 'The Quotation Exception Under EU Copyright Law' in Eleonora Rosati *The Routledge Handbook of EU Copyright Law*, (1st edn Routledge, 2021)

Kavenna, Joanna, *Zed: A Novel* (1st edn Doubleday 2020)

Kur, Annette, Dreier, Thomas, and Luginbuehl, Stefan, *European Intellectual Property Law: Text, Cases and Materials* (2nd edn Edward Elgar Publishing 2019)

Langvardt, Kyle, 'Regulating Online Content Moderation' (2017) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.302473> accessed 20 April 2022

Latzer, Michael and others 'The Economics of Algorithmic Selection on the Internet' in Johannes M. Bauer and Michael Latze (eds) *Handbook on the Economics of the Internet* (Edward Elgar Publishing Limited 2016)

Lee, Edward A, 'Are We Losing Control?' in Hannes Werthner and others (eds) *Perspectives on Digital Humanism* (1st edn Springer 2022)

Leerssen, Paddy, 'Cut Out by the Middle Man: The Free Speech Implications of Social Network Blocking and Banning in the EU' (2015) 6(2) Journal of Intellectual

Property, Information Technology and Electronic Commerce Law <http://ssrn.com/abstract=3494317> accessed 20 April 2022

Leistner, Matthias, 'European Copyright Licensing and Infringement Liability Under Art. 17 DSM-Directive' (2020) 12(2) Zeitschrift Für Geistiges Eigentum <https://doi.org/10.1628/zge-2020-0008> accessed 20 April 2022

Lessig, Lawrence, 'The New Chicago School' (1998) 27(S2) The Journal of Legal Studies <https://doi.org/10.1086/468039> accessed 20 April 2022

Lessig, Lawrence, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113(2) Harvard Law Review <https://doi.org/10.2307/1342331> accessed 20 April 2022

Lester, Toni, and Pachamanova, Dessislava, 'The Dilemma of False Positives: Making Content ID Algorithms More Conducive to Fostering Innovative Fair Use in Music Creation' (2017) 24(1) UCLA Entertainment Law Review <https://doi.org/10.5070/lr8241035525> accessed 20 April 2022

Marcus, Gary, and Davis, Ernest, *Rebooting AI: Building Artificial Intelligence We Can Trust* (*Vintage 2019*)

Markou, Christopher and Deakin, Simon, 'Ex Machina Lex: Exploring the Limits of Legal Computability' in Simon Deakin and Christopher Markou (eds), *Is Law Computable?: Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing 2020)

McGonagle, Tarlach, 'Free Expression and Internet Intermediaries: The Changing Geometry of European Regulation' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

McGregor, Lorna, Murray, Daragh, and, Ng, Vivian, 'International Human Rights Law as a Framework for Algorithmic Accountability' (2019) 68(2) International and Comparative Law Quarterly <https://doi.org/10.1017/s0020589319000046> accessed 20 April 2022

Mendis, Sunimal, 'Democratic Discourse in the Digital Public Sphere: Re-Imagining Copyright Enforcement on Online Social Media Platforms' in Hannes Werthner and others (eds) *Perspectives on Digital Humanism* (1st edn Springer 2022)

Montagnani, Maria Lillà, 'Virtues and Perils of Algorithmic Enforcement and Content Regulation in the EU – a Toolkit for a Balanced Algorithmic Copyright Enforcement' (2020) 11(1) Case Western Reserve Journal of Law, Technology & the Internet <http://ssrn.com/abstract=3767008> accessed 20 April 2022

Morison, John, 'Towards a Democratic Singularity ? Algorithmic Governmentality, the Eradication of Politics – and the Possibility of Resistance' in Simon Deakin and Christopher Markou (eds), *Is Law Computable?: Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing 2020)

Mostert, Frederick, 'Study on IP Enforcement Measures, Especially Anti-Piracy Measures in the Digital Environment' (2019) World Intellectual Property Organization (WIPO) Advisory Committee on Enforcement <www.wipo.int/meetings/en/doc_details.jsp?doc_id=452655> accessed 20 April 2022

Norvig, Peter, and Stuart Russell, *Artificial Intelligence: A Modern Approach* (Global edn 4th edn Pearson 2021)

Pasquale, Frank, 'Beyond Innovation and Competition: The Need for Qualified Transparency in Internet Intermediaries' (2010) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.1686043> accessed 20 April 2022

Pasquale, Frank, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Harvard University Press 2016)

Perel, Maayan, and Elkin-Koren, Niva, 'Accountability in Algorithmic Enforcement' (2015) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2607910> accessed 20 April 2022

Perel, Maayan, and Elkin-Koren, Niva, 'BLACK BOX TINKERING: Beyond Transparency in Algorithmic Enforcement' (2016) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2741513> accessed 20 April 2022

Pila, Justine, and Torremans, Paul, *European Intellectual Property Law* (2nd edn Oxford University Press 2019)

Riis, Thomas, and Schwemer, Sebastian Felix, 'Leaving the European Safe Harbor, Sailing Towards Algorithmic Content Regulation' (2018) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3300159> accessed 20 April 2022

Sartor, Giovanni, and Loreggia, Andrea, 'The Impact of Algorithms for Online Content Filtering or Moderation' (2020) Policy Department for Citizens' Rights and Constitutional Affairs Directorate-General for Internal Policies <www.europarl.europa.eu/supporting-analyses> accessed 20 April 2022

Senftleben, Martin, 'Bermuda Triangle – Licensing, Filtering and Privileging User-Generated Content Under the New Directive on Copyright in the Digital Single Market' (2019) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3367219> accessed 20 April 2022

Senftleben, Martin, 'Institutionalized Algorithmic Enforcement – The Pros and Cons of the EU Approach to UGC Platform Liability' (2020) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3565175> accessed 20 April 2022

Senftleben, Martin, and others, 'The Recommendation on Measures to Safeguard Fundamental Rights and the Open Internet in the Framework of the EU Copyright Reform' (2017) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3054967> accessed 20 April 2022

Solomon, Leron, 'Fair Users or Content Abusers? The Automatic Flagging of Non-Infringing Videos by Content ID on YouTube' (215) 44(1) Hofstra Law Review <http://scholarlycommons.law.hofstra.edu/hlr/vol44/iss1/8> accessed 20 April 2022

Spindler, Gerald, 'Copyright Law and Internet Intermediaries Liability' in Tatiana-Eleni Synodinou and others (eds) *EU Internet Law in the Digital Era: Regulation and Enforcement* (1st edn Springer 2020)

Srnicek, Nick, *Platform Capitalism* (Theory Redux) (1st edn Polity 2016)

Stalla-Bourdillon, Sophie, and others, 'Open Letter to the European Commission - on the Importance of Preserving the Consistency and Integrity of the EU Acquis Relating to Content Monitoring Within the Information Society' (2016) SSRN Electronic Journal <http://ssrn.com/abstract=2850483> accessed 20 April 2022

Stamatoudi, Irini and Torremans, Paul, 'The Digital Single Market Directive' in Irini Stamatoudi and Paul Torremans (eds) *EU Copyright Law: A Commentary* (Edward Elgar Publishing 2021)

Stedman, Michael, 'Mind the Value Gap: Article 17 of the Directive on Copyright in the Digital Single Market' (2019) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3810144> accessed 20 April 2022

Thompson, Marcelo, 'Beyond Gatekeeping: The Normative Responsibility of Internet Intermediaries' (2016) 18(4) Vanderbilt Journal of Entertainment & Technology Law <http://ssrn.com/abstract=2683301> accessed 20 April 2022

Tóth, Andrea Katalin, 'Algorithmic Copyright Enforcement and AI: Issues and Potential Solutions through the Lens of Text and Data Mining' (2019) 13(2) Masaryk University Journal of Law and Technology <https://doi.org/10.5817/mujlt2019-2-9> accessed 20 April 2022

Urban, Jennifer M. and others, 'Notice and Takedown in Everyday Practice' (2016) UC Berkeley Public Law Research Paper No. 2755628 <https://doi.org/10.2139/ssrn.2755628> accessed 20 April 2022

Urban, Jennifer M. and others, 'Notice and Takedown: Online Service Provider and Rightsholder Accounts of Everyday Practice' (2017) 64(371) Journal of the Copyright Society <http://ssrn.com/abstract=3126401> accessed 20 April 2022

Veale, Michael, Van Kleek, Max, Binns, Reuben 'Fairness and Accountability Design Needs for Algorithmic Support in High-Stakes Public Sector Decision-Making' (2018) Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems <https://doi.org/10.1145/3173574.3174014> accessed 20 April 2022

Visser, Dirk J. G, 'Trying to Understand Article 13' (2019) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3354494> accessed 20 April 2022

Vrins, Olivier, 'The EU Policies and Actions in the Fight Against Piracy' in Irini Stamatoudi and Paul Torremans (eds) *EU Copyright Law: A Commentary* (Edward Elgar Publishing 2021)

Wagner, Ben, 'Algorithmic Accountability: Towards Accountable Systems' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020)

Yu, Peter K, 'The Graduated Response' (2010) 62 Florida Law Review <http://ssrn.com/abstract=1579782> accessed 20 April 2022

Yu, Peter K, 'Can Algorithms Promote Fair Use?' (2020) 14(2) FIU Law Review <https://doi.org/10.25148/lawrev.14.2.12> accessed 20 April 2022

PRIMARY SOURCES

EU Legislation and Documents

Commission Recommendation (EU) 2018/334 of 1 March 2018 on measures to effectively tackle illegal content online [2018] OJ L63/50

Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions' COM(2015) 192 final, May 2015

Commission, 'Guidance on Article 17 of Directive 2019/790 on Copyright in the Digital Single Market' Communication From The Commission To The European Parliament And The Council' COM(2021) 288 Final, June 2021

Commission, 'Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market' COM(2016) 593 final, September 2016

Commission, 'Proposal for a Regulation of the European Parliament and of the Council on a Single Market For Digital Services (Digital Services Act) and amending Directive 2000/31/EC' COM(2020) 825 final, December 2020

Commission, 'Questions & Answers: EU negotiators reach a breakthrough to modernise copyright rules' European Commission - Fact Sheet, February 2019

Corrigendum to Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights [2004] OJ L195/16

Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC [2019] OJ L130/92

Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market [2000] OJ L178/0001

Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society [2001] OJ L167/0010

Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations [1998] OJ L217/0018

US Legislation

Digital Millennium Copyright Act — 17 U.S. Code § 512 — Limitations on liability relating to material online

ONLINE REFERENCES

'Protect Artists. End Safe Harbor Protection For Internet Piracy', <www.perma.cc/NQ3F-9CJG> accessed 10 May 2022

'Transparency Report 2020' (Reddit, 2020) <www.redditinc.com/policies/transparency-report-2020> accessed 10 May 2022

'Video Search' (Videntifier Technologies) <www.videntifier.com> accessed 10 May 2022

Audible Magic, 'Audible Magic - Automatic Content Recognition, Content Identification (ID) and Rights Administration' (Audible Magic, 13 January 2022) <www.audiblemagic.com> accessed 10 May 2022

Bailey, Jonathan, 'Copyright in the Age of Bots' (Plagiarism Today, 23 September 2021) <www.plagiarismtoday.com/2021/09/23/copyright-in-the-age-of-bots> accessed 10 May 2022

BasicAI, 'Basic.Ai', <www.basic.ai> accessed 10 May 2022

Brownlee, Jason, 'Difference Between Classification and Regression in Machine Learning' (Machine Learning Mastery, 22 May 2019) <www.machinelearningmastery.com/classification-versus-regression-in-machine-learning> accessed 10 May 2022

Brownlee, Jason, 'Supervised and Unsupervised Machine Learning Algorithms' (Machine Learning Mastery, 20 August 2020) <www.machinelearningmastery.com/supervised-and-unsupervised-machine-learning-algorithms> accessed 10 May 2022

Cabinet Office Government of Japan, 'Society 5.0.' (Cabinet Office, Government of Japan) <www8.cao.go.jp/cstp/english/society5_0/index.html> accessed 10 May 2022

Cisco, 'Cisco Annual Internet Report (2018–2023) White Paper' (Cisco, 23 January 2022) <www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html> accessed 10 May 2022

Delaney, Kevin, 'YouTube to Test Software to Ease Licensing Fights' (WSJ, 13 June 2007) <www.wsj.com/articles/SB118161295626932114> accessed 10 May 2022

D'Onfro, Jillian, 'More Than 70% of Internet Traffic During Peak Hours Now Comes From Video and Music Streaming' (Business Insider, 8 Dec. 2015) <www.businessinsider.com/sandvine-bandwidth-data-shows-70-of-internet-traffic-is-video-and-music-streaming-2015-12?r=US&IR=T> accessed 10 May 2022

EDRi, 'European Digital Rights (EDRi)' (EDRi) <www.edri.org> accessed 10 May 2022

EFF, 'Takedown Hall of Shame' (Electronic Frontier Foundation, 9 April 2019) <www.eff.org/takedowns> accessed 10 May 2022

EFF, 'The Electronic Frontier Foundation' (eff.org) <www.eff.org> accessed 10 May 2022

European Commission, 'Questions and Answers: Digital Services Act' (European Commission, 20 May 2022) <www.ec.europa.eu/commission/presscorner/detail/en/QANDA_20_2348> accessed 10 May 2022

European Commission, 'Stakeholder Dialogue on Copyright' (European Commission) <https://digital-strategy.ec.europa.eu/en/policies/stakeholder-dialogue-copyright > accessed 10 May 2022

Facebook, 'Community Standards Report' (Facebook, 13 November 2019) <www.ai.facebook.com/blog/community-standards-report> accessed 10 May 2022

Facebook, 'Copyright Management | Facebook' (Facebook) <www.rightsmanager.fb.com> accessed 10 May 2022

Facebook, 'How Do I Report Copyright Infringement on Facebook?' (Facebook) <www.facebook.com/help/325058084212425> accessed 10 May 2022

Facebook, 'How Facebook Uses Super-Efficient AI Models to Detect Hate Speech' (Facebook, 19 November 2020) <www.ai.facebook.com/blog/how-facebook-uses-super-efficient-ai-models-to-detect-hate-speech> accessed 10 May 2022

Facebook, 'What tools does Facebook provide to help me protect my intellectual property in my videos?' (Facebook) <www.facebook.com/help/348831205149904> accessed 10 May 2022

Facebook, 'Writing Great Group Rules' (Facebook) <www.facebook.com/community/establishing-membership-and-rules/how-to-write-great-group-rules> accessed 10 May 2022

Felten, Ed, 'The New Freedom to Tinker Movement' (Freedom-to-Tinker, 21 March 2013) <www.freedom-to-tinker.com/2013/03/21/the-new-freedom-to-tinker-movement> accessed 10 May 2022

Geigner, Timothy, 'YouTube's Content ID System Flags, Demonetizes Video of Cat Purring' (Techdirt, 26 February 2022) <www.techdirt.com/2022/02/14/youtubes-

content-id-system-flags-demonetizes-video-cat-purring> accessed 10 May 2022

Google, 'Community Guidelines Strike Basics - YouTube Help' (Google) <www.support.google.com/youtube/answer/2802032> accessed 10 May 2022

Google, 'Content Verification Program - YouTube Help' (Google) <www.support.google.com/youtube/answer/6005923> accessed 10 May 2022

Google, 'Copyright Transparency Report' (Google, 2021) <www.storage.googleapis.com/transparencyreport/report-downloads/pdf-report-22_2021-1-1_2021-6-30_en_v1.pdf> accessed 10 May 2022

Google, 'Dispute a Content ID Claim - YouTube Help' (Google) <www.support.google.com/youtube/answer/2797454> accessed 10 May 2022

Google, 'Frequently Asked Questions About Fair Use - YouTube Help' (Google) <www.support.google.com/youtube/answer/6396261> accessed 10 May 2022

Google, 'How Content ID Works - YouTube Help' (Google) <www.support.google.com/youtube/answer/2797370> accessed 10 May 2022

Google, 'Overview of Copyright Management Tools - YouTube Help' (Google) <www.support.google.com/youtube/answer/9245819> accessed 10 May 2022

Google, 'Qualify for Content ID - YouTube Help' (Google) <www.support.google.com/youtube/answer/1311402> accessed 10 May 2022

Google, 'Submit a Copyright Takedown Request - YouTube Help' (Google) <www.support.google.com/youtube/answer/2807622> accessed 10 May 2022

Google, 'The Difference Between Copyright Takedowns and Content ID Claims - YouTube Help' (Google) <www.support.google.com/youtube/answer/7002106> accessed 10 May 2022

Google, 'Use the Content Verification Tool - YouTube Help' (Google) <www.support.google.com/youtube/answer/3010500> accessed 10 May 2022

Google, 'Use the Copyright Match Tool - YouTube Help' (Google) <www.support.google.com/youtube/answer/7648743> accessed 10 May 2022

Google, 'What Is a Content ID Claim? - YouTube Help' (Google) <www.support.google.com/youtube/answer/6013276> accessed 10 May 2022

Gross, Grant, 'What's the Problem with DMCA Takedown Notices?' (PC World New Zealand, 22 May 2022) <www.pcworld.co.nz/article/541043/what_problem_dmca_takedown_notices> accessed 10 May 2022

Harmon, Elliot, ''Notice-and-Stay-Down' Is Really 'Filter-Everything'' (Electronic Frontier Foundation, 22 January 2016) <www.eff.org/deeplinks/2016/01/notice-and-stay-down-really-filter-everything> accessed 10 May 2022

Hartline, Devlin, 'Endless Whack-A-Mole: Why Notice-and-Staydown Just Makes Sense' (Antonin Scalia Law School, 14 January 2016) <http://cip2.gmu.edu/2016/01/14/endless-whack-a-mole-why-notice-and-staydown-just-makes-sense> accessed 10 May 2022

Jdhao, 'How Does The YouTube Content ID System Work?' (Jdhao's Digital Space, 28 November 2021) <www.jdhao.github.io/2021/08/02/the_youtube_content_id_system> accessed 10 May 2022

Killeen, Molly, ,Copyright Directive Transposition Still Lagging Despite Infringement Procedures' (Euractiv, 14 April 2022) <www.euractiv.com/section/digital/news/copyright-directive-transposition-still-lagging-despite-infringement-procedures> accessed 10 May 2022

Manara, Cedric, 'Protecting What We Love About the Internet: Our Efforts to Stop Online Piracy' (Google, 7 November 2018) <www.blog.google/outreach-initiatives/public-policy/protecting-what-we-love-about-internet-our-efforts-stop-online-piracy> accessed 10 May 2022

Marsden, Chris 'How "Liberty" Disappeared from Cyberspace: The Mystery Shopper Tests Internet Content Self-Regulation' (Academia.Edu, 7 June 2014) <www.academia.edu/686683/How_Liberty_Disappeared_from_Cyberspace_The_Mystery_Shopper_Tests_Internet_Content_Self_Regulation> accessed 10 May 2022

Matas, Ariadna, 'Copyright Directive Series: Progress in the Directive Transposition' (Europeana Pro, 21 April 2022) <www.pro.europeana.eu/post/copyright-directive-series-progress-in-the-directive-transposition> accessed 10 May 2022

Moon, Meriella, 'YouTube Paid $3 Billion to Copyright Owners Through Content ID' (Engadget, 7 November 2018) <www.engadget.com/2018-11-07-google-anti-piracy-report.html> accessed 10 May 2022

Noyb, 'NOYB Enforces Your Right to Privacy Everyday' <www.noyb.eu/en> accessed 10 May 2022

NPR, 'Understanding Unconscious Bias' (National Public Radio, 15 July 2020) <www.text.npr.org/891140598> accessed 10 May 2022

Pancini, Marco, 'YouTube's Approach to Copyright' (Google, 31 Aug. 2021) <www.blog.google/around-the-globe/google-europe/youtubes-approach-to-copyright> accessed 10 May 2022

Patrick, Kate, 'EU's New Copyright Directive Could Force Google, Facebook to Pay for Their Content' (InsideSources, 14 Sept. 2018) <www.insidesources.com/eus-new-copyright-directive-could-force-google-facebook-to-pay-for-their-content> accessed 10 May 2022

Sar, Ernesto van der, 'YouTube Flags Cat Purring as Copyright Infringing Music' (Torrentfreak.com, 2 July 2020) <www.torrentfreak.com/youtube-flags-cat-purring-as-copyright-infringing-music-150211> accessed 10 May 2022

Switchboard Live Team, 'Copyright Rules and How to Avoid Getting Flagged' (Medium, 12 Dec. 2021) <www.medium.com/@switchboardlive/copyright-rules-how-to-avoid-getting-flagged-f0376b15e1ca> accessed 10 May 2022

Telarico, Fabio, 'The Day France Fustigated Big Tech: How Google Ended up in the Crosshair and What Will Follow' (Modern Diplomacy, 21 October 2021) <www.moderndiplomacy.eu/2021/07/29/the-day-france-fustigated-big-tech-how-google-ended-up-in-the-crosshair-and-what-will-follow> accessed 10 May 2022

Trendacosta, Katherine, 'Unfiltered: How YouTube's Content ID Discourages Fair Use and Dictates What We See Online' (Electronic Frontier Foundation, 11

December 2020) <www.eff.org/wp/unfiltered-how-youtubes-content-id-discourages-fair-use-and-dictates-what-we-see-online> accessed 10 May 2022

Tune, Cydney, and others, 'The Rise of the Copyright Bots' (Internet & Social Media Law Blog, 22 April 2021) <www.internetandtechnologylaw.com/copyright-bots> accessed 10 May 2022

Twitch, 'Copyrights and Your Channel' (Twitch.tv) <www.twitch.tv/creatorcamp/en/learn-the-basics/copyrights-and-your-channel> accessed 10 May 2022

Wikipedia, 'Reddit' (Wikipedia, 20 May 2022) <www.en.wikipedia.org/wiki/Reddit> accessed 10 May 2022

World Development Report 2021 team, 'World Development Report 2021: Data for Better Lives | Crossing Borders' (Worldbank) <www.wdr2021.worldbank.org/stories/crossing-borders> accessed 10 May 2022.

YouTube Team, 'Access for All, a Balanced Ecosystem, and Powerful Tools' (Blog.Youtube, 6 Dec. 2021) <www.blog.youtube/news-and-events/access-all-balanced-ecosystem-and-powerful-tools> accessed 10 May 2022

YouTube Team, 'An Update on Our Commitment to Fight Violent Extremist Content Online' (Blog.Youtube, 18 October 2017) <www.blog.youtube/news-and-events/an-update-on-our-commitment-to-fight> accessed 10 May 2022

YouTube, 'What Action Does YouTube Take for Copyright Infringement?' (YouTube) <www.youtube.com/intl/en_us/howyoutubeworks/policies/copyright/#enforcing-copyright> accessed 10 May 2022

Zola, Andrew. 'Hashing' (techtarget, 3 June 2021) <www.techtarget.com/searchdatamanagement/definition/hashing> accessed 10 May 2022

CASES

Court of Justice of European Union (CJEU)

Sabam v Netlog	Case C-360/10, *Belgische Vereniging van Auteurs, Componisten en Uitgevers CVBA (SABAM) v Netlog NV* [2012] ECLI:EU:C:2012:85
Glawischnig-Piesczek v Facebook	Case C-18/18, *Eva Glawischnig-Piesczek v Facebook Ireland Limited* [2019] ECLI:EU:C:2019:821
Google Cases C-236/08 to C-238/08	Cases C-236/08, C-237/08, and C-238/08, *Google France SARL and Google Inc. v Louis Vuitton Malletier SA (C-236/08), Google France SARL v Viaticum SA and Luteciel SARL (C-237/08) and Google France SARL v Centre national de recherche en relations humaines (CNRRH) SARL and Others (C-238/08)* [2010] ECLI:EU:C:2010:159
L'Oréal v eBay	Case C-324/09, *L'Oréal SA and Others v eBay International AG and Others* [2011] ECLI:EU:C:2011:474
Poland v Parliament and Council	Case C-401/19, *Republic of Poland v European Parliament and Council of the European Union* [2022] ECLI:EU:C:2022:297
Scarlet Extended v Sabam	Case C-70/10, *Scarlet Extended SA v Société belge des auteurs, compositeurs et éditeurs SCRL (SABAM)* [2011] ECLI:EU:C:2011:771

The US

Viacom v YouTube	Viacom Int'l Inc. v. YouTube, Inc., 718 F. Supp. 2d 514, 525 (S.D.N.Y. 2010), aff'd 676 F.3d 19, 31, 35 (2d Cir. 2012)

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
ANN	Artificial Neural Network
Art(s).	Article
CJEU	Court of Justice of European Union
CNN	Convolutional Neural Network
DSA	Digital Services Act
DSM	Digital Single Market
e.g.	Exempli gratia (for example)
ECHR	European Convention on Human Rights
EFF	Electronic Frontier Foundation
EU	European Union
EUCF	Charter of Fundamental Rights of the European Union
GB	Gigabyte
i.e.	Id est (it is)
ISP	Internet Service Provider
ITO	Input-Throughput-Output
ML	Machine Learning
N&A	Notice and Action
N&N	Notice and Notice
N&SD	Notice and Stay Down

N&TD	Notice and Takedown
NGO(s)	Non-governmental Organisation(s)
NLP	Natural Language Processing
OCCSP(s)	Online Content-Sharing Service Provider(s)
UI	User Interface
US	United States of America

1   INTRODUCTION

1.1   BACKGROUND

We are heading towards what is known as Society 5.0, 'A human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space'.[1] With this degree of technological integration into our lives, it is not much of a surprise that Giancarlo Frosio recognises that 'our "[platform] society" has transformed into an "intermediated society".'[2] A society where platforms have control over what is published, when, and to whom. Not only do platforms provide and facilitate services, but they also have a central role in disseminating information. They can present us with a novel and expanded public sphere where political and democratic discourse takes place,[3] meaning that the effects of these intermediary platforms are not limited to a specific part, rather, they have changed all aspects of life substantially.[4]

Now at the core of this ecosystem is the algorithm. Balkin speaks of 'a society organized around social and economic decision making by algorithms, robots, and AI agents; who not only make the decisions but also, in some cases, carry them out'.[5] Already on platforms, the algorithm prioritises, incentivises, monitors, filters, shapes discourse, and influences humans' decision-making process. However, integrating the algorithm was not much of a choice. During last decade only, the number of internet users and generally internet traffic have risen exponentially.[6] We no longer live in the age of Internet 1.0, where the network was limited to visiting some brochure-like webpages. Now, in a single second, about 150,000 GB of data is

---

[1]   Cabinet Office, Government of Japan, 'Society 5.0.' (Cabinet Office, Government of Japan) <www8.cao.go.jp/cstp/english/society5_0/index.html> accessed 10 May 2022: 'Society 5.0 was proposed in the 5th Science and Technology Basic Plan as a future society that Japan should aspire to. It follows the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0), and information society (Society 4.0)'.

[2] Frosio, Giancarlo, 'Editor's Note: A Dialogue on the Role of Online Intermediaries' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), p. x.

[3] To read generally about how internet has changed the political forums and discourse see e.g: Benkler, Yochai, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (Yale University Press 2006).

[4] See e.g. Srnicek, Nick, *Platform Capitalism (Theory Redux)* (1st edn Polity 2016): The author explains how in the new platform capitalism, platforms have impacted life from changing modes of employment and creating new monopolies to their unquenchable thirst for data and taking away privacy.

[5] Balkin, Jack M, 'The Three Laws of Robotics in the Age of Big Data' (2017) 78 Ohio State Law Journal <ssrn.com/abstract=2890965> accessed 20 April 2022, p. 5.

[6] Cisco Annual Internet Report (n 108).

shared[7], with over 70% of it 'during peak hours now [coming] from video and music streaming'.[8] Moreover, we are in a society where it takes digital pirates a click of a mouse to share thousands of pirated materials that can be downloaded millions of times by users quickly. Perhaps more interesting is that piracy is no longer necessarily a shady practice where some users in the back alley of the internet exchange stolen goods. Rather, it is now simply putting a piece of unauthorised content on a platform as famous as YouTube and gaining revenues from it until the content is taken down —which sometimes might never actually happen. Therefore, the modern era has brought about severe challenges for the enforcement of copyright and the help of algorithms was deemed the only option to keep copyright alive.

Furthermore, over time with the emergence of online sharing platforms, it was noticed that conglomerates such as Google and Facebook would gain enormous revenues without creative content of their own. They relied on user-generated content and would monetise that content with their pervasive advertisements. While still, huge players would benefit from some of those revenues, smaller ones were practically given nothing or a small unfair amount, a situation known as the 'value gap'.[9] This situation was also partly due to the safety and immunity that the legal system provided these platforms. For more than 20 years, the legal system has been holding such platforms free of liability in a 'safe harbour'. This was while, unlike, e.g. hosting services, online sharing platforms such as YouTube and Facebook have been doing more than just passively storing information; they were designed to be a place for sharing content and had almost complete control on the sharing process, especially by means of a new algorithmic enforcement system they voluntarily created. With all of this, in 2019, the EU legislature took the initiative to increase the degree of liability of sharing platforms. This was achieved by adopting Directive on Copyright in the Digital Single Market[10] (DSM Directive), in particular

[7] World Development Report 2021 team, 'World Development Report 2021: Data for Better Lives | Crossing Borders' (Worldbank) <www.wdr2021.worldbank.org/stories/crossing-borders> accessed 10 May 2022: 'By 2022, traffic is expected to reach 150,000 GB of traffic per second, a 1,000-fold increase compared to the 156 GB in 2002, 20 years earlier. Ten years before that, in 1992, global internet traffic was 100 GB per day, which roughly equates to just 10 households binge watching a Netflix series for 10 hours'.

[8] D'Onfro, Jillian, 'More Than 70% of Internet Traffic During Peak Hours Now Comes From Video and Music Streaming' (Business Insider, 8 Dec. 2015) <www.businessinsider.com/sandvine-bandwidth-data-shows-70-of-internet-traffic-is-video-and-music-streaming-2015-12?r=US&IR=T> accessed 10 May 2022.

[9] To read more about 'value gap' see e.g. Patrick, Kate, 'EU's New Copyright Directive Could Force Google, Facebook to Pay for Their Content' (InsideSources, 14 Sept. 2018) <www.insidesources.com/eus-new-copyright-directive-could-force-google-facebook-to-pay-for-their-content> accessed 10 May 2022; Stedman, Michael, 'Mind the Value Gap: Article 17 of the Directive on Copyright in the Digital Single Market' (2019) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3810144> accessed 20 April 2022.

[10] Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on opyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC [2019] OJ L130/92.

its Art. 17. This was a radical shift in a well-established system for over 20 years that in the eyes of some, was failing and in the eyes of others, was doing what it was intended to do. Still, most important for our purpose is that this new liability regime can have a substantial impact on the way and the extent algorithms are used to enforce copyright online.

Art. 17 of the Directive has been quite stirring. Traditionally, the liability of online services has been limited; in the sense that as long as there was no awareness, platforms bore no responsibility in ensuring that the uploads on their platforms are authorised. In other words, protection of copyright was reactive and ex post. However, Art. 17 has substantially altered the previous liability regime and the obligations of sharing platforms. Now, DSM Directive ideally wants that copyright infringement to be tackled at its roots before the content goes online, which can be called a proactive or ex ante method of enforcement. This is a requirement very likely to necessitate widespread use of the algorithm to monitor and take down. However, using the algorithm to enforce copyright raises many concerns, especially relating to users' fundamental rights, such as creating a chilling effect when lawful content is erroneously removed. This is why any effective legislative intervention should take place in a manner that counters unlawful content and simultaneously provides safeguards to protect fundamental rights.[11]

1.2 SCOPE, RESEARCH QUESTIONS, AND EXPECTED OUTCOMES

Against this background, this thesis embarks on a journey to study the world of algorithms designed to protect copyright on online sharing platforms. The study is carried out with a specific focus on the EU law and is primarily inspired by the most fundamental and recent change in the EU's copyright legal framework, namely DSM Directive and in particular, its Art. 17.

This work will assess if Art. 17 tolerates or even perhaps requires algorithmic enforcement of copyright by online sharing platforms. What is certain is that Art. 17 heavily impacts the way copyright is enforced on such platforms, and it needs further consideration as to how that affects the already in-use algorithmic technologies which platforms have voluntarily deployed. Certainly, there are some precautions and duties that sharing platforms must comply with. In line with this, the origin of algorithmic copyright protection will be examined, followed by the

---

[11] Mendis, Sunimal, 'Democratic Discourse in the Digital Public Sphere: Re-Imagining Copyright Enforcement on Online Social Media Platforms' in Hannes Werthner and others (eds) *Perspectives on Digital Humanism* (1st edn Springer 2022), p. 42.

legal developments that have brought us to this present point. Algorithmic copyright enforcement is strongly linked to the liability that platforms face when carrying out their obligations online; thus, the thesis will also focus on the platform's liability regime. Also, while DSM Directive is central to this work, in the argumentative steps, the Directive is a part of the bigger picture, a new paradigm of copyright enforcement. Thus, this thesis recognises the forces that compelled the technological vanguards to take the initiative and implant automated protective agents at the very structure of cyberspace.

The thesis also concerns itself with the question of the suitable regulatory approach for addressing the concerns that algorithms entail when used for moderating unauthorised content. This is inspired by the presumption that regulating algorithms and bringing the law to the lines of computer code is crucial. As far as the law is concerned, the changes in the digital age have been so radical that many scholars have called for an equally fundamental change in the law. Lessig opines that it no longer suffices us to write legal codes while ignoring the technological lines of codes. He explains that for the legislature, it is imperative to recognise and regulate the very basic structure of cyberspace.[12] Therefore, a technology-focused approach in this work will lead us to delve deeper into the specific technological aspects of algorithmic enforcement of copyright. This would also enable us to look at the technological issues from the prism of law and present a more profound and comprehensive analysis.

Still, what is certain is that the voluntary regime of copyright enforcement is now largely regulated by Art. 17 of DSM Directive. Thus, the thesis evaluates the practical impacts of the Directive in light of its overall objectives including an all-works-licensed ideal and fair distribution of revenues. Given all of this, the main questions this thesis will attempt to answer are as follows:

1   What is the current legal framework relating to the algorithmic enforcement of copyright online? How was the existing framework developed?

2   How does this algorithmic mechanism function? How did the algorithmic method emerge from manual methods of enforcement?

3   What concerns and challenges are associated with sharing platforms utilising algorithms in enforcing copyright? Was the EU legislature able to address such concerns?

---

[12] Lessig, Lawrence, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113(2) Harvard Law Review <https://doi.org/10.2307/1342331> accessed 20 April 2022.

4   Overall, has DSM Directive been able to achieve its goals and objectives? Where did the Directive fail, and where did it succeed?

5   As of now, are most popular platforms —particularly YouTube— complying with the requirements of DSM Directive? If not, do they have a plan in place for compliance in the future?

6   Finally, how can the current system be improved?

In light of these questions, this thesis is structured in 5 Sections. Following the intro, Section 2 lays the foundation by identifying the boundaries of the current legal framework. It starts with describing the legal background of copyright enforcement online. Next, the Section will study the underlying rationale behind that regime and the causes of a fundamental change in platforms' liability regime and approach towards algorithmic enforcement. For a more thorough legal analysis further on, Section 3 studies the mechanism used to enforce copyright on sharing platforms, including the algorithm and the specific technologies used.

In Section 4, the discussion is taken to the challenges and concerns associated with both online sharing platforms and their use of algorithmic enforcement. This Section also hinges on the issue of choosing a regulatory approach and in particular, how the algorithm has to be regulated. The challenges and the regulatory analysis lead the discussion to assess how DSM Directive and its Art. 17 have been able to ameliorate the situation or otherwise perhaps even exacerbate it —as claimed by some critics. Finally, Section 5 deals with assessing the overall objectives of DSM Directive, the means to actualise them, and the EU legislature's chosen approach. This is followed by appraising the compliance of online sharing platforms with the Directive. The technological analysis in Section 3 would prove very useful here, as the compliance assessment is taken to a technological level. This work concludes by reaching the final part on suggestions for improving the current legal framework. Multiple suggestions are presented, varying from legal to technological ones.

By conducting the present research, it is expected that the reader gains a better factual understanding of algorithmic protection. This will inter alia include understanding the techniques and methods as well as getting familiarised with the legal environment that surrounds such means of protection. This would result in discerning the underlying doctrines and principles in the legal framework and the regulatory approach taken to deal with this relatively novel and challenging subject. The more significant expectation out of the research

at hand is that we would be able to —as a result of deep scrutiny— propose some suggestions to enhance the technical as well as legal protection of copyright in cyberspace.

1.3 METHODOLOGY

This is a doctrinal and critical study. It primarily deals with the question of how copyright is protected online via algorithmic tools, given the novel challenges to protection in cyberspace. Doctrinal research, also known as legal dogmatic, aims at pinpointing the underlying legal principles based on which the legal and legislative measures are taken.[13] To this end, as a start, the legal framework relating to a subject of the law needs to be outlined; one must consider what the legal provisions are and next determine the rationale behind them. Thus, in the present work, it is suitable to evaluate the current legal framework relating to copyright and algorithmic protection online, namely identifying the legal provisions and the issues discerned and how they were attempted to be tackled.

At the same time, studying the legal environment surrounding a legal phenomenon requires a relatively profound study and consideration of relevant legal instruments. This is why this study closely analyses DSM Directive —and other legal instruments as necessary— in a stand-alone manner or comparatively to provide doctrinal examples and knowledge. Relating to the comparative approach, the example of the US and the opinion of American scholars are repeatedly used in the present work. The reason is that first, most well-known online sharing platforms such as YouTube and Facebook are US-based. Second, the US has not yet changed its copyright law system despite substantial changes in cyberspace, which has inter alia seen the emergence of online sharing platforms. Thus, many American scholars are critical of the challenges that this unregulated, underregulated or misregulated environment has created. Their opinions are helpful to assess whether, conversely, the EU legislature has successfully addressed such concerns.

Where one speaks of the legal framework, it also implies the issue of boundaries of the law. That is to say, although in a functional society, the spirit of the law as a whole is present and the rule of law exists, the law does not regulate all matters. Some issues would fall within the area of custom; some other rules are ethical, and so forth. As far as it concerns the algorithmic protection of copyright, given the industry of online platforms, the matter of self-regulation and

---

[13] Chynoweth, Paul, 'Legal Research' in Andrew Knight and Les Ruddock (eds) Advanced Research Methods in the Built Environment (Wiley-Blackwell 2008) p. 29.

thus the question of the boundaries of law gain importance. There would be a question of how the industry has decided to get into the role of a private legislature to protect the content from infringing copyright or being infringed. Thus, this paper has to consider these modalities of regulation and the rationale and incentive behind those need to be evaluated. However, self-regulation should not connote the lack of legislature presence. That is, there would be a question of negative and positive regulatory measures; there are instances that a private rule would be against the fundamental legal provision, e.g. human rights. In these cases, the public regulator would intervene to limit the scope of private regulation. There are other instances where the public regulator expands the scope of the private system. The example for both is from the European legislature, which through DSM Directive might have imposed a form of privatised automated algorithmic content filtering to protect copyright while protecting fundamental rights with its public authority. Hence, studying the interaction between these two systems seems crucial in the present research.

Further, on challenges and concerns, human rights are perhaps one of the deepest concerns of both the public and the legislature. Given the power that algorithm provides its controllers, it can be misused to violate users' fundamental rights, including that of freedom of speech. At the same time, the fundamental rights to conduct business for platforms and for rightholders to have their right of ownership recognised and respected are present. This is why this dogmatic and critical study employs a human rights approach throughout the study, especially in Section 4.

All of this seeks to present a clearer picture to the reader when it comes to a more critical analysis that is to follow. Through a theoretical approach, this work analyses Art. 17 of DSM Directive to critically assess if the Directive has been able to achieve its legislative goals. The methodology employed serves a bigger purpose of detecting any deficiencies and envisaging a better status of legal protection. Given this ideal, this study seeks to outline how the algorithmic technologies that protect our rights, specifically copyrights, can be improved. However, of course, there are limits to understanding the infrastructure of such technologies and our technological study would be limited to the necessity. The minimum that is required so as to evaluate whether the law is going side-by-side the technological realities, and if not, how it can improve its status for that matter. This would entail practical suggestions and solutions that could be implemented in the arena of technology and law.

2   BACKGROUND AND EXISTING LEGAL FRAMEWORK

The main purpose of this Section is to primarily, through a dogmatic approach, identify the boundaries of the current legal framework for more critical analyses in the future sections. To this end, first, the background to algorithmic protection of copyright will be studied, followed by the legal developments that have led to the present stage. It needs to be noted that algorithmic enforcement of copyright deals closely with the liability that content moderators face in performing their obligations online; hence, below, we will closely analyse content-sharing platforms liability regime. Furthermore, especially given that most well-known sharing platforms are US-based, the final part of this Section will engage in a comparative study to help a more comprehensive and critical analysis further on in this thesis.

2.1   THE TRADITION, SAFE HARBOUR REGIME AND REACTIVE ENFORCEMENT OF COPYRIGHT

Traditionally in the EU, rules relating to intermediary liability have had their roots in E-Commerce Directive[14]. The Directive generally concerns all 'information society services', which are defined as: 'any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services'[15]

For the purpose of copyright enforcement, in the Directive, the relevant information society services are internet hosts covered by Art. 14 of the Directive. Hosts are online intermediaries whose service 'consists of the storage of information provided by a recipient of the service'[16]. The definition of hosts, in terms of Art. 14, is not limited only to services that are solely dedicated to online storage. But also, those online services that, as the result of their main purpose —e.g. search engines or online markets— store users' files and information and maintain a passive and technical role are included in the scope of Art. 14.[17] Therefore, prior to

---

[14] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market [2000] OJ L178/0001.

[15] Art. 2(a) E-Commerce Directive, referring to: Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations [1998] OJ L217/0018.

[16] Art. 14 E-Commerce Directive.

[17] Cases C-236/08, C-237/08, and C-238/08, Google France SARL and Google Inc. v Louis Vuitton Malletier SA (C-236/08), Google France SARL v Viaticum SA and Luteciel SARL (C-237/08) and Google France SARL v Centre national de recherche en relations humaines (CNRRH) SARL and Others (C-238/08) [2010] ECLI:EU:C:2010:159; Case C-324/09, L'Oréal SA and Others v eBay International AG and Others [2011] ECLI:EU:C:2011:474.

DSM Directive, the liability of platforms such as YouTube would be determined by Art. 14 of E-Commerce Directive. Below the rights and obligations of hosting services will be analysed.

Under Art. 14, a hosting service is not liable for the unlawful content uploaded by its users. This is the general rule as the service provider was not involved in any meaningful way in the illegal act. Therefore, it can be said under E-Commerce Directive hosting services are granted a high degree of immunity, or in other words, they are provided with a 'safe harbour'. However, this safe harbour is lost in certain cases enumerated in Art. 14. A hosting service is liable for illegal materials that users upload on its servers if it has 'actual knowledge of illegal activity or information' or failed to act 'expeditiously to remove or to disable access to the information' in case of 'obtaining such knowledge'.

Therefore, it could be said that a platform is exempt from liability only as long the platform's activity is 'of a mere technical, automatic and passive nature, which implies that the information society service provider has neither knowledge of nor control over the information which is transmitted or stored'.[18] The criteria of knowledge and control are very dynamic by nature and require to be determined on a case-by-case basis. However, it could be said that the phrasing 'actual knowledge' in the article and 'knowledge and control' in the preamble indicates what Riis and Schwemer call 'specific knowledge'[19], in the sense that: 'A sharing platform, such as YouTube, has the general knowledge that a large amount of the content uploaded by its user is illegal, but the platform does not have the specific knowledge of what content this applies to'.[20]

While platforms may gain such 'specific knowledge' through other ways, such as their own voluntary search, in most cases, this knowledge is gained by users' notices. Following these notices, the burden is shifted on the platform with the high risk of liability if the platform does not remove the material which was actually infringing. Therefore, to maintain their 'safe harbour', it would make sense for the platform to take as many claimed materials down as possible, even with a quick and superficial review. In other words, on the one hand, there is a huge liability, and on the other hand, there is no consequence; thus, the platform would take no

---

[18] Recital 42 E-Commerce Directive; The Recital was also emphasised Google Cases C-236/08 to C-238/08 (n 17), para 113: 'In that regard, it follows from recital 42 in the preamble to Directive 2000/31 that the exemptions from liability established in that directive cover only cases in which the activity of the information society service provider is "of a mere technical, automatic and passive nature", which implies that that service provider "has neither knowledge of nor control over the information which is transmitted or stored".'

[19] Riis, Thomas, and Schwemer, Sebastian Felix, 'Leaving the European Safe Harbor, Sailing Towards Algorithmic Content Regulation' (2018) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3300159> accessed 20 April 2022, p. 10.

[20] ibid

chances and almost always choose to be overcautious. This in turn, creates a considerable risk of removing lawful content entailing a 'chilling effect' which will be considered further in Section 4.

Furthermore, one of the essential concerns in moderating online content is the issue of general monitoring. General monitoring by a platform refers to probing all established connections with a platform and analysing every material uploaded to its server in order to detect unlawful content. This would be virtually impractical or otherwise requires heavy investment into the platform's technological capabilities and, at the same time, raises significant concerns relating to user privacy. Therefore, Art. 15 of E-Commerce Directive prohibits Member States from imposing a general monitoring obligation on online service providers —including hosts and sharing platforms— to either 'monitor the information which they transmit or store' or otherwise to 'actively to seek facts or circumstances indicating illegal activity'[21]. However, Recital 47 of the Directive clarifies that Art. 15 does not prevent Member States from requiring 'monitoring obligations in a specific case'.

Art. 15 of the Directive was the centrepiece of two landmark cases brought before CJEU. In two cases, namely Scarlet Extended v Sabam[22] and Sabam v Netlog[23], CJEU ruled over the national courts injunctions requiring the respective online services to install a filtering system that would make it impossible to upload unlicensed copyrighted material from the repertoire of Sabam, a Belgian copyright collective society. The CJEU, in both cases, reasoned that such systems would require the relevant online service provider to monitor all data transmission along with users' information. Hence, the Court prohibited the installation of such monitoring systems.[24]

2.2 INCREASING LIABILITY, TRANSITION TO PROACTIVE ENFORCEMENT

It is essential to know why the EU legislature decided to grant online services such a broad scope of immunity in E-Commerce Directive. In the early days of the internet, lawmakers

---

[21] Art. 15 E-Commerce Directive; For a detailed commentary on the Article and the Directive see Vrins, Olivier, 'The EU Policies and Actions in the Fight Against Piracy' in Irini Stamatoudi and Paul Torremans (eds) EU Copyright Law: A Commentary (Edward Elgar Publishing 2021), p. 868.

[22] Case C-70/10, Scarlet Extended SA v Société belge des auteurs, compositeurs et éditeurs SCRL (SABAM) [2011] ECLI:EU:C:2011:771.

[23] Case C-360/10, Belgische Vereniging van Auteurs, Componisten en Uitgevers CVBA (SABAM) v Netlog NV [2012] ECLI:EU:C:2012:85.

[24] ibid

needed to create a legal framework that would not stand in the way and facilitate the internet's growth.[25] Furthermore, online intermediaries and platforms were also deemed the very pillars of this online structure, and therefore, they needed utmost support from the legislature to run successful businesses and expand their technological infrastructure. Bridy and Keller explain that:

> Without the limitations on liability provided by the [safe harbour], the legal exposure for a service provider relying upon vast numbers of users freely exchanging content with one another would be entirely unmanageable; a business built on such a foundation could not attract financing in any rational marketplace—or provide the new distribution channels that are now a significant revenue source for copyright owners.[26]

Equally important was that in the EU, there were inconsistent liabilities for intermediaries and platforms in the different Member States.[27] Therefore, a legislative measure that would encourage internet expansion and at the same time imbibe the necessary harmonisation effect was needed. This was the reason for a harmonised 'safe harbour' liability regime.

However, after 15 years, it became clear that some of these platforms were doing more than passively storing some material, some of which happened to be copyrighted. Rather, some platforms were, in fact, designed to disseminate copyrighted materials. Copyrighted materials constituted the core of those platforms, and they were doing more than just sharing information. They had direct control over which material, when and how is distributed. Therefore, the element of passivity no longer held true for these platforms, and globally there has been a change in perception of such online platforms from mere technological facilitators to 'untameable monsters'.[28] This is also, to a significant extent, due to automated and algorithmic measures taken by platforms, which have been largely unregulated.[29] This is why it has been

---

[25] Kur, Annette, Dreier, Thomas, and Luginbuehl, Stefan, *European Intellectual Property Law: Text, Cases and Materials* (2nd edn Edward Elgar Publishing 2019), p. 558.

[26] Bridy, Annemarie, and Keller, Daphne, 'U.S. Copyright Office Section 512 Study: Comments in Response to Notice of Inquiry' (2016) SSRN Electronic Journal, <https://doi.org/10.2139/ssrn.2757197> accessed 20 April 2022, p. 9.

[27] Recital 40 E-Commerce Directive explains: 'Both existing and emerging disparities in Member States' legislation and case-law concerning liability of service providers acting as intermediaries prevent the smooth functioning of the internal market…'.

[28] Frosio, Giancarlo, 'The Death of "No Monitoring Obligations": A Story of Untameable Monsters' (2017) 8(3) Journal of Intellectual Property, Information Technology and E-Commerce Law <http://ssrn.com/abstract=2980786> accessed 20 April 2022.

[29] ibid

opined that 'immunity from liability regime demonstrates an obsolete conception of how online intermediaries operate'.[30]

Additionally, not only these new forms of platforms are active players but unfair ones too. Without direct involvement, these platforms have gained huge revenues from unauthorised content put on their platforms by third party users. These platforms, of course, had no liability whatsoever so long as they were not notified about the infringing upload. Many of these infringing uploads were never detected —simply due to the heavy burden on rightholders with the tremendous amount of infringement they face. Or even if the infringing material was eventually detected, until takedown, the platforms still benefited from the revenue generated in the meanwhile. This is a problem known as 'value gap'[31]. As a result of all of these problems, there have been calls both within the EU and the US for a change in the legal framework.[32] While the US Congress is still evaluating the strategy to tackle such issues[33], these calls have been answered by the European legislature.

2.3 LEGISLATIVE REFORM AND DIGITAL SINGLE MARKET STRATEGY

The answer to these copyright issues in the EU was part of a broader plan for change. In 2015, the European Commission (EC) headed by Jean-Claude Juncker heralded such a far-reaching change through 'Digital Single Market Strategy'.[34] The President previously had explained:

> I believe that we must make much better use of the great opportunities offered by digital technologies, which know no borders. To do so, we will need to have the courage to break down national silos … We can create a fair level playing field where all companies offering their goods or services in the European Union are subject to the same data protection and consumer rules, regardless of where their

---

[30] Castets-Renard, Céline, 'Algorithmic Content Moderation on Social Media in EU Law: Illusion of Perfect Enforcement' (2020) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3535107> accessed 20 April 2022, p. 5.

[31] Commission, 'Questions & Answers: EU negotiators reach a breakthrough to modernise copyright rules' European Commission - Fact Sheet, February 2019; See also Ginsburg, Jane C, 'A United States Perspective on Digital Single Market Directive Article 17' in Irini Stamatoudi and Paul Torremans (eds) EU Copyright Law: A Commentary (Edward Elgar Publishing 2021), p. 736: 'The same has been identified in the US with US's framework which the author explains that "DMCA Section 512's effective codification of 'seek forgiveness, not permission' has fostered a vast amount of communication among internet users, but also shifted a vast amount of wealth to large commercial actors, without commensurate benefits to the creators of works'.

[32] Castets-Renard (n 30); Frosio, Giancarlo and Mendis, Sunimal, 'Monitoring and Filtering: European Reform or Global Trend?' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), p. 547; Kur (n 25) p. 330.

[33] Ginsburg (n 31).

[34] Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions' COM(2015) 192 final, May 2015.

server is based … To achieve this, I intend to take … ambitious legislative steps towards a connected digital single market …[35]

Then the statement continues that as one of the practical strategies, the objectives are to be achieved 'by modernising copyright rules in the light of the digital revolution and changed consumer behaviour …'[36]

With all of this, on 14 September 2016, EC provided the Proposal to DSM Directive.[37] After much criticism with multiple back and forth, the final version of DSM Directive was adopted on 17 April 2019.[38] Below we will analyse Art. 17 of the Directive; this article is the primary part of the Directive that deals with the liability regime of online sharing platforms and closely relates to algorithmic enforcement of copyright.

2.4 DIRECTIVE ON COPYRIGHT IN DIGITAL SINGLE MARKET, ART. 17, AND PLATFORMS LIABILITY

So far, we have used the terms 'online platforms', 'content sharing platforms' or similar terms. As the diversity of terms suggests, the definition of such services seems quite problematic yet crucial as it relates to the scope of the present work. DSM Directive in Art. 17 refers to Online Content-Sharing Service Providers (OCSSPs). Below, we will seek to determine this term using the Directive itself.

2.4.1 DEFINITION OF OCSSPS

Art. 2(6) of DSM Directive defines an OCSSP as follows:

> [A] provider of an information society service of which the main or one of the main purposes is to store and give the public access to a large amount of copyright-protected works or other protected subject matter uploaded by its users, which it organises and promotes for profit-making purposes.

---

[35] Juncker, Jean-Claude, 'A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change' (2014) Political Guidelines for the next European Commission, <https://ec.europa.eu/info/sites/default/files/juncker-political-guidelines-speech_en.pdf> accessed 20 April 2022.

[36] ibid

[37] Commission, 'Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market' COM(2016) 593 final, September 2016.

[38] To read more about the legislative history of the Directive see e.g: Spindler, Gerald, 'Copyright Law and Internet Intermediaries Liability' in Tatiana-Eleni Synodinou and others (eds) *EU Internet Law in the Digital Era: Regulation and Enforcement* (1st edn Springer 2020).

Two elements provided by this article are the purpose of the service provider as well as the number of copyrighted works in line with that purpose. The purpose of the service has to be providing copyrighted works for financial gain. However, this purpose alone is not sufficient, and the quantity of provided copyrighted works must be 'large'. In this regard, Recital 63 clarifies whether the amount of presented works is large or not has to be determined in each particular case considering factors including the proportion of numbers of users to that of uploaded works. By this definition it becomes clear that while platforms such as YouTube and Facebook are subject of Art. 17, non-profit entities such as Wikipedia and services with other purposes such as hosting services are excluded from the breadth of the article.

2.4.2 LIABILITY REGIME UNDER ART. 17

The need for a paradigm-level change in the legal framework was answered by providing that where an OCSSP give public the access to copyrighted works on their online platforms, they 'performs an act of communication to the public or an act of making available to the public'.[39] This is the most significant change brought by Art. 17.1 of DSM Directive. Therefore, the Directive clarifies that the limitation of liability in Art. 14 of E-Commerce Directive is excluded for OCSSPs.[40] As a result of this, OCSSPs are directly liable for any unauthorised content posted on their platforms, and all uploads have to be pre-authorised.[41] Under Art. 17.2, this authorisation by rightholders also automatically extends to the acts of the OCSSP's users as long as users are not acting commercially.

Interestingly, it seems the Directive recognises the impossibility of this obligation to obtain pre-authorisation for all works and sets up a special liability regime that functions based on good faith and best effort with three cumulative criteria. In case of appearance of infringing content on an OCSSP, the platform can avoid liability if it can prove that best efforts were made, first, to obtain an authorisation from the respective rightholder,[42] second to block the infringing content via a mechanism with 'high industry standards' which functions using the information rightholders provide in advance. Third, at all times, the OCSSP should have 'acted

---

[39] Art. 17.1 DSM Directive.

[40] Art. 17.3 DSM Directive.

[41] Art. 17.1 DSM Directive.

[42] Stamatoudi, Irini and Torremans, Paul, 'The Digital Single Market Directive' in Irini Stamatoudi and Paul Torremans (eds) EU Copyright Law: A Commentary (Edward Elgar Publishing 2021), p. 741, authors opine that best efforts in this context: 'mean contacting all major labels and collective management organisations, whilst being prepared to acquire an authorisation for their whole repertoire including all existing and future works'.

expeditiously' to remove the infringing content following a notice submitted by the rightholder. While this last part is similar to Art. 14 of E-Commerce Directive, Art. 17.4(C) of DSM Directive continues that the OCSSP should have 'made best efforts to prevent [infringing content's] future uploads in accordance with [the mechanism with high industry standards]'.

Thus, it can be inferred from the provisions that the authorisation obligation on OCSSPs would not automatically make them liable for all unauthorised material held on their servers. Neither the platforms have any obligation to proactively search for such content. If the platform is not provided with specific information by rightholders, infringing content can appear on platforms and stay accessible. This specific information may be presented to platforms either *in advance* or otherwise *later* in the form of a copyright notice. Still, in practice, it is likely that rightholders would in advance provide specific information on as many works as possible, which would shift the burden on OCSSPs virtually for all infringing materials. Nevertheless, OCSSPs are not expected to perform perfect enforcement of copyright and what matters is that they employ their best effort. Also, the exact technicalities of such an enforcement mechanism are to be decided by the platform.[43]

2.4.3 POSSIBILITY OF ALGORITHMIC ENFORCEMENT UNDER THE DIRECTIVE

The question is whether it is permissible or even required to use algorithmic enforcement systems under Art. 17 of the Directive in line with its newly-introduced liability regime. It is interesting that the proposal for DSM Directive originally provided that OCSSPs:

> [S]hall, in cooperation with rightholders, take measures to ensure the functioning of agreements concluded with rightholders for the use of their works or other subject-matter or to prevent the availability on their services of works or other subject-matter identified by rightholders through the cooperation with the service providers. Those measures, such as the **use of effective content recognition technologies**, shall be appropriate and proportionate.[44]

In the final text of the Directive, the explicit reference to measures such as 'effective content recognition technologies' was omitted and instead, Art. 17.4(b) provides for '[best efforts] in accordance with high industry standards of professional diligence'. While initially, it might seem the intention of the European legislature changed, a deeper look reveals that the legislature

---

[43] Grisse, Karina, 'After the Storm—Examining the Final Version of Article 17 of the New Directive (EU) 2019/790' (2019) 14(11) Journal of Intellectual Property Law & Practice <https://doi.org/10.1093/jiplp/jpz122> accessed 20 April 2022, p.894; Stamatoudi and Torremans (n 42) p. 743.

[44] Art. 13 Commission, 'Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market' COM(2016) 593 final, September 2016 (emphasis added).

merely replaced 'content recognition technologies' with 'high industry standards', and the obligation to prevent the availability of unauthorised materials has been moved to Art. 17.4(c), where it obliges OCSSPs to 'prevent their future uploads'. Thus, without excluding automated and algorithmic means, now Art. 17 in a consequentialist manner provides a more generalised, future-proof, and technologically-neutral approach, leaving it to OCSSPs' discretion to choose the exact method of enforcement. This view is confirmed by Recital 66 of the Directive that Art. 17's requirements include 'the evolving state of the art as regards existing means, including potential future developments'.

In this regard, any other way than extensive monitoring and blocking by the use of automated algorithmic tools seems a lofty ideal failing to actualise the requirements of Art. 17.[45] With a massive list of works provided by rightholders and many hours of content uploaded by users each minute, it is unlikely that platforms would decide to enforce such rights by other means than algorithms which are already widely deployed. Of particular importance is the obligation of OCSSPs to make their best efforts to 'prevent' the future upload of previously-identified infringing materials. Copyright enforcement algorithms are in fact designed to match and identify identical or almost identical content. This would make them swift copyright enforcement agents that can rather easily detect uploads of the same work in the future. Therefore, as opined by Montagnani, this obligation, in particular, is something that only algorithms can handle.[46]

As such, the whole spirit of Art. 17 seems to adopt algorithmic enforcement. The phrase 'rightholders have provided the service providers with the relevant and necessary information',[47] clearly refers to the mode algorithmic systems —especially content recognition technologies— function which depends on a prepared list of works for the purpose of search and comparison. Moreover, Senftleben argues that new mandatory exceptions of Art. 17.7 are meant to specifically be a safeguard in the face of the excepted algorithmic enforcement.[48] He continues that this would in fact lead to the development of algorithmic technologies given that

---

[45] Castets-Renard (n 30) p. 13; Montagnani, Maria Lillà, 'Virtues and Perils of Algorithmic Enforcement and Content Regulation in the EU – a Toolkit for a Balanced Algorithmic Copyright Enforcement' (2020) 11(1) Case Western Reserve Journal of Law, Technology & the Internet <http://ssrn.com/abstract=3767008> accessed 20 April 2022, p. 25.

[46] Montagnani (n 45).

[47] Art. 17.4(b) DSM Directive.

[48] Senftleben, Martin, 'Institutionalized Algorithmic Enforcement – The Pros and Cons of the EU Approach to UGC Platform Liability' (2020) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3565175> accessed 20 April 2022, p. 313.

now instead of merely 'focusing on traces of protected third-party content', those technologies have to shift focus 'on creative user input that may justify the unauthorized upload'.[49] In fact, it seems that the phrase 'When defining best practices, special account shall be taken of fundamental rights, the use of exceptions and limitations as well as ensuring that … automated blocking of content is avoided'[50] was taken out of the final version of the Directive in order to open room for using automated algorithmic technologies.

In the end, perhaps one place worth looking for an answer is the guidance issued by EC. Paragraph 10 concludes Art. 17 of DSM Directive by requiring EC to issue a practical guidance (EC's Guidance) as to how platforms have to comply with the requirements of the article. EC's Guidance is supposed to be the result of discussions with the presence of platforms, rightholders and users' organisations. Following six meetings[51] held between October 2019 and February 2020, the Commission issued the guidance. While not legally binding, the guidance aims to 'support a correct and coherent transposition of Article 17 across the Member States' as well as helping 'market players when complying with national legislations implementing Article 17'.[52] The guidance recognises that while automated content recognition systems as of now are the state-of-the-art technologies for countering copyright infringement online, this does not mean that all platforms are obliged to its use. Considering the test of proportionality, it might be sufficient or even necessary to use other technologies on a case-by-case basis.[53]

Therefore, it seems that certainly platforms can use automated and algorithmic enforcement systems; however, it is not a requirement in most cases, and other technologies and tools can be sufficient. Still, it is plausible that there would be some cases where the only proportionate technology for enforcing copyright could are algorithmic mechanisms; and as such, in practice using the algorithm to proactively monitor and filter content may be mandatory in some instances, under Art. 17.

---

[49] ibid

[50] Proposed amendments to draft of DSM Directive on September 12, 2018 available at: <https://www.europarl.europa.eu/doceo/document/TA-8-2018-0337_EN.html> accessed 10 May 2022.

[51] To read about and watch the meetings visit: European Commission, 'Stakeholder Dialogue on Copyright' (European Comission) <https://digital-strategy.ec.europa.eu/en/policies/stakeholder-dialogue-copyright> accessed 10 May 2022.

[52] Commission, "Guidance on Article 17 of Directive 2019/790 on Copyright in the Digital Single Market' Communication From The Commission To The European Parliament And The Council' COM(2021) 288 Final, June 2021, p.1.

[53] ibid p.12.

2.4.4 GENERAL MONITORING AS AN OBSTACLE TO ALGORITHMIC ENFORCEMENT

Art. 17.8 of DSM Directive prohibits a general monitoring obligation.[54] In L'Oréal v eBay, CJEU interpreted Art. 11 of Enforcement Directive[55] as follows:

> … [that article gives national courts the ability to order] the operator of an online marketplace to take measures which contribute, not only to bringing to an end infringements of those rights by users of that marketplace, but also to **preventing further infringements of that kind**.[56]

However, in the same case as well as in Scarlet Extended and Netlog it has been emphasised that such orders must not amount to a general monitoring obligation in terms of Art. 15 of E-Commerce Directive.[57] Therefore, there might be a question of how should further infringement be prevented without generally monitoring all information? Although relating to illegal content other than copyright, in Glawischnig-Piesczek v Facebook, CJEU by virtue of EU law, including Arts. 14 & 15 of E-Commerce Directive clarified an obligation to prevent further illegality.[58] The Court held that:

> in order to ensure that the host provider at issue prevents any further impairment of the interests involved, it is legitimate for the court having jurisdiction to be able to require that host provider to block access to the information stored, **the content of which is identical** to the content previously declared to be illegal, or to remove that information, irrespective of who requested the storage of that information.

---

[54] For more detail on this concern and its relation to Art. 17 see e.g. Stalla-Bourdillon, Sophie, and others, 'Open Letter to the European Commission - on the Importance of Preserving the Consistency and Integrity of the EU Acquis Relating to Content Monitoring Within the Information Society' (2016) SSRN Electronic Journal <http://ssrn.com/abstract=2850483> accessed 20 April 2022.

[55] Corrigendum to Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights [2004] OJ L195/16, Art. 11 of this directive states: 'Member States shall ensure that, where a judicial decision is taken finding an infringement of an intellectual property right, the judicial authorities may issue against the infringer an injunction aimed at prohibiting the continuation of the infringement. Where provided for by national law, non-compliance with an injunction shall, where appropriate, be subject to a recurring penalty payment, with a view to ensuring compliance. Member States shall also ensure that rightholders are in a position to apply for an injunction against intermediaries whose services are used by a third party to infringe an intellectual property right, without prejudice to Article 8(3) of Directive 2001/29/EC'

[56] L'Oréal v eBay (n 17) para 144 (emphasis added).

[57] L'Oréal v eBay (n 17) para 139: '[T]he measures required of the online service provider concerned cannot consist in an active monitoring of all the data of each of its customers in order to prevent any future infringement of intellectual property rights via that provider's website. Furthermore, a general monitoring obligation would be incompatible with Article 3 of Directive 2004/48, which states that the measures referred to by the directive must be fair and proportionate and must not be excessively costly'; Scarlet Extended v Sabam (n 22) para 35; Sabam v Netlog (n 22) para 34.

[58] Case C-18/18, Eva Glawischnig-Piesczek v Facebook Ireland Limited [2019] ECLI:EU:C:2019:821.

Therefore, prevention of future infringement when it relates to a specified material is permissible under EU law and reconcilable with the prohibition of a general monitoring obligation. Hence, for Art. 17 to avoid imposing such an obligation, it sets forth the requirement of 'relevant and necessary information' in Art. 17.4(b), limiting filtering and monitoring to certain materials previously identified by rightholders. We also read in the Advocate General's Opinion in Poland v Parliament and Council,[59] that European legislature can 'choose to impose certain monitoring obligations, in respect of specific illegal information, on **certain online intermediaries**'.[60] The idea that such a relatively limited obligation can be imposed on 'certain online intermediaries' is particularly important as according to EC's Guidance, Art. 17 is a lex specialis.[61] In this light, then perhaps the opinion of Frosio and Mendis is not very convincing who believe: while Art. 17 avoid expressing it out in its wording, the article in practice forces OCSSPs to carry out general monitoring; this way, they believe, Art. 17 'would effectively circumvent formal incompliance' with the prohibition of a general monitoring obligation.[62]

Furthermore, I argue that pertaining to concerns of general monitoring, comparison of OCSSPs to other platforms and intermediaries in E-Commerce Directive and thus relying on cases such as Scarlet Extended v Sabam[63] or Sabam v Netlog[64] is a false analogy. Regarding those cases, one of the main arguments was that it is virtually impossible and substantially costly for those intermediaries to monitor all the traffic.[65] However, regarding OCSSPs, while the initial development of algorithmic systems requires large resources, they are eventually even highly profitable. For example, until 2018, YouTube invested around $100 million into Content ID.[66] However, during the same period, YouTube gained more than $1.35 billion and rightholders themselves more than $3 billion from the revenue pool of Content ID.[67]

---

[59] Case C-401/19, *Republic of Poland v European Parliament and Council of the European Union* [2022] ECLI:EU:C:2022:297.

[60] Case C-401/19, Republic of Poland v European Parliament and Council of the European Union [2022] ECLI:EU:C:2022:297, Opinion of AG Saugmandsgaard Øe, p. 1 (emphasis added).

[61] EC's Guidance (n 52) p. 2.

[62] Frosio and Mendis (n 32) pp. 561—562.

[63] Scarlet Extended v Sabam (n 22) para 16: The plaintiff Scarlet was an 'internet service provider…which provides its customers with access to the internet without offering other services such as downloading or file sharing'.

[64] Sabam v Netlog (n 23) para 16: The defendant Netlog was 'an online social networking platform …'.

[65] Scarlet Extended v Sabam (n 22) para 48; Sabam v Netlog (n 23) para 44.

[66] Manara, Cedric, 'Protecting What We Love About the Internet: Our Efforts to Stop Online Piracy' (Google, 7 November 2018) <www.blog.google/outreach-initiatives/public-policy/protecting-what-we-love-about-internet-our-efforts-stop-online-piracy> accessed 10 May 2022.

[67] Moon, Meriella, 'YouTube Paid $3 Billion to Copyright Owners Through Content ID' (Engadget, 7 November 2018) <www.engadget.com/2018-11-07-google-anti-piracy-report.html> accessed 10 May 2022.

Additionally, the other argument in those cases was that monitoring all traffic and information 'may also infringe the fundamental rights of that ISP's customers, namely their right to protection of their personal data and their freedom to receive or impart information …'.[68] As opposed to internet service providers (ISPs) and a social network platform, OCSSPs only hold specific content on their servers which is public by nature. In Netlog, CJEU argued that 'prohibition applies [to requiring an intermediary provider] to actively monitor all the data of each of its customers'[69]. Not only on OCSSPs, any monitoring for copyright concerns the uploaded materials and not the personal data of users, but also, as far as uploaded materials are concerned, there is no expectation of privacy as the materials were intended to be made public in the first place. In fact, Art. 17.9 clarifies that proactive monitoring and blocking, except in compliance with EU law, 'shall not lead to any identification of individual users nor to the processing of personal data …'. Hence, any monitoring would be limited to uploaded works only. Relating to the concern of freedom of expression, accurate filtering targeted at specific materials, along with sufficient respect for mandatory exceptions, could ensure that there is no indiscriminate blocking of content.

Therefore, not only Art. 17 of the Directive permits using algorithmic enforcement systems, but also this might be necessary in some cases. At the same time, there would be no concern about general monitoring since such algorithmic systems would target pre-specified materials and would not need to monitor data and information other than visual and audio features of uploaded works. With further elaboration on the technologies used in algorithmic systems in Section 3, this might become more evident.

2.5 COMPARATIVE STUDY OF THE US SYSTEM

In a similar way, in the US, the Digital Millennium Copyright Act (DMCA)[70] in Section 512 deals with the liability, rights, and obligations of service providers online. Subsection (c) of Section 512 specifically covers the liability of online services with 'Information Residing on Systems or Networks At Direction of Users'. This description inter alia applies to hosting

---

[68] Scarlet Extended v Sabam (n 23) para 48; Similarly in Sabam v Netlog (n 23) para 48: 'Moreover, the effects of that injunction would not be limited to the hosting service provider, as the contested filtering system may also infringe the fundamental rights of that hosting service provider's service users, namely their right to protection of their personal data and their freedom to receive or impart information, which are rights safeguarded by Articles 8 and 11 of the Charter respectively'.

[69] Sabam v Netlog (n 23) para 34.

[70] Digital Millennium Copyright Act — 17 U.S. Code § 512 — Limitations on liability relating to material online.

services and OCSSPs such as YouTube and Facebook. Subsection (c) grants such online services a general safe harbour which is effective provided that: the service provider 'does not have actual knowledge that the material or an activity using the material on the system or network is infringing'[71] or otherwise 'is not aware of facts or circumstances from which infringing activity is apparent'[72] and 'upon obtaining such knowledge or awareness, acts expeditiously to remove, or disable access to, the material'.[73]

As a second general condition, the service provider should not 'receive a financial benefit directly attributable to the infringing activity, in a case in which the service provider has the right and ability to control such activity'.[74] And finally, 'upon notification of claimed infringement…responds expeditiously to remove, or disable access to, the material that is claimed to be infringing or to be the subject of infringing activity'.[75] A critical difference with E-Commerce Directive as well as DSM Directive in the EU is that while EU law is silent, Section 512 sets forth the requirements for notices by rightholders such as being 'a written communication' with 'signature' identifying the alleged infringing work with 'information reasonably sufficient to permit the service provider to locate the material'.[76] While Art. 17 of DSM Directive also requires that notices have to be 'sufficiently substantiated', it does not elaborate further. However, the EC's Guidance prescribes the Commission Recommendation on Measures to Effectively Tackle Illegal Content Online[77] to complement the requirement of 'sufficiently substantiated' notices in Art. 17.[78] It is also noteworthy that in the US law, similar to the EU, under subsection (g)(1) of Section 512 of DMCA and arising from legal precedence, there is no general obligation of monitoring even if there is a general knowledge that infringements are taking place on the platform.[79]

---

[71] 17 U.S. Code § 512 (c)(1)(A)(i).

[72] 17 U.S. Code § 512 (c)(1)(A)(ii).

[73] 17 U.S. Code § 512 (c)(1)(A)(iii).

[74] 17 U.S. Code § 512 (c)(1)(B).

[75] 17 U.S. Code § 512 (c)(1)(C).

[76] 17 U.S. Code § 512 (c)(3).

[77] Commission Recommendation (EU) 2018/334 of 1 March 2018 on measures to effectively tackle illegal content online [2018] OJ L63/50.

[78] EC's Guidance (n 52) p. 16.

[79] Viacom Int'l Inc. v. YouTube, Inc., 718 F. Supp. 2d 514, 525 (S.D.N.Y. 2010), aff'd 676 F.3d 19, 31, 35 (2d Cir. 2012: affirming that general awareness of possible infringement does not impose a duty to monitor, and that red-flag knowledge refers to awareness of specific instances of infringement.

However, one of the key differences is the counter-notice mechanism in the US. To elaborate, according to subsections (g)(2) & (3) of Section 512 of DMCA, once a rightholder submits a claim on an infringing material, the alleged infringer will be contacted. Subsequently, if the alleged infringer submits a counter-notification, the material will be restored unless the rightholders —as its only option— file 'an action seeking a court order to restrain the subscriber from engaging in infringing activity'. In the EU, such a mechanism is missing in both the E-Commerce Directive and DSM Directive. Hence, it can be inferred that in the EU, there is no obligation to restore the allegedly infringing content as long as the alleged infringer has not been able to prove the validity of its counter-notification. As to DSM Directive, it seems that the legislature intentionally gave more freedom to rightholders in enforcing their rights while providing complaint and redress mechanism as the primary safeguard for users' rights. Nevertheless, the obligations in Art. 17 for rightholders to 'duly justify the reasons for their requests'[80] in advance, as well as that 'decisions to disable access to or remove uploaded content shall be subject to human review'[81] seems to provide innovative measures to protect users.

Overall, the liability regime of platforms in both US and EU had been almost identical for many years. The same high level of similarity also was true, relating to the rationale and the purpose of granting platforms rather a large degree of freedom to platforms. However, with the adoption of DSM Directive, this proximity between the two legal systems now has turned into noticeable divergence. Having analysed the current legal framework that impacts algorithmic enforcement of copyright, we can continue our journey through Section 3, which seeks to elaborate further on technological aspects of such a method of enforcement. That would enable us to practically take apart the systems and assess them from a techno-legal perspective in the following Sections.

---

[80] Art. 17.9 DSM Directive.

[81] ibid

3 TECHNOLOGICAL ASPECTS OF ALGORITHMIC ENFORCEMENT

As shown above, the current legal framework in the EU, specifically DSM Directive necessitates automated filtering of infringing content. Therefore, it is now worthwhile to consider how such a mechanism of filtering is carried out in practice, followed by the next Sections discussing the risks and threats associated with algorithmic measures in such a context.

3.1 MODERATION OF ILLEGAL CONTENT ON PLATFORMS

Apart from all of their benefits, platforms can entail or facilitate harmful behaviours by the users. These may include hate speech, misinformation and, as far as the present work is concerned, copyright infringement. To counter such harmful conduct, mere legislative measures with traditional forms of enforcement would fail. This is why it is imperative that content moderation takes place on the platform itself. We are living in what called 'regulatory society' where regulatory measures are not exclusive to the state and, its enforcement, not to primary enforcement agents.[82] In line with this laissez-faire approach to regulation, platforms are now given the necessary power to manage conduct and enforce rights. Grimmelmann defines moderation as 'the governance mechanisms that structure participation in a community to facilitate co-operation and prevent abuse'.[83]

Platforms may have their general rules. However, since they might be divided into smaller communities[84], there can be specific rules relating to those communities as well. For example, on Facebook, group administrators have been given such a capability.[85] Another example is Reddit which functions based on its communities (subreddits).[86] Moderation can concern different levels of users' interaction with a platform, including the initial enrolment of users

---

[82] Black, Julia, 'Critical Reflection on Regulation' (2002) 27 Australian Journal of Legal Philosophy <www.researchgate.net/publication/265568938_Critical_Reflection_on_Regulation> accessed 20 April 2022, pp. 1—7.

[83] Grimmelmann, James, 'The Virtues of Moderation' (2015) 17(42) Yale Journal of Law & Technology <http://scholarship.law.cornell.edu/facpub/1486> accessed 20 April 2022, p. 47; According to Mendis (n 11): 'Content moderation refers to the governance mechanism through which OCSSPs ensure that content shared on the platforms comply with applicable legal rules and regulatory requirements'.

[84] Sartor, Giovanni, and Loreggia, Andrea, 'The Impact of Algorithms for Online Content Filtering or Moderation' (2020) Policy Department for Citizens' Rights and Constitutional Affairs Directorate-General for Internal Policies <www.europarl.europa.eu/supporting-analyses> accessed 20 April 2022, p. 19.

[85] Facebook, 'Writing Great Group Rules' (Facebook) <www.facebook.com/community/establishing-membership-and-rules/how-to-write-great-group-rules> accessed 10 May 2022.

[86] Wikipedia, 'Reddit' (Wikipedia, 20 May 2022) <www.en.wikipedia.org/wiki/Reddit> accessed 10 May 2022.

(e.g. platforms with limited access) or subsequent moderation (e.g. content filtering); Similarly, it can include a variety of formats such as rejection, editing, and commenting.[87]

3.2 MODALITIES OF MODERATING COPYRIGHT-INFRINGING CONTENT ONLINE

Filtering or taking down content is a remedy that has been around almost as long as the internet has been. In line with the moderating role of platforms granted by the legislature, rightholders can ask, i.e. send notices to, the online platforms to take remedial action against infringing content on their platform. Therefore, generally, these measures implemented through close collaboration of right holders and platforms, are called Notice and Action (N&A). [88] However, the exact actions can take three forms described below.

3.2.1 NOTICE AND TAKEDOWN

This (N&TD) is a technique that results in a platform removing the infringing material expeditiously following the rightholder has submitted its notice. Indeed, a complaint can be fake or simply erroneous, [89] YouTube Copyright Transparency Report in 2021 reports around 9% abuse and around 7% invalid complaints through one of its noticing systems.[90] Invalid notices were much higher on Reddit, and as a result, out of about 517,000 pieces of content reported for removal, more than a fifth, namely 120,000, were not filtered out.[91] Therefore, a careful evaluation by platforms is crucial, even though it seems that this evaluation needs to be done only in good faith and to the best effort of the platform, given its capacities and resources.[92] One of the main disadvantages of this method is that once the infringing content is removed, it is very likely that the same content reappears after a short while, this issue is called the 'whack-

---

[87] For a detailed categorisation of modes of moderation see Sartor and Loreggia (n 85) p. 20.

[88] Frosio, Giancarlo and Kuczerawy, Aleksandra, 'From "Notice and Takedown' to "Notice and Stay Down': Risks and Safeguards for Freedom of Expression' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), pp. 525—543.

[89] Hartline, Devlin, 'Endless Whack-A-Mole: Why Notice-and-Staydown Just Makes Sense' (Antonin Scalia Law School, 14 January 2016) <http://cip2.gmu.edu/2016/01/14/endless-whack-a-mole-why-notice-and-staydown-just-makes-sense> accessed 10 May 2022.

[90] Google, 'Copyright Transparency Report' (Google, 2021) <www.storage.googleapis.com/transparencyreport/report-downloads/pdf-report-22_2021-1-1_2021-6-30_en_v1.pdf> accessed 10 May 2022.

[91] 'Transparency Report 2020' (Reddit, 2020) <www.redditinc.com/policies/transparency-report-2020> accessed 10 May 2022.

[92] Thompson, Marcelo, 'Beyond Gatekeeping: The Normative Responsibility of Internet Intermediaries' (2016) 18(4) Vanderbilt Journal of Entertainment & Technology Law <http://ssrn.com/abstract=2683301> accessed 20 April 2022, p. 847.

a-mole' problem.[93] As observed in the previous Section, N&TD mechanism is most famously employed by the E-Commerce Directive[94] and DMCA[95] in the US. However, regarding copyright, DSM Directive also introduces a third modality, i.e. notice and stay down.

3.2.2 NOTICE AND NOTICE

This (N&N) is another form of N&TD, the main difference being that under N&TD the content is removed with subsequent notification to the uploader and a chance to appeal the decision. However, N&N requires that once a notice is submitted on potentially infringing content, first the uploader is merely notified in the form of a 'warning'. Repeating wrongful behaviour could be followed by subsequent actions, similar to N&TD.[96]

3.2.3 NOTICE AND STAY DOWN

This method functions similar to those above; the difference emerges after content is taken down. Under this method, the platform tries to ensure that the content would not reappear (be reuploaded) following the takedown, i.e. ensuring that the content 'stays down'.[97] N&SD has emerged as a response to the inefficiencies of N&TD in fighting copyright infringement.[98] Relating to the 'whack-a-mole' problem mentioned above[99], many have called for a change in N&TD systems. One open letter state that copyright holders not only are laboriously creating their copyrighted work but also have to send countless notices to counter the infringement of their rights; thus, they call for a change that sending one notice would be sufficient 'Thereafter it should be the duty of the website to prevent the reposting of the same material'.[100]

---

[93] Mostert, Frederick, 'Study on IP Enforcement Measures, Especially Anti-Piracy Measures in the Digital Environment' (2019) World Intellectual Property Organization (WIPO) Advisory Committee on Enforcement <www.wipo.int/meetings/en/doc_details.jsp?doc_id=452655> accessed 20 April 2022, p. 11.

[94] E-Commerce Directive Art. 14.

[95] 17 U.S. Code § 512 (g)(1).

[96] Frosio and Kuczerawy (n 88) p. 532; Yu, Peter K, 'The Graduated Response' (2010) 62 Florida Law Review <http://ssrn.com/abstract=1579782> accessed 20 April 2022, p. 1374.

[97] Angelopoulos, Christina, and Smet, Stijn, 'Notice-and-Fair-Balance: How to Reach a Compromise between Fundamental Rights in European Intermediary Liability' (2016) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2944917> accessed 20 April 2022, p. 17.

[98] Mostert (n 93) p. 12.

[99] ibid p. 11.

[100] 'Protect Artists. End Safe Harbor Protection For Internet Piracy', <www.perma.cc/NQ3F-9CJG> accessed 10 May 2022; Husovec, Martin, 'The Promises of Algorithmic Copyright Enforcement: Takedown or Staydown? Which Is Superior? And Why?' (2018) Columbia Journal of Law & the Arts <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=3239040> accessed 20 April 2022, p. 54.

However, specifically with regard to N&SD, there are human rights concerns, as N&SD necessitates that the platform monitor all and every submitted content on its servers.[101] Nevertheless, as seen above, given the CJEU precedence, this mechanism is permissible under the EU law once targeting a specific material.[102] Thus, until DSM Directive, N&SD had remained mainly a method derived from judicial precedence.[103] However, DSM Directive in Art. 17 expresses that platforms must make 'best efforts to prevent [unauthorised content's] future uploads', which inevitably necessitates N&SD.[104]

3.3   A NEW GENERATION OF ALGORITHMIC ENFORCEMENT OF COPYRIGHT

As Figure 1 below illustrates, in just one minute in 2021, 500 hours of content were uploaded on YouTube. Additionally, YouTube has received around 730 million copyright complaints in just the first half of 2021.[105] In 2018, Reddit received about 9,500 notices; in just over two years, this number exponentially rose nine times to over 86,000. [106] Similarly, CISCO's Annual Internet Report tells us that from 2018 to 2023, the number of internet users is projected to grow by 15% and that the total amount of internet traffic increased 11 times in the decade between 2012 to 2022. [107] Considering the enormous volume of internet traffic, it is impossible for a human agent to carry out even near sufficient copyright protection on the internet.[108]

---

[101] Harmon, Elliot, ''Notice-and-Stay-Down' Is Really 'Filter-Everything'' (Electronic Frontier Foundation, 22 January 2016) <www.eff.org/deeplinks/2016/01/notice-and-stay-down-really-filter-everything> accessed 10 May 2022

[102] Case C-18/18, Eva Glawischnig-Piesczek v Facebook Ireland Limited [2019] ECLI:EU:C:2019:821; Case C-401/19, Republic of Poland v European Parliament and Council of the European Union [2022] ECLI:EU:C:2022:297, Opinion of AG Saugmandsgaard Øe.

[103] ibid

[104] DSM Directive Art. 17.4 (C).

[105] YouTube Team, 'Access for All, a Balanced Ecosystem, and Powerful Tools' (Blog.Youtube, 6 Dec. 2021) <www.blog.youtube/news-and-events/access-all-balanced-ecosystem-and-powerful-tools> accessed 10 May 2022.

[106] 'Transparency Report 2020' (Reddit, 2020) <www.redditinc.com/policies/transparency-report-2020> accessed 10 May 2022.

[107] Cisco, 'Cisco Annual Internet Report (2018–2023) White Paper' (Cisco, 23 January 2022) <www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html> accessed 10 May 2022.

[108] Montagnani (n 45) p. 20.

Figure 1. What happens on the internet in one minute in 2021, Source:
https://www.allaccess.com/merge/archive/32972/infographic-what-happens-in-an-internet-minute

With much lower numbers but similar trends in the early days of the internet and to ensure that platforms stay in the safe harbour regime envisaged by DMCA, platforms started to develop systems that would automatically remove uploaded materials flagged as unlawful. This N&TD based regime was known as the 'robo-takedown regime'.[109] The assumption behind this system is that still humans would search for unlawful content and report it.[110] Automation in terms of this regime is heavily tool-like, and in practice, it is merely automation of receiving notices and taking down the associated content with the chance of future amendment by human agents.

However, over the years, given the inefficiencies of the previous regime and in response to the pressure from rightholders, OCSSPs deployed a system of copyright enforcement that went beyond the mechanism required by the legal framework.[111] This scheme consists of more sophisticated methods of detecting unlawful content and closer collaboration among platforms and rightsholders. 'Gone are the days of relying solely on viewers to report things'.[112] In this new paradigm, instead of a mere N&TD system, automated content recognition technologies,

---

[109] Montagnani (n 45) p. 20; Carpou, Zoe, 'Robots, Pirates, and the Rise of the Automated Takedown Regime' (2016) 39(551) COLUM. J.L. & ARTS <http://ssrn.com/abstract=2591187> accessed 20 April 2022, p. 553.

[110] Husovec (n 100) p. 70.

[111] Montagnani (n 45) p. 23.

[112] Switchboard Live Team, 'Copyright Rules and How to Avoid Getting Flagged' (Medium, 12 Dec. 2021) <www.medium.com/@switchboardlive/copyright-rules-how-to-avoid-getting-flagged-f0376b15e1ca>   accessed 10 May 2022.

also known as 'copyright bots'[113], proactively at the time the content is being uploaded, scan and compare the content against a list of protected works provided by rightholders. Additionally, the remedial process is more diverse, where rightholders would be given the option to monetise the content uploaded by third parties rather than necessarily removing it.[114]

Another distinguishing feature of the second generation of automated copyright filtering is more complex algorithms. Compared to automation in the robo-takedown regime, automation becomes more sophisticated systems capable of processing content. This is achieved by means of machine learning and other techniques that will be explained further on. Some examples in this new stage of automated enforcement include YouTube's Content ID, which accounted for around 99% of YouTube's takedowns in 2021.[115] Furthermore, in this new regime, rightholders too are given the automated tools to handle sending notices which in any case could still be numerous. For example, YouTube has developed Content Verification Program that enables rightholders to search on the platform for similar materials and eventually send multiple notices at once.[116] Also, traditional mechanisms such as N&TD are still maintained and even improved. For example, YouTube users can use 'Webform' to report illegal content.[117]

3.4 EXAMPLES OF ALGORITHMIC SYSTEMS

As mentioned in Section 2, Art. 17.4(b) of DSM Directive requires that platforms make 'best efforts' with 'high industry standards of professional diligence' to takedown copyright-infringing content. The EC's Guidance identifies the automated content recognition systems as currently among the state-of-the-art technologies for countering copyright online, even though other technologies can always be utilised depending on a case.[118] Therefore, while there are various copyright management tools available on different platforms, only proactive copyright

---

[113] Tune, Cydney, and others, 'The Rise of the Copyright Bots' (Internet & Social Media Law Blog, 22 April 2021) <www.internetandtechnologylaw.com/copyright-bots> accessed 10 May 2022.

[114] Google, 'How Content ID Works - YouTube Help' (Google) <www.support.google.com/youtube/answer/2797370> accessed 10 May 2022.

[115] Google, 'Copyright Transparency Report' (Google, 2021) <www.storage.googleapis.com/transparencyreport/report-downloads/pdf-report-22_2021-1-1_2021-6-30_en_v1.pdf> accessed 10 May 2022.

[116] Google, 'Use the Content Verification Tool - YouTube Help' (Google) <www.support.google.com/youtube/answer/3010500> accessed 10 May 2022.

[117] Google, 'Submit a Copyright Takedown Request - YouTube Help' (Google) <www.support.google.com/youtube/answer/2807622> accessed 10 May 2022; Copyright Transparency Report (n 115).

[118] EC's Guidance (n 52) p.12.

enforcement systems that would meet the 'high industry standards' requirement will be considered below.

3.4.1 YOUTUBE'S CONTENT ID

In the mid-2000s, YouTube found itself in a lawsuit brought against it by Viacom.[119] Viacom claimed that YouTube contributed to the widespread infringement of copyright by giving access to a massive volume of Viacom's works without its permission.[120] Although settled outside court, this case is generally seen as the most important driving force for YouTube to change the nature of automated enforcement in favour of a more preventive one by developing Content ID.[121] Until 2018, the development of Content ID had cost YouTube more than $100 million, although with revenues by far exceeding the costs.[122] This is because any revenue gained from Content ID is shared between YouTube and the rightholder. In fact, this financial incentive also seems to be one of the main reasons for developing Content ID, giving YouTube the incentive to claim rights to as much content as possible.

Content ID is not accessible to every user on YouTube. Only rightholders who own a massive body of copyrighted works with exclusive rights prone to frequent infringement can apply for this system.[123] If accepted, this leads to an agreement between the rightholder and the platform stipulating that YouTube can have access to the content for reference and algorithmic comparison, with the rightholder defining the geographical scope of the protection they seek.[124] Content ID relies on the work provided by rightholders; once a rightholder gives the digital work to YouTube, Content ID algorithm analyses the work with technologies such as hashing and fingerprinting technologies, elaborated later on.[125] This enables the system to proactively

---

[119] Viacom Int'l Inc. v. YouTube, Inc., 718 F. Supp. 2d 514, 525 (S.D.N.Y. 2010), aff'd 676 F.3d 19, 31, 35 (2d Cir. 2012).

[120] ibid

[121] Frosio and Mendis (n 32) p.554; DeLisa, Nicholas T, 'You(Tube), Me, and Content ID: Paving the Way for Compulsory Synchronization Licensing on User-Generated Content Platforms' (2016) Brooklyn Law Review <http://brooklynworks.brooklaw.edu/blr/vol81/iss3/8> accessed 20 April 2022, p. 1285; Delaney, Kevin, 'YouTube to Test Software to Ease Licensing Fights' (WSJ, 13 June 2007) <www.wsj.com/articles/SB118161295626932114> accessed 10 May 2022.

[122] Manara, Cedric, 'Protecting What We Love About the Internet: Our Efforts to Stop Online Piracy' (Google, 7 November 2018) <www.blog.google/outreach-initiatives/public-policy/protecting-what-we-love-about-internet-our-efforts-stop-online-piracy> accessed 10 May 2022.

[123] Google, 'Qualify for Content ID - YouTube Help' (Google) <www.support.google.com/youtube/answer/1311402> accessed 10 May 2022.

[124] Google, 'Content Verification Program - YouTube Help' (Google) <www.support.google.com/youtube/answer/6005923> accessed 10 May 2022.

[125] Frosio and Mendis (n 32) p. 555; Sartor and Loreggia (n 84) p. 43.

look for any uploaded work in the future, similar to the works in the database. Once such content is detected in the protected geographical region, Content ID would automatically make a copyright claim on behalf of the rightholder, asking the rightholder to choose to either block, monetise, or track the video.[126] The monetisation option leads to a typical 55:45 splitting of revenues between rightholder and YouTube. It is estimated that only through Content ID, YouTube has acquired around $1.35 billion until 2018.[127]

The user who uploaded the allegedly infringing material, in all different stages of a Content ID claim, has the option to dispute the claim.[128] If YouTube becomes aware of a rightholder abusing Content ID, this might lead to 'suspension' of account or 'other legal consequences'.[129] Perhaps partly due to such consequences and the pre-appraisal of Content ID users, the rates of disputed Content ID claims were as low as 0.5% in 2021. Finally, it should be noted that Content ID on YouTube is deemed a voluntary policy-based measure different from a formal and legal takedown request under DMCA. Of course, a user always can opt for a legal copyright action. YouTube explains that:

> Unlike takedowns, which are defined by law, Content ID is a YouTube system that is made possible by deals made between YouTube and content partners who have uploaded material they own to our database.[130]

Now, the question is that, given DSM Directive, which already requires proactive measures such as Content ID, how would the legal status of Content ID from a voluntary policy measure change, at least within the EU? This is a question that will be dealt with in Section 5.

---

[126] Google, 'Overview of Copyright Management Tools - YouTube Help' (Google) <www.support.google.com/youtube/answer/9245819> accessed 10 May 2022

Pancini, Marco, 'YouTube's Approach to Copyright' (Google, 31 August 2021) <www.blog.google/around-the-globe/google-europe/youtubes-approach-to-copyright> accessed 10 May 2022.

[127] Moon, Meriella, 'YouTube Paid $3 Billion to Copyright Owners Through Content ID' (Engadget, 7 November 2018) <www.engadget.com/2018-11-07-google-anti-piracy-report.html> accessed 10 May 2022; Husovec (n 100) p. 74.

[128] Google, 'Dispute a Content ID Claim - YouTube Help' (Google) <www.support.google.com/youtube/answer/2797454> accessed 10 May 2022.

[129] Google, 'Overview of Copyright Management Tools - YouTube Help' (Google) <www.support.google.com/youtube/answer/9245819> accessed 10 May 2022

Pancini, Marco, 'YouTube's Approach to Copyright' (Google, 31 August 2021) <www.blog.google/around-the-globe/google-europe/youtubes-approach-to-copyright> accessed 10 May 2022.

[130] Google, 'The Difference Between Copyright Takedowns and Content ID Claims - YouTube Help' (Google) <www.support.google.com/youtube/answer/7002106> accessed 10 May 2022.

3.4.2 AUDIBLE MAGIC AND OTHERS

Audible Magic is another well-known content recognition system that is sold at hefty prices to any company requiring this form of copyright enforcement. Facebook, for example, offers a variety of tools for copyright management and protection, ranging from typical report forms to content flagging.[131] However, these are not proactive technologies for enforcement and for this purpose, Facebook uses Audible Magic in its all-inclusive 'Rights Manager'[132]. Facebook states that:

> We also use Audible Magic to help prevent unauthorized videos from being posted to Facebook. Audible Magic allows content owners to fingerprint their media files for copyright management. Videos uploaded to Facebook are then run through Audible Magic at the time of upload. If a match is detected, the upload is stopped and the user is notified.[133]

Similarly, Twitch, another popular platform for gaming streamlining on its website, announced that since 2014 they have been using Audible Magic for proactive enforcement of copyright.[134] Other customers of Audible Magic include Sony, Soundcloud, and Disney.[135] There are other companies that either generally provide content recognition technologies that can be used in proactive copyright enforcement, for example Videntifier[136], or companies that are able to develop such systems from their own AI and data processing technologies such as BasicAI[137].

3.5 HOW DOES THE ALGORITHM WORK?

Algorithm can be defined as 'a sequence of computational steps that transform the input into the output'.[138] Overall, the general functioning of the algorithm can be summarised in three

---

[131] Facebook, 'What tools does Facebook provide to help me protect my intellectual property in my videos?' (Facebook) <www.facebook.com/help/348831205149904> accessed 10 May 2022.

[132] Facebook, 'Copyright Management | Facebook' (Facebook) <www.rightsmanager.fb.com> accessed 10 May 2022/: Rights Manager, similar to Content ID, is only available to 'creators and publishers who have a large or growing catalog of content that people love to share'.

[133] Facebook, 'What tools does Facebook provide to help me protect my intellectual property in my videos?' (Facebook) <www.facebook.com/help/348831205149904> accessed 10 May 2022.

[134] Twitch, 'Copyrights and Your Channel' (Twitch.tv) <www.twitch.tv/creatorcamp/en/learn-the-basics/copyrights-and-your-channel> accessed 10 May 2022.

[135] Audible Magic, 'Audible Magic - Automatic Content Recognition, Content Identification (ID) and Rights Administration' (Audible Magic, 13 January 2022) <www.audiblemagic.com> accessed 10 May 2022.

[136] 'Video Search' (Videntifier Technologies) <www.videntifier.com> accessed 10 May 2022.

[137] BasicAI, 'Basic.Ai', <www.basic.ai> accessed 10 May 2022.

[138] Cormen, Thomas and others, Introduction to Algorithms (3rd ed. The MIT Press 2009), p. 5.

stages, using an input-throughput-output model (ITO).[139] Input stage consists of two elements, i.e. 'User Request' and 'Basic Data Set'. User request is submitted via User Interface (UI) or submitted automatically (the trend with rightholders).[140] This request includes the characteristics of the user that might influence the whole algorithmic process.[141]

Throughput stage takes place entirely outside UI and consists of two sets of algorithmic processors of 'Selection Algorithm' and 'Relevance-assigning Algorithm' with the 'Intermediary Data Set' in between. Depending on the request made by the user and its characteristics, Selection Algorithm selects data from Intermediary Data Set, which is utilised by Relevance-assigning Algorithm. Depending on the type of application, Relevance-assigning Algorithm might feed some processed data back to Selection Algorithm for repetition of the process.[142]

In the final stage, the output is then produced as 'Output Data Set', which next is generated on UI and varies depending on the type of application. The feedback on the final output can also be returned to Basic Data Set.[143] In our case, the output would be detecting infringing content.

3.6 TECHNOLOGICAL ASPECTS OF ALGORITHMIC SYSTEMS

As mentioned earlier, algorithmic enforcement has witnessed a new generation of much more intricate systems experiencing a relative degree of autonomy. These algorithms also have a great chance of rapid development as they have access to and can use almost an infinite amount of user data on platforms.[144] The algorithms used in copyright enforcement are mainly designed to recognise audio and visual features for the purpose of comparisons. First, this part will discuss more general technologies of AI and algorithms, and then the next part will analyse specific technologies used in automated copyright enforcement systems.

---

[139] Latzer, Michael and others 'The Economics of Algorithmic Selection on the Internet' in Johannes M. Bauer and Michael Latze (eds) Handbook on the Economics of the Internet (Edward Elgar Publishing Limited 2016) P. 397.

[140] ibid pp. 397—399.

[141] ibid

[142] ibid

[143] ibid

[144] Tóth, Andrea Katalin, 'Algorithmic Copyright Enforcement and AI: Issues and Potential Solutions through the Lens of Text and Data Mining' (2019) 13(2) Masaryk University Journal of Law and Technology <https://doi.org/10.5817/mujlt2019-2-9> accessed 20 April 2022, p. 371.

3.6.1 MACHINE LEARNING

Machine Learning (ML) is a group of complex techniques that emerged in the field of computer science that is one of the fundamentals of AI development. ML is closely related to the field of data mining in that both utilise massive datasets to detect correlations and produce a new form of data. When 'learning' is mentioned, it refers to a method of 'training' that involves empirical learning through trial and error by which once the machine is exposed and has access to an enormous volume of data, it can change specific variables in order to achieve an objective.[145] Once each stage of training is completed, the result is assessed by putting the machine against unfamiliar data (data not used during training). According to the result, it might be necessary to modify the variables and parameters to achieve the desired goal eventually. This is also why supervised learning is much more susceptible to the biases produced by the supervisor, 'a supervised algorithm is only as good as the people constructing, tuning, and training it, and the data it has available'.[146]

The methods for training AI can be generally categorised into three techniques of supervised, unsupervised, and reinforcement learning.

(1) Supervised Learning: In supervised learning, AI is exposed to a dataset with specified data. In this method, the required outcome is predefined; in other words, the system could have right or wrong answers as opposed to the unsupervised method. In this method, AI 'observes input-output pairs and learns a function that maps from input to output'.[147] The input is given a 'label' such as 'bus or pedestrian', and AI 'learns a function that, when given a new image, predicts the appropriate label'.[148] For instance, the system can be tasked with identifying whether new content is spam based on prior similar observations.[149] A supervised AI is further divided into two subsets of 'classification' and 'regression'.

In classification, being a qualitative method, the goal is to determine the category of new observations based on previous observations, that is to say, to 'label' new data based on

---

[145] Alpaydin, Ethem, *Introduction to Machine Learning* (3rd edn, The MIT Press 2014), pp. 1—16.

[146] Markou, Christopher and Deakin, Simon, 'Ex Machina Lex: Exploring the Limits of Legal Computability' in Simon Deakin and Christopher Markou (eds), Is Law Computable?: Critical Perspectives on Law and Artificial Intelligence (Hart Publishing 2020), p. 36.

[147] Norvig, Peter, and Stuart Russell, *Artificial Intelligence: A Modern Approach* (Global edn 4th edn Pearson 2021), p. 651.

[148] ibid

[149] Sartor and Loreggia (n 84) p. 37; Markou and Deakin (n 146) pp. 36—37.

predefined labels. The criteria for classifying items are 'Classifiers' introduced by the programmer beforehand. Classification could be binary, where there are only two classes, or multi-labelled, with more than two categories.[150]

Regression refers to the task of a system to predict the numeric value of a new input based on previous observations of input-outputs of other data. For example, where the system detects a correlation between A and B (both having a numeric value), the system can be asked to predict the value of C based on the identified correlation. Regression is necessarily always quantitative. Input values are called 'Predicators', and output is called the 'Response'. [151]

(2) Unsupervised Learning: As Alpaydin explains, in 'supervised learning, the aim is to learn a mapping from the input to an output whose correct values are provided by a supervisor. In unsupervised learning, there is no such supervisor and we only have input data'[152] Unsupervised learning involves an AI system freely analysing an assorted dataset in order to detect similar objects.[153] This is also called clustering, in which AI tries to identify similar objects into multiple distinct clusters.[154] This might seem similar to the classes mentioned above; however, clusters are not predefined in this method, and their number is not limited. Unsupervised learning is particularly useful for its ability to learn 'new representations—for example, new features of images that make it easier to identify the objects in an image'.[155] Unsupervised learning is a much more complex procedure, and the outcomes can be unpredictable.[156]

(3) Reinforcement: Finally, the reinforcement technique refers to the self-reward/punishment mechanism by which AI learns to improve the generated outcome to acquire the highest reward. In Norvig and Russell's words:

> With supervised learning, an agent learns by passively observing example input/output pairs provided by a "teacher' [With Reinforcement], … agents can

---

[150] Brownlee, Jason, 'Difference Between Classification and Regression in Machine Learning' (Machine Learning Mastery, 22 May 2019) <www.machinelearningmastery.com/classification-versus-regression-in-machine-learning> accessed 10 May 2022.

[151] ibid

[152] Alpaydin (n 145) p. 11.

[153] Brownlee, Jason, 'Supervised and Unsupervised Machine Learning Algorithms' (Machine Learning Mastery, 20 August 2020) <www.machinelearningmastery.com/supervised-and-unsupervised-machine-learning-algorithms> accessed 10 May 2022.

[154] Sartor and Loreggia (n 84) p. 37.

[155] Norvig and Russell (n 147) p. 775.

[156] Alpaydin (n 145) pp. 11—13.

actively learn from their own experience, without a teacher, by considering **their own ultimate success or failure**.[157]

The reward depends on the feedback AI gains externally, e.g. from user interactions. Prioritisation is a good example, where depending on user interactions, AI learns that it has to prioritise one content over the other.[158]

3.6.2 ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING

Artificial Neural Networks (ANN) and Deep Learning (DL) have played the leading role in advancing AI over the past years.[159] DL refers to a non-linear technology in which AI's simple input, throughput, and output mechanism become much more interlinked and complex. ANN, of course, still consists of input and output layers; however, the throughput layer is replaced by —or rather developed into— many hidden layers. At the same time, the size of data fed as input is massive, which, once entered into the procedure, is passed through countless nodes (neurons) to be processed. All layers are intertwined, resulting in passing input and output back and forth numerous times until a final output is generated.[160] These technologies have become a reality due to the exponential increase of computer hardware capacity as well as the emergence of big data.[161] Figure 2 shows a simplified illustration of ANNs:
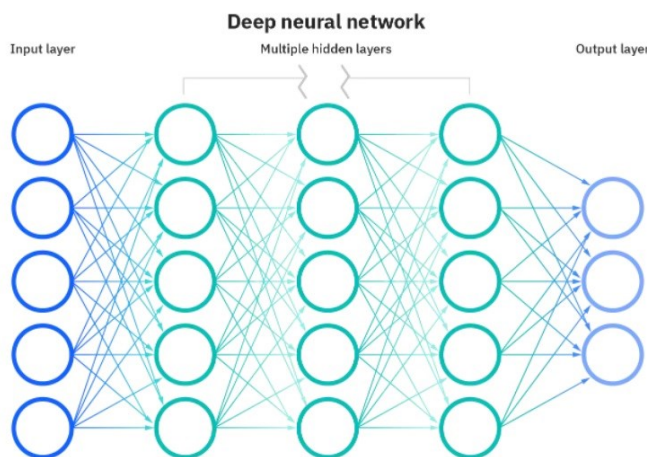
Figure 2. A simplified representation of Deep Neural Networks. Source:
https://www.ibm.com/cloud/learn/neural-networks

---

[157] Norvig and Russell (n 147) p. 789 (emphasis added).

[158] Sartor and Loreggia (n 84) p. 37; Alpaydin (n 145) pp. 13—14.

[159] Marcus, Gary, and Davis, Ernest, Rebooting AI: Building Artificial Intelligence We Can Trust (Vintage 2019), p. 10.

[160] Sartor and Loreggia (n 84) p. 38; Markou and Deakin (n 146) pp. 39—40.

[161] Marcus and Davis (n 158) p. 10.

The term ANN stems from the representation of the human brain in this method, with numerous neurons in the brain processing millions of bits of data per second[162]. The number of nodes and the number of hidden layers are pre-set by the programmer, which determines the network's depth. In recent years, the capacity to increase these numbers as well as the size of input data (big data) has grown to the extent that now such systems work almost in a 'black box'[163], i.e. it is nearly impossible to comprehend the exact logic followed by the system in generating the output.[164] Thus, the problem of opacity is yet another human rights concern that will be discussed in the following Sections. These complex systems are called 'Deep Neural Networks' and their learning process 'Deep Learning'. Most ANN systems use an even more complex technology named 'Convolutional Neural Network' (CNN), which significantly helps in visual recognition, for example, even after some changes are done to the original version of a picture. ANNs generally are good at detecting patterns in large datasets. As far as filtering is concerned, these systems can aid in comparing uploaded contents with previously observed material and detecting identical or similar contents for countering copyright infringement.

3.6.3 NATURAL LANGUAGE PROCESSING

Natural Language Processing (NLP) is a system that 'can be understood as a system for conveying meaning or semantics'[165]. NLP helps AI comprehend language, and one of its core applications is speech recognition and analysis. NLP can help automated systems equip the capacity to go beyond superficial audio and visual analysis and explore subjectivity and sentiment. In addition to taking into account sentiment, by nature, context is essential in NLP. Markou and Deakin explain that 'the context of documents matters for how subjective sentiment is assessed. For instance "go read the book" is a positive sentiment in the context of a book review, but negative in the context of a review of a film based on the book'. [166]

Given such abilities, NLP is already in use for detecting hateful or extreme content on platforms. However, as far as copyright enforcement is concerned, this technology is not

---

[162] NPR, 'Understanding Unconscious Bias' (National Public Radio, 15 July 2020) <www.text.npr.org/891140598> accessed 10 May 2022.

[163] For more information on the concept of 'black box' see: Pasquale, Frank, The Black Box Society: The Secret Algorithms That Control Money and Information (Harvard University Press 2016).

[164] Sartor and Loreggia (n 84) p. 38; Markou and Deakin (n 146) pp. 39—40

[165] Markou and Deakin (n 146) p. 41.

[166] Markou and Deakin (n 146) p. 46.

deployed. The use of such technologies, as a suggestion, will be further analysed in the last Section of the present work.

3.7 SPECIFIC TECHNOLOGIES UTILISED IN ALGORITHMIC SYSTEMS FOR ENFORCING COPYRIGHT

Before explaining the technicalities of automated copyright enforcement systems, it should be noted that their exact mode of operation and the underlying algorithm are not publicly known.[167] Such information is proprietary knowledge of their developers in a highly competitive industry where even some of the most well-known companies, such as Facebook, use third-party systems. However, through limited information published by OCSSPs and through what is called 'black box tinkering', i.e. a 'reverse engineering technique', we can better understand the underlying algorithm.[168] How algorithm enforcing copyright works varies depending on the content and purpose. This means what type of multimedia content as the input is processed and what the expected result is. Below, we will explain two techniques typically used in content recognition systems designed to detect the similarity of two or more audio or visual content pieces.

3.7.1 HASHING

This is a mechanism by which multiple shorter binary values, i.e. 'hash key', are ascribed to a particular file.[169] Content recognition through hashing uses a prepared list of hashes of copyright-protected works. The bot scans the server for unauthorised uploads with hashes from the list. When sufficient similarity between the hash keys of two files is detected, subsequent protective action (e.g. blocking or notification) as defined by the platform is followed.[170] The main purpose of hashing is to use fewer resources by increasing comparison speed via summarizing the digital work's code. However, hashing might not be as helpful as fingerprinting since detection could be avoided by changing the hash keys through technical

---

[167] Perel, Maayan, and Elkin-Koren, Niva, 'BLACK BOX TINKERING: Beyond Transparency in Algorithmic Enforcement' (2016) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2741513 > accessed 20 April 2022 p.185.

[168] ibid

[169] Zola, Andrew. 'Hashing' (techtarget, 3 June 2021) <www.techtarget.com/searchdatamanagement/definition/hashing> accessed 10 May 2022.

[170] Lester, Toni, and Pachamanova, Dessislava, 'The Dilemma of False Positives: Making Content ID Algorithms More Conducive to Fostering Innovative Fair Use in Music Creation' (2017) 24(1) UCLA Entertainment Law Review <https://doi.org/10.5070/lr8241035525> accessed 20 April 2022, pp. 62—63.

means that would make particular modifications to the protected work —while still keeping its wholeness.[171]

3.7.2 FINGERPRINTING

Unlike hashing, which transforms the work into specified numbers, fingerprinting analyses the file and records its characteristics 'fingerprint'. This is done by AI technologies such as Deep Neural Network, which decompiles the original file into smaller audio or visual units. In most cases, even major changes in the file cannot avoid detection as an AI system with fingerprinting would compare countless characteristics, i.e. features or vectors, of uploaded files with those available in the database. Depending on the set threshold or sensitivity, the fingerpainting mechanism is activated once there are sufficient similarities.[172]

Now following a deeper analysis of the technological aspects of algorithmic tools used for copyright enforcement online, we can proceed to Section 4 to consider the risks and challenges of such mechanisms.

---

[171] Sartor and Loreggia (n 84) p. 40.

[172] ibid; Lester and Pachamanova (n 170) pp. 63—64; Jdhao, 'How Does The YouTube Content ID System Work?' (Jdhao's Digital Space, 28 November 2021) <www.jdhao.github.io/2021/08/02/the_youtube_content_id_system> accessed 10 May 2022.

4 DSM DIRECTIVE AND CHALLENGES OF ALGORITHMIC ENFORCEMENT OF COPYRIGHT

While most scholars see Art. 17 of DSM Directive itself as a human right concern, they fail to maintain a contextual view wherein DSM Directive is a part of the whole new algorithmic enforcement system. As opined by Frosio and Kuczerawy, 'for reasons of practicality and efficiency, involvement of intermediaries in content regulation seems inevitable … however, sufficient safeguards … must be put in place' [173] Hence, we can ask ourselves whether DSM Directive has been a remedy, providing 'sufficient safeguards' for this unregulated environment, or has it been simply a failure, or even perhaps extra pain? This will be considered after describing the fundamental rights context around the algorithmic enforcement system and assessing challenges and concerns.

4.1 NEW DECENTRALISED REGIME OF REGULATION AND CHALLENGES TO THE RULE OF LAW

Elkin-Koren and Perel recognise three roles for platforms (OCSSPs); 'legislature, 'judges', and 'administrative agencies'[174] The first role is played by OCSSPs where they provide rules to regulate users' behaviour on their platform. This can happen, among others things, through their terms of service and privacy policy. The second role as judges is where OCSSPs' human or algorithmic agents evaluate behaviour —or in the case of copyright, the uploaded content— based on the rules specified before. Finally, OCSSPs also act as administrative agencies where they take actions based on a judgment made in the previous stage, e.g. removing content.

As a result of this, different forms of power that have traditionally been distinct are accumulated in the single hand of OCSSPs. This is against the constitutional power granted to state in a democratic society, which heavily impacts the rule of law and equally other concepts such as transparency and accountability as well as free speech and public participation. In this new form of power distribution, online platforms take two forms that may be paradoxical. They are both private enterprises seeking their own economic interest as well as moderators of speech.[175]

---

[173] Frosio and Kuczerawy (n 88) p. 527

[174] Elkin-Koren, Niva, and Perel, Maayan, 'Guarding the Guardians: Content Moderation by Online Intermediaries and the Rule of Law' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), p. 670.

[175] ibid p. 671.

Once the new regime of algorithmic enforcement of copyright is considered, all these concerns intensify. One primary challenge of these algorithms to the rule of law is that they become, in effect, the new law. In this new system, users (legal subjects) do not necessarily have to worry about what is legally right or wrong and make their choices accordingly. Instead, they need to figure out the algorithm and adjust their behaviour according to the rules of the algorithm and not the rules of law.[176] Users would, over time, realise that the algorithm works in a certain way, and if they do or do not perform some specific actions, they would not 'get caught'. In other words, algorithm makes a new game, where the algorithm is the ruler and the law is much less important.

4.2 KEY ROLE OF PLATFORMS AND THEIR ALGORITHMS IN FREE FLOW OF INFORMATION

The right to freedom of expression is protected by Art. 10 of European Convention on Human Rights (ECHR) as well as Art. 11 of Charter of Fundamental Rights of the European Union (EUCF). This right possesses two aspects of holding and expressing opinions as well as the freedom to hear and access opinions and information.

Platforms now have a significant active role in how information is disseminated. Previously, platforms and particularly OCSSPs used to be seen as 'mere conduits'; this is no longer the reality.[177] In fact, now these platforms are active 'gate keepers'.[178] Platforms are able to give access to information or block it; they can recommend a piece of content on the tip of the iceberg or otherwise bury it deep down. They have the ability to 'set the tone of public debate'.[179] Hence, we can 'define them as a core component of the contemporary digital public sphere'.[180] In this function, OCSSPs can facilitate and improve public discourse or otherwise harm it by

---

[176] To read more about this form of challenge to rule of law see e.g. Bailey, Jonathan, 'Copyright in the Age of Bots' (Plagiarism Today, 23 September 2021) <www.plagiarismtoday.com/2021/09/23/copyright-in-the-age-of-bots> accessed 10 May 2022

[177] Mendis (n 11) p. 42; Pasquale, Frank, 'Bey.ond Innovation and Competition: The Need for Qualified Transparency in Internet Intermediaries' (2010) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.1686043> accessed 20 April 2022.

[178] McGonagle, Tarlach, 'Free Expression and Internet Intermediaries: The Changing Geometry of European Regulation' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), p. 479

[179] Leerssen, Paddy, 'Cut Out by the Middle Man: The Free Speech Implications of Social Network Blocking and Banning in the EU' (2015) 6(2) Journal of Intellectual Property, Information Technology and Electronic Commerce Law <http://ssrn.com/abstract=3494317> accessed 20 April 2022, p. 100; McGonagle (n 178).

[180] Mendis (n 11) p. 41.

over-enforcement or over-blocking —partly due to mistakes of law or fact.[181] Still, the main underlying reason is that platforms are always in fear of losing their immunity and therefore tend to be on the safe side and over-block rather than taking the risk.[182] Additionally, the whole business models of OCSSPs rely on the proprietary work of rightholders, where revenues are shared between the rightholders and the platform. Therefore, OCSSPs, in reality, are incentivised to claim rights (on behalf of the rightholder) on as much content as possible to monetise them.[183] The option for the user affected would be to dispute that claim, which, even if successful, the platforms would not lose anything. Still, as demonstrated by some studies, the average user would almost never go through the complex mechanism of disputing a copyright claim.[184]

All these issues can get aggravated with automated takedowns, which can be as inaccurate as being unable to assess legality in 30% of cases correctly.[185] There might be a false assumption that the current algorithm can genuinely perceive the content and make accurate judgments based on that. However, as seen in Section 3, still these technologies are tools, although advanced ones. They cannot truly understand a piece of content; they just pick up correlations following millions or billions of trial and error, errors that can be fixed in a certain situation but might be repeated in others. Hence, it has been observed by scholars including Frosio and Mendis that the algorithmic content recognition systems could be a threat to legitimate copyright exception uses,[186] which in fact, is the very foundation of balancing different rights surrounding copyrighted works. YouTube says outright 'The easiest way to deal with Content ID claims is to avoid them in the first place. Don't use copyrighted material unless it's essential

---

[181] Erickson, Kristofer and Kretschmer, Martin, 'Empirical Approaches to Intermediary Liability' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020), p. 112; Depoorter, Ben and Walker, Robert, 'Copyright False Positives' (2013) 89(319) Notre Dame Law Review <http://ssrn.com/abstract=2337684> accessed 20 April 2022.

[182] See e.g. Marsden, Chris 'How "Liberty' Disappeared from Cyberspace: The Mystery Shopper Tests Internet Content Self-Regulation' (Academia.Edu, 7 June 2014) <www.academia.edu/686683/How_Liberty_Disappeared_from_Cyberspace_The_Mystery_Shopper_Tests_Inter net_Content_Self_Regulation> accessed 10 May 2022: in an experiment called 'The Mystery Shopper' one of the ISPs removes a fully legitimate webpage after receiving a completely bogus complaint.

[183] Tune, Cydney, and others, 'The Rise of the Copyright Bots' (Internet & Social Media Law Blog, 22 April 2021) <www.internetandtechnologylaw.com/copyright-bots> accessed 10 May 2022.

[184] Urban, Jennifer M. and others, 'Notice and Takedown in Everyday Practice' (2016) UC Berkeley Public Law Research Paper No. 2755628 <https://doi.org/10.2139/ssrn.2755628> accessed 20 April 2022, p. 127.

[185] Urban and others (n 184) p. 2; However, the findings are inconsistent and some studies suggest that automated takedowns are largely accurate, e.g. see Gross, Grant, 'What's the Problem with DMCA Takedown Notices?' (PC World New Zealand, 22 May 2022) <www.pcworld.co.nz/article/541043/what_problem_dmca_takedown_notices> accessed 10 May 2022.

[186] Frosio and Mendis (n 32) p. 563.

to your video'.[187] Therefore, users should either forgo their fundamental rights or otherwise this can lead to a vast number of false positives. A situation that can be called the 'chilling effect' of algorithmic enforcement systems.[188]

4.3 ACCOUNTABILITY OF ALGORITHM AND CONCERNS OF TRANSPARENCY AND AUTONOMY

In the dystopian world that some writers describe, even the 'human soul' is comprehended and controlled by AI.[189] Lee contests the very idea that humans control and form technology.[190] In his opinion, 'technology should instead be viewed as the result of a Darwinian evolutionary process'.[191] This is a deterministic technology-driven view that while we create technology, the consequences are, in reality, beyond our free will. We talked about OCSSPs being legislature, judges, and enforcing agents. To take it to the next level, it could be argued that all humans, including the operators of OCSSPs, do not have much control over the algorithm. Although bots were initially intended to help humans in enforcing the law, due to the high number of complaints and limited human resources, we have given the wheel to the bots.[192]

While we can be sceptical of such overly pessimistic pictures, even viewing things from a Darwinist perspective, our fight for our rights and autonomy is what expected of us. Accountability of platforms is no longer sufficient; power should be accompanied by accountability, and hence the concept of 'algorithmic accountability' gains importance. Algorithmic accountability relates to a comprehensive form of accountability that endeavours to bring responsibility to the whole technological system, including the algorithm itself as well as the people designing, deploying, and using it.[193] In this regard, transparent systems have been

---

[187] Google, 'Frequently Asked Questions About Fair Use - YouTube Help' (Google) <www.support.google.com/youtube/answer/6396261> accessed 10 May 2022.

[188] Carpou (n 109) p. 554; Frosio and Mendis (n 32) p. 563.

[189] Kavenna, Joanna, *Zed: A Novel* (1st edn Doubleday 2020); Morison, John, 'Towards a Democratic Singularity ? Algorithmic Governmentality, the Eradication of Politics – and the Possibility of Resistance' in Simon Deakin and Christopher Markou (eds), Is Law Computable?: Critical Perspectives on Law and Artificial Intelligence (Hart Publishing 2020), p. 87.

[190] Lee, Edward A, 'Are We Losing Control?' in Hannes Werthner and others (eds) *Perspectives on Digital Humanism* (1st edn Springer 2022), p. 3.

[191] ibid

[192] Montagnani (n 45); Citron, Danielle Keats, 'Technological Due Process' (2008) 85(6) Washington University Law Review 1249 <http://openscholarship.wustl.edu/law_lawreview/vol85/iss6/2> accessed 20 April 2022; Tóth (n 144).

[193] Wagner, Ben, 'Algorithmic Accountability: Towards Accountable Systems' in Giancarlo Frosio (ed) *Oxford Handbook of Online Intermediary Liability* (Oxford University Press 2020) p. 679.

introduced as the main solution with practical suggestions such as transparency reports.[194] However, detailed reports are not intelligible to the typical user, and such reports, in any case, are often biased and cherry-picked.[195] For example, YouTube's transparency report tells us that less than 0.5% of counter-notices were submitted.[196] Assuming that this indicates almost a perfect enforcement fails to see the whole picture where users are often reluctant to file counter-notices due to practical difficulties as well as fear of facing court injunctions under DMCA if they fail to prove their innocence.[197]

Having seen such concerns and challenges, the legislature's response in the face of these issues should be assessed. To this end, we need to build our regulatory theory in order to ascertain the best approach and response.

4.4 LAW COMING TO AID, PRIMARY AND SECONDARY REGULATION

Generally, Lessig recognises four modalities of regulation through 'law', 'norms', 'market', and finally 'architecture'.[198] Indeed, the legislature can achieve its legislative goals through either of these or a combination of them, with each method having its own pros and cons. Specifically, concerning regulating speech, Balkin identifies 'old-school' and 'new-school' modes of regulation. The first mode traditionally deals directly with 'people', 'spaces' and 'predigital technologies'.[199] Here state attempts to regulate behaviour via direct intervention by more deterrent and incapacitating methods.[200] As a result of this, state and people interact directly, which is conducive to accountability and democracy. In the 'new-school' method — as a feature of the present age— regulation takes place primarily by controlling digital technologies, especially the internet. Online platforms at the centrepiece of the internet are moderators of speech. Therefore, state seeks to regulate platforms' behaviour indirectly, leading to regulating users. This method, by nature, is more preventive than punitive, avoids direct

---

[194] ibid p. 686.

[195] Perel, Maayan, and Elkin-Koren, Niva, 'Accountability in Algorithmic Enforcement' (2015) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2607910> accessed 20 April 2022 p. 529.

[196] Google, 'Copyright Transparency Report' (Google, 2021) <www.storage.googleapis.com/transparencyreport/report-downloads/pdf-report-22_2021-1-1_2021-6-30_en_v1.pdf> accessed 10 May 2022.

[197] Urban and other (n 184) p. 127.

[198] Lessig, Lawrence, 'The New Chicago School' (1998) 27(S2) The Journal of Legal Studies <https://doi.org/10.1086/468039> accessed 20 April 2022.

[199] Balkin, Jack M, 'Old School/New School Speech Regulation' (2014) Harvard Law Review Forthcoming, Yale Law School Public Law Research Paper no. 491, <http://ssrn.com/abstract=2377526> accessed 20 April 2022 p. 2306.

[200] ibid

interaction and tremendously uses incentivisation as the key method in shaping conduct.[201] However, as Sartor observes, a third form of regulation can also be identified, i.e. 'tertiary regulation'. [202] Instead of focusing on users, this method directly governs the very regulatory role of platforms and is aimed at restoring or maintaining the public authority.[203]

At any rate, the success of any of these regulatory approaches is not guaranteed. Indeed, the legislature would fail its secondary role of regulation where legitimate content is removed or where it loses control to supervise the implementation of the law. Now, take the example of unfair terms of platforms. To protect users against being subject to unfair and one-sided terms, there are two relevant doctrines of unfairness in the EU and unconscionability in the US, which both relate to cases wherein there is a practical impossibility to negotiate terms. This lack of equilibrium, quite plausibly, can give rise to a situation where platforms are able to insert unfair rights and obligations into their agreement.

In both legal systems, the abovementioned principles are enshrined in law, but we can ask how realistic and effective these rules are in today's world? Nowadays, we are so used to one-sided terms on platforms that taking an unfair agreement to court to have it revoked almost never happens. However, this does not mean that the problem is not there; it just means that the problem is practically out of hand and users cannot, in effect, exercise their rights. Thus, it could be said that while the principles exist unaffected, the safeguards devised by the legislature through secondary regulation are no longer effective.

Perhaps the same can be said about platforms, algorithms and copyright. By considering the concerns in this Section, we can conclude that while principles are in place and still seem fair and firm, rules are failing us, which would necessitate both a secondary and tertiary regulatory intervention by the legislature to maintain those principles and balance different rights involved. Indeed, we read in Recital 3 of DSM Directive that 'The objectives and the principles laid down by the Union copyright framework remain sound'. The recital continues that, however, there has been a need for 'adaptation' of those principles to the modern digitised context.

This adaptation, however, had to be quite fundamental in the sense of a paradigm shift. Mere tweaking of the previous regime —e.g. imposing transparency obligations— would not be

---

[201] ibid

[202] Sartor and Loreggia (n 84) p. 56.

[203] ibid

sufficient. While OCSSPs have been moderating speech, creating a chilling effect for their financial benefit, arbitrarily using the algorithm and many other challenges, they were not accountable for it. Wagner believes 'there are good reasons to increase the burden of liability on online intermediaries'.[204] Therefore, the substantial change of liability regime through DSM Directive seems to be the correct answer.

4.5   DSM DIRECTIVE, EXTRA PAIN OR A CURE?

As far as Art. 17 is concerned, opposing voices usually criticise the Directive for disrupting the necessary balance by pressing OCSSPs to widespread monitoring and filtering through deploying algorithmic technologies, which are, in their opinion, highly questionable.[205] Senftleben argues that while a voluntary regime of algorithmic enforcement of copyright might be acceptable if the law 'institutionalizes algorithmic enforcement and imposes a legal obligation on platform providers to employ automated filtering tools, the law itself transforms copyright into a censorship and filtering instrument'.[206]

However, I remain highly sceptical of such arguments. Many of these criticisms are struck with a dose of perfect solution fallacy considering regulation as black and nonregulation (voluntary regime) as white. While Art. 17 is by no means perfect, it might be able to ameliorate the disarranged situation without law, *completely* transforming 'copyright into a censorship and filtering instrument'[207]. Additionally —and closely relating to the previous argument— these criticisms fail to see that well before the adoption of the Directive, algorithmic systems were deployed, there were considerable numbers of false positives, unfair revenue distribution, lack of transparency and accountability and all other concerns discussed previously.

Already before the Directive the situation was very disordered; we read in an article voicing utmost disappointment that YouTube's Content ID 'doesn't work'.[208] It is unclear why a

---

[204] Wagner (n 193) p. 685.

[205] Frosio and Mendis (n 32) pp. 562—564: 'Of even greater concern is the high likelihood that the enhanced risks of liability for copyright infringement would compel OCSSPs to adopt automated filtering systems …', '… automatic infringement-assessment systems may undermine freedom of expression and information by preventing users from benefiting from exceptions and limitations granted under EU copyright law to make certain privileged uses of copyright protected content'.

[206] Senftleben (n 48) p. 300.

[207] ibid

[208] Geigner, Timothy, 'YouTube's Content ID System Flags, Demonetizes Video of Cat Purring' (Techdirt, 26 February 2022) <www.techdirt.com/2022/02/14/youtubes-content-id-system-flags-demonetizes-video-cat-purring> accessed 10 May 2022.

voluntary-private regime would function adequately, and legislative intervention would change things for the worse. Big names such as YouTube, Facebook, and Twitter have been engaged in automated ex ante enforcement and 'they create greater challenges to accountability because they are not subject to any regulation'.[209] Furthermore, in the US, it has been opined that:

> Since the DMCA has been around for well over a decade, its application to websites like YouTube indicates that it is governing websites that did not even exist when it was enacted in 1998. As a result, the application of the DMCA heavily favors the mass media copyright holders, and not the small users who generate much of the content on YouTube. Furthermore, [YouTube's Content ID] makes it much easier, and much more likely, for user-generated content to be flagged as infringing, regardless of the context in which it is uploaded.[210]

Given this and what seen prior to that[211], there have been sufficient reasons to adjust the accountability and liability of OCSSPs to suit the degree of power and control they possess. Thus, first and foremost, Art. 17.1 expands OCSSPs liability to an extraordinary degree. Furthermore, contrary to the criticisms, in fact Art. 17 of DSM Directive provide much more protection for users' fundamental rights as compared to the former voluntary regime. Although there is little doubt that the main incentive behind adopting DSM Directive has been economic reasons such as the issue of 'value gap' —discussed in Section 1— still the Directive as a whole and Art. 17, in particular, provide unprecedented protection of fundamental rights, which will be analysed below.

4.5.1 MANDATORY EXCEPTIONS AND LIMITATIONS AND THEIR PRACTICAL SAFEGUARDS

OCSSPs, as one of their core functions, are a place for users to make their own creative content, i.e. user-generated content; and indiscriminate or inaccurate filtering can in effect take away users' right to free expression.[212] In this light, Recital 70 of DSM Directive states:

> Users should be allowed to upload and make available content generated by users for the specific purposes of quotation, criticism, review, caricature, parody or

---

[209] Perel, Maayan, and Elkin-Koren, Niva, 'Accountability in Algorithmic Enforcement' (2015) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2607910> accessed 20 April 20222, pp. 504—505.

[210] Solomon, Leron, 'Fair Users or Content Abusers? The Automatic Flagging of Non-Infringing Videos by Content ID on YouTube' (215) 44(1) Hofstra Law Review <http://scholarlycommons.law.hofstra.edu/hlr/vol44/iss1/8> accessed 20 April 2022 p. 238.

[211] Wagner (n 193) p. 685.

[212] Senftleben, Martin, and others, 'The Recommendation on Measures to Safeguard Fundamental Rights and the Open Internet in the Framework of the EU Copyright Reform' (2017) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3054967> accessed 20 April 2022.

pastiche. That is particularly important for the purposes of striking a balance between the fundamental rights …

Art. 17.7 sets forth a list of such exceptions and limitations of copyright which must be respected despite the cooperative method of copyright enforcement in Art. 17.4. The Directive seeks utmost protection of these rights by making them 'mandatory'.[213] The wording of the article itself also supports the mandatory nature of these exceptions by using the phrase 'Member States shall ensure'.[214] This is a critical shift from the mechanism outlined in InfoSoc Directive[215] , which in Art. 5(3) enumerates a list of optional exceptions and limitations with Member States free to transpose any of them.

However, if these exceptions and limitations are at substantial risk of being frequently neglected by algorithmic systems, there should be some practical safeguards to protect them. While the exact way of safeguarding the right to rely on copyright exceptions and limitations is not evident from Art. 17 itself, the opinion of Advocate General and the EC's Guidance come to aid. We read in Advocate General's opinion that:

> [OCSSPs] are not allowed to preventively block **all** content reproducing the protected subject matter identified by the rightholders... It would not be sufficient for users to have the possibility, under a complaints and redress mechanism, to have their legitimate content re-uploaded after such preventive blocking. [216]

The opinion continues that: Consequently, sharing service providers must only detect and block content that is 'identical' or 'equivalent' to the protected subject matter identified by the rightholders, that is to say content the unlawfulness of which may be regarded as **manifest** …[217]

Just one month prior to that, the EC's Guidance explains that automated copyright enforcement 'should in principle be limited to **manifestly infringing uploads**'[218]. That means the proactive and ex ante enforcement of copyright has to be carried out only against a version of copyright-protected work with almost no doubt about its violation of copyright. The EC's Guidance clarifies that the most important indicators of a 'manifestly infringing' material are:

---

[213] Recital 70 DSM Directive.

[214] Senftleben (n 48) p. 314.

[215] Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society [2001] OJ L167/0010.

[216] Opinion of AG Saugmandsgaard Øe (n 60) p. 2 (emphasis added).

[217] ibid (emphasis added).

[218] EC's Guidance (n 52) p. 20 (emphasis added).

(1) 'the length/size of the identified content used in the upload'[219]

(2) 'the proportion of the matching/identified content in relation to the entire upload (e.g. whether the matched content is used in isolation or in combination with other content)' [220] and,

(3) 'the level of modification of the work (e.g. whether the upload matches only in part the identified content because it has been modified by the user)'.[221]

Next, EC's Guidance provides a practical example: 'Exact matches of entire works or of significant proportions of a work' are typically a clear instance of 'manifestly infringing' content. Although the threshold of 'significant proportion' is not clear, the guidance explains that usually, when there is a sufficient amount of creative modification done to the original work, and only a portion of it is used —for example, in the form of short extracts— that is non-manifestly infringing content.[222] If the uploaded content is not manifestly infringing, it must not be taken down, even if there is a degree of similarity. In such instances, the same traditional N&TD system is used; that means the content 'should in principle go online and may be subject to an ex post human review when rightholders oppose by sending a notice'.[223]

Although there is still some ambiguity left, what is certain is that OCSSPs need to employ manual ex post copyright enforcement more widely now compared to before DSM Directive. OCSSPs will have to increase the threshold (lower sensitivity) of AI content recognition systems. This approach by the Directive is truly the state-of-the-art approach in algorithmic copyright enforcement and its accountability. We can see that in the US, there have been opinions such as that: 'An ideal copyright bot should handle the clear cases outright (obvious piracy, significant infringement, etc.) but turned more nuanced cases over to humans. However, that rarely happens'.[224]

The European approach, at least on paper, is actualisation of such an ostensibly idealistic view. Collaboration seems to be the key in today's world of algorithmic enforcement; this is a solution in the face of the ever-increasing complexity and opacity of automated systems. The fact that

---

[219] ibid p. 21.

[220] ibid

[221] ibid

[222] ibid

[223] ibid p. 20.

[224] Bailey, Jonathan, 'Copyright in the Age of Bots' (Plagiarism Today, 23 September 2021) <www.plagiarismtoday.com/2021/09/23/copyright-in-the-age-of-bots> accessed 10 May 2022.

EC's Guidance presents the latest solutions to numerous challenges of automated enforcement is thanks to the call for collaboration by DSM Directive in Art. 17.10.

4.5.2 ENTERING HUMANS IN THE LOOP AND COUNTERING FALSE CLAIMS

The concerns relating to autonomy and accountability of algorithms necessitate a system that works responsibly at all levels of using the algorithm. One of the optimal ways to achieve this responsible behaviour and maintain the needed autonomy is designing an enforcement system that integrates algorithmic enforcement and human supervision. However, if humans decide on each individual case, the whole purpose of a proactive algorithmic system is lost. Still, Art. 17 is able to take a balanced approach by providing an effective solution and entering humans in the loop of algorithmic enforcement of copyright. Art. 17.9 expresses that 'decisions to disable access to or remove uploaded content shall be subject to human review'. Therefore, it can be deduced that the initial decision to accept proactive or preventive filtering in accordance with Art.17.4 (b) & (c) is subject to human review and merely the practical enforcement of that initial decision in subsequent cases can be assigned to the algorithm. Hence, perhaps it is not very convincing that Stamatoudi and Torremans argue that the mechanism of Art. 17 prioritises rightholders over other stakeholders with the requirement of acting 'expeditiously' in Art. 17.4(c) which takes away the chance of sufficient assessment of notices.[225]

On the contrary, Art. 17 attempts to counter the issue of bogus or hasty claims —which can also be detrimental to freedom of expression and flow of information— by providing that: 'Where rightholders request to have access to their specific works or other subject matter disabled or to have those works or other subject matter removed, they shall **duly justify the reasons for their requests**'.[226] This comes as the second step of the appraisal, along with the requirement that at all times, rightholders should provide OCSSPs with 'the relevant and necessary information' to benefit from the proactive protection of their works.[227]

4.5.3 LAST LINE OF DEFENCE: EFFECTIVE AND EXPEDITIOUS COMPLAINT AND REDRESS MECHANISM

Still, the first layer of safeguard might fail in some instances. Therefore, it was vital to set a procedure in place to protect the right of users who fall victim to faulty enforcement of

---

[225] Stamatoudi and Torremans (n 21) p. 743.

[226] Art. 17.9 DSM Directive (emphasis added).

[227] Art. 17.4.(b) DSM Directive.

copyright. In this regard, the Directive provides an opportunity to remedy users whose legitimate content has been unjustly taken down. As the last mechanism, Art. 17.9 clarifies that OCSSPs must be equipped with:

> [A]n effective and expeditious complaint and redress mechanism that is available to users of their services in the event of disputes over the disabling of access to, or the removal of, works or other subject matter uploaded by them ...

The final protective element is 'out-of-court redress mechanisms', which must be facilitated by Member States in parallel with traditional judicial remedies. It is noteworthy that an effective and efficient complaint mechanism also acts in favour of rightholders. This is because as a result of such a mechanism —with a robust discouraging factor for bogus claims— a lower number of genuine claims would be assessed faster yet more accurately.

Concluding this section, it appears that, contrary to some critics, DSM Directive can even improve the rather disordered fundamental rights situation in a voluntary regime. The Directive sets up a degree of liability that matches OCSSPs' authority. Also, the strong and multi-layered safeguards provided in Art. 17 seem to adequately protect users' rights in the face of the risk of over-blocking or over-enforcement. Nonetheless, there is a point for which Art. 17 can be criticised, and that is not determining the consequences of noncompliance by OCSSPs, which will be explained in the following Section.

5   FINAL EVALUATION OF ART. 17, COMPLIANCE BY OCSSPS, AND SUGGESTIONS

In this Section, Art. 17 of DSM Directive is assessed from a more holistic viewpoint in line with its primary objectives, such as licensing obligation. Next, notwithstanding limited information available, the Section will assess the current practices of OCSSPs and see whether they comply with Art. 17 of DSM Directive or otherwise if OCSSPs have an effective compliance plan in place as of now. Finally, considering the legal framework depicted, followed by an analysis of technologies used in algorithmic enforcement and the associated challenges and concerns, this Section puts forth some recommendations that can be considered during the transposition of the Directive or future legal amendments.

5.1   HAS ART. 17 BEEN ABLE TO ACHIEVE ITS GOALS?

5.1.1   FAILURE OF LICENSING IDEAL BUT ACHIEVING FAIRNESS

The main or one of the most important goals of Art. 17 of DSM Directive is ensuring that all copyrighted materials uploaded on OCSSPs are licensed in advance. I argue that to achieve this goal, Art. 17 could take two approaches, namely a strict or flexible approach. This is while, it seems the Directive took a combined approach that cannot fully benefit from the advantages of either of those approaches and conversely absorbs the negative aspects of both.

The Directive could impose 'strict' liability on OCSSPs. This would, as a result, mean that generally, OCSSPs' and users' fundamental rights concerns would come second for the DSM Directive, with the primary goal being protecting rightholders virtually at any cost. Where strict liability is imposed on OCSSPs, they would try to block any content that there might even be the slightest chance of illegality, just to be on the safe side. This would mean almost an ideal protection of the rights of copyright owners; users would realise that if they do not assess the legitimacy of the content of their uploads, their uploaded work would be taken down in a split second. Therefore, users would engage in thorough evaluations beforehand and ensure that copyrights related to the work are cleared or licensed. However, a strict approach creates genuine risks to fundamental rights. Imposing a strict liability not only would impose a huge pressure on OCSSPs but could also lead to over-blocking. Thus, the Directive left this approach in favour of one which is more 'flexible'. This flexible approach creates a special liability regime for OCSSPs. Recital 66 of the Directive tells us that:

> Taking into account the fact that online content-sharing service providers give access to content which is not uploaded by them but by their users, it is appropriate to provide for a specific liability mechanism ...

Therefore, the legislature recognised that creating a strict liability regime would be unrealistic, as the content is in the end uploaded by the users. This method, however, would be contrary to the licensing objective of the Directive. This is because, the true incentive for users to comply with an ex ante licensing system is either the concern that all content which is not licensed would be taken down by OCSSPs or that there would be some liability for users who disregard the licensing requirement. The first discouraging factor for users, namely that all non-licensed content would be proactively taken down, is not present. Indeed, the EC's Guidance and the Opinion of the Advocate General make it clear that OCSSPs should remove only 'manifestly infringing' material and other content which their unlawfulness is not evident should be uploaded and remain accessible.[228]

As a result, we would see what DeLisa calls 'upload first, assess later paradigm'[229]. While DeLisa uses the example of Content ID, we can apply the same logic to all content recognition technologies and the whole system created by Art. 17 of the Directive. To specify further, while the Directive's objective is to ideally encourage OCSSPs and their users only to publish licensed copyrighted works, this would hardly ever happen. Given that only 'manifestly infringing content' is taken down as well as that there is always a chance to remedy copyright infringement once the work is put up on the platform, few users would concern themselves with whether a work is actually permitted to be uploaded or not. They would upload the work, and the work remains there; the worst case should be any valid copyright claims on the content later, the users would still lose nothing. This is precisely against the primary intention of the legislature behind Art. 17 of DSM Directive, which is the ideal picture in which all works published on OCSSPs are licensed in advance, an all-works-licensed ideal. Therefore, the compromise made by the Directive is paradoxical to its objective.

On the other hand, the second discouraging factor for users to avoid uploading unlicensed content is that by uploading such content, they would face some liability, which is not present in the Directive. Therefore, while it seems initially that the Directive intended that all non-licensed content must be taken down from OCSSPs, given the fundamental rights concerns,

---

[228] Opinion of AG Saugmandsgaard Øe (n 60) p. 2; EC's Guidance (n 51) p. 20.
[229] DeLisa (n 121) pp. 1291—1292.

there was a compromise which appears to be inconsistent with the ideal objective of the Directive. However, even this compromise in favour of fundamental rights might not happen in reality. As argued by Mendis, while Art. 17 prohibits the removal of lawful material in the process of removing infringing content; it does not back this prohibition up with appropriate safeguards. It is unclear what ramifications OCSSPs would face if they, in practice, do not respect their obligations of not taking down legal (as well as non-manifestly infringing) content. On the other hand, it is clear that if they do not remove 'manifestly infringing' content, they would be directly liable for copyright infringement. Therefore, it might make sense for OCSSPs to remove some uploaded works which seem infringing, though not manifestly.[230]

However, failing the licensing ideal does not mean that the Directive was not able to achieve perhaps a more significant objective. If we agree that the Art. 17 as a whole mainly concerns itself with fair distribution of revenues gained from the use of copyrighted works; even in an 'upload first, assess later paradigm', this revenue would eventually be shared fairly between OCSSPs and rightholders; even though the work might not have been licensed previously. Therefore, from one perspective, the described problems with licensing and proactive enforcement could be seen as formal issues, as long as the revenue distribution is done properly. Additionally, one of the main achievements of Art. 17 of DSM Directive is entitling a greater number of rightholders to benefit from rights that were previously available only to a few. Indeed, it has been observed by Ginsburg that while already some of the requirements of Art. 17 is being performed voluntarily by OCSSPs 'EU approach should enable more authors and rightholders to obtain the benefits of licensing and ex ante blocking'.[231]

5.1.2 THE HARMONISING EFFECT

DSM Directive deserves to be lauded for ensuring harmonisation and encouraging collaboration. In recent years, different scholars have recognised the multiplicity of practices used on OCSSPs. For example, Urban and others observe that:

> The diversity of practice among both [OCSSPs] and rightsholders, and their lack of insight into each others' practices, were notable observations in Study 1. In this situation, organized guidance in the form of best practices and educational materials

---

[230] Mendis (n 11) p. 44; See also Senftleben, Martin, 'Bermuda Triangle – Licensing, Filtering and Privileging User-Generated Content Under the New Directive on Copyright in the Digital Single Market' (2019) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.3367219> accessed 20 April 2022:'the scope of this obligation and the consequences of insufficient support for relevant copyright limitations remain unclear'.

[231] Ginsburg (n 31) p.796.

could supplement statutory reform by sharing information and increasing the quality and accuracy of notice and takedown practice.[232]

Additionally, given the concerns relating to the rule of law in Section 4, harmonisation and standardisation of practices in this regard would be the right choice for the lawmaker. This harmonising effect by Directive is partly due to the Directive itself as a standardised document and the collaborative dialogues 'to discuss best practices for cooperation between online content-sharing service providers and rightholders' —required by Art. 17(10) of DSM Directive. However, the collaboration for best practices in Art. 17 is only to reach a conclusion on best practices acting as a guidance during transposition. In other words, this collaboration is not continuous and is merely a stage in adopting and transposing the Directive. Especially given the advancements of automated technologies and the everchanging creative behaviour of users, a legislative basis for continued cooperation of different participants in the industry would have been a better choice.

Furthermore, one obligation that closely relates to a collaborative approach is transparency. In the form of a regulatory approach where different stakeholders engage and state as the supervisory authority moderates the discourse, transparency is imperative to free, unbiased, and constructive dialogues. While there is a vague obligation of transparency located in Art. 17.10 of the Directive, this again seems to be only 'For the purpose of the stakeholder dialogues'[233]. In other words, in the same way that the collaboration located in the Article is merely a milestone, transparency also is only required in that step. Other obligations of transparency are included in Art. 17.8 and Art. 19; however, these solely relate to rightholders 'at their request' or only to 'information on the exploitation of their works'. Instead, without an obligation to reveal the source code, the legislature should have imposed concrete and ongoing obligations relating to the transparency of algorithmic and automated systems that all stakeholders, including users could access. Perel and Elkin-Koren argue in favour of 'mandatory disclosure' obligations as well as determining 'minimal standards for such disclosure duties'. [234] This should result from a 'collaborative-dynamic regulation' that devises sufficient flexibility for those standards to be updated regularly.[235] Considering all these shortcomings of DSM

---

[232] Urban and others (n 184) p. 133; See also Perel and Elkin-Koren (n 209), p. 530: 'Perhaps it would even be advisable to standardize measures of copyright infringement and fair use to create uniformity and consistency among the different intermediaries…'.

[233] Art. 17.10 DSM Directive.

[234] Perel and Elkin-Koren (n 209), p. 520.

[235] ibid

Directive, it is also noteworthy that in December 2020, the Proposal for Digital Single Market Act (DSA)[236] was published. This would also significantly impact the DSM Directive; this Act seems to significantly change the environment of OCSSPs operation and thus should be considered to provide a more fair and holistic judgment on DSM Directive.

5.1.3 DIGITAL SINGLE MARKET ACT, HAND-IN-HAND WITH DSM DIRECTIVE

According to Section 1 of the Explanatory Memorandum, which accompanies the Proposal for DSA, the Act aims at 'an ambitious reform of the existing EU e-commerce legal framework while maintaining the core principles ..'.[237] Given that DSA subjects all online platforms, one of the first questions would be: what happens to DSM Directive and OCSSPs. It is explained in Art. 1.5(c) that DSA is 'without prejudice to … Union law on copyright and related rights …'. Therefore, no provision of DSA would 'replace or amend' those of DSM Directive, but where the Directive is silent, the Act would 'complement'.[238]

As such, a lot of missing points in Art. 17 of DSM Directive will be completed by DSA. Art. 13 of the Proposal expressly requires transparency reports to be published at least annually by online platforms, which must include 'type of measures taken' in the role as moderators. According to Art. 33, this interval is reduced to 6 months for 'very large online platforms'. Art. 10 obliges platforms to introduce a 'point of contact' for providing a direct link between state authorities and the platform. There are also provisions relating to 'risk assessment' and 'mitigating' these risks, respectively envisaged in Arts. 26 and 27. Additionally, in line with the need for ongoing harmonisation and standardisation, Arts. 34 and 35 introduce the requirement for creating and updating standards and codes of conduct. Again, relating to 'very large online platforms', Art. 54 provides for a right to 'conduct on-site inspections', which would result in EC supervising 'organisation, functioning, IT system, algorithms, data-handling and business conducts' of platforms.

One valuable innovation of DSA is the introduction of 'trusted flaggers' in Art. 19. According to the Proposal, some entities will act as 'trusted flaggers' who are independent agents in

---

[236] Commission, 'Proposal for a Regulation of the European Parliament and of the Council on a Single Market For Digital Services (Digital Services Act) and amending Directive 2000/31/EC' COM(2020) 825 final, December 2020.

[237] ibid, p. 1.

[238] European Commission, 'Questions and Answers: Digital Services Act' (European Commission, 20 May 2022) <www.ec.europa.eu/commission/presscorner/detail/en/QANDA_20_2348> accessed 10 May 2022.

advance appraised by a designated state authority called 'Digital Services Coordinator'.[239] Trusted flaggers' notices —including those on copyright infringement— must be handled with priority by online platforms. All the obligations on platforms are explicitly safeguarded with the mechanisms in Section 5 of the Proposal for DSA, which introduces relevant authorities for enforcing the Act as well as the sanctions and penalties on noncomplying platforms. The effects of DSA in practice remain to be seen; however, as far as the topic of the present work is concerned, DSA would substantially increase algorithmic accountability and create a more complex yet sufficiently dynamic legal framework that suits today's everchanging digitised world.

5.2   OCSSPS' COMPLIANCE WITH ART. 17 OF DSM DIRECTIVE

Although DSM Directive as a directive has to be transposed and subsequently complied with the national versions by OCSSPs, currently, the majority of Member States who have adopted the Directive in their national law have included Art. 17 verbatim.[240] Therefore, in evaluating the compliance of OCSSPs with Art. 17 we can directly consider the text of that article. In view of that, it appears that so far, none of the major OCSSPs —except for YouTube— have provided the public with information on their compliance plan with the Directive. Relating to Art. 17 of DSM Directive, YouTube has announced that:

> YouTube supports updating copyright rules for the digital age and has been working closely with policymakers across Europe on Article 17's implementation and on a means of compliance that best meets the needs of our partners' growing businesses.[241]

Although this collaborative approach is valuable, from reading YouTube's plan, it seems the actual means of compliance do not introduce any new changes. The plan reemphasises the role of already-exiting tools such as Content ID and Copyright Match Tool. However, as it will be

---

[239] Digital Services Act Art. 38: 'Member States shall designate one of the competent authorities as their Digital Services Coordinator. The Digital Services Coordinator shall be responsible for all matters relating to application and enforcement of this Regulation in that Member State, unless the Member State concerned has assigned certain specific tasks or sectors to other competent authorities. The Digital Services Coordinator shall in any event be responsible for ensuring coordination at national level in respect of those matters and for contributing to the effective and consistent application and enforcement of this Regulation throughout the Union'

[240] For more details see: Killeen, Molly, ,Copyright Directive Transposition Still Lagging Despite Infringement Procedures' (Euractiv, 14 April 2022) <www.euractiv.com/section/digital/news/copyright-directive-transposition-still-lagging-despite-infringement-procedures> accessed 10 May 2022; Matas, Ariadna, 'Copyright Directive Series: Progress in the Directive Transposition' (Europeana Pro, 21 April 2022) <www.pro.europeana.eu/post/copyright-directive-series-progress-in-the-directive-transposition> accessed 10 May 2022.

[241] Pancini, Marco, 'YouTube's Approach to Copyright' (Google, 31 August 2021) <www.blog.google/around-the-globe/google-europe/youtubes-approach-to-copyright> accessed 10 May 2022.

shown, such systems do not fully comply with DSM Directive and require modification. Thus, YouTube and other OCSSPs that do not abide by DSM Directive should reconsider their approach to avoid problems such as the case of €500 million fines on YouTube by French authorities —although relating to a different part of DSM Directive on 'tax link'.[242]

5.2.1 PROACTIVE REMOVAL OF MATERIALS THAT ARE NOT MANIFESTLY INFRINGING

As explained in Section 3, automated copyright enforcement tools that function using content recognition technologies provide different settings that their operators can tweak to optimise their ability to detect infringing content. One of such options is the ability to modify algorithm sensitivity or threshold; the lower the threshold, the higher the chances of matching two materials that are not identical or similar but merely have negligible resemblance. Now OCSSPs are required only to proactively monitor and remove 'manifestly infringing content'.[243] This would require these platforms to adjust their algorithm sensitivity accordingly, i.e. either increase or decrease the threshold. To elaborate, on the one hand, if an OCSSP now is employing a more lenient approach and is allowing the majority of uploaded materials to be published unless it is almost a complete copy of another work —for which beforehand rightholders have provided the necessary information; that OCSSP need to increase the sensitivity of its algorithmic content recognition technologies so that those technologies also proactively block uploaded materials with its majority consisting of a copyrighted work that is not meaningfully modified in the uploaded content. This is the result of the criteria provided by the EC's Guidance.[244] Thus, YouTube's Copyright Match Tool, for example, seems to not comply with this requirement. Aside from that Copyright Match Tool is an ex post tool; the problem here is that Copyright Match Tool only detects 'full or nearly-full matches'[245] of a copyrighted work.

On the other hand, in cases where the sensitivity of content recognition technologies is too high, it should be lowered to be limited only to 'materially infringing content'. That means a

---

[242] Telarico, Fabio, 'The Day France Fustigated Big Tech: How Google Ended up in the Crosshair and What Will Follow' (Modern Diplomacy, 21 October 2021) <www.moderndiplomacy.eu/2021/07/29/the-day-france-fustigated-big-tech-how-google-ended-up-in-the-crosshair-and-what-will-follow> accessed 10 May 2022.

[243] Opinion of AG Saugmandsgaard Øe (n 60) p. 2; EC's Guidance (n 52) p. 20.

[244] EC's Guidance (n 52) p. 20.

[245] Google, 'Use the Copyright Match Tool - YouTube Help' (Google) <www.support.google.com/youtube/answer/7648743> accessed 10 May 2022.

copyrighted work that only a portion of it is used in the uploaded material —especially in a creative manner— should not be subject to proactive takedown. Again, it seems the practice of YouTube with its Content ID is in contrast with this requirement. YouTube announces that: 'you could end up with a Content ID claim … even if you only use a few seconds, such as short uses of popular songs'.[246] However, using only a few seconds of a popular song seems certainly not to be an instance of 'manifestly infringing content' once EC's test is applied.[247] Therefore, within the territory of the EU, this requires changing rules by YouTube and other OCSSPs who follow the same practice. They have to take a minimalist approach and limit ex ante protection only to the unauthorised content with little or no doubt of their illegality.

5.2.2 RIGHTHOLDERS CAN POTENTIALLY ASK PROACTIVE REMOVAL OF NON-COPYRIGHTED WORKS

Another requirement of Art. 17 of DSM Directive is that OCSSPs should make 'best efforts to ensure the unavailability of specific works and other subject matter for which the rightholders have provided the service providers with the relevant and necessary information'. However, 'the relevant and necessary information' could only be provided on 'copyright-protected works or other protected subject matter'.[248]Additionally, Art. 17.9 of the Directive expresses that:

> Where rightholders request to have access to their specific works or other subject matter disabled or to have those works or other subject matter removed, they shall duly justify the reasons for their requests … decisions to disable access to or remove uploaded content shall be subject to human review.

Therefore, before OCSSPs accept a proactive monitoring request, they must require sufficient reasons from rightholders which have to be reviewed by a human agent. Nevertheless, it seems that users of Content ID can claim ownership of any material without any pre-assessment by human agents, even if the material is a recording of a cat purring[249]. This is certainly against the provisions of the Directive as well as the requirement that only manifestly infringing content should be proactively taken down. Therefore, YouTube and other OCSSPs should accept

---

[246] Google, 'Frequently Asked Questions About Fair Use - YouTube Help' (Google) <www.support.google.com/youtube/answer/6396261> accessed 10 May 2022.

[247] EC's Guidance (n 52) p. 20.

[248] Art. 17.1 DSM Directive.

[249] Sar, Ernesto van der, 'YouTube Flags Cat Purring as Copyright Infringing Music' (Torrentfreak.com, 2 July 2020) <www.torrentfreak.com/youtube-flags-cat-purring-as-copyright-infringing-music-150211> accessed 10 May 2022; Geigner, Timothy, 'YouTube's Content ID System Flags, Demonetizes Video of Cat Purring' (Techdirt, 26 February 2022) <www.techdirt.com/2022/02/14/youtubes-content-id-system-flags-demonetizes-video-cat-purring> accessed 10 May 2022.

'relevant and necessary information' only on materials that are actually copyrighted. However, YouTube's appraisal is carried out only at the stage of granting users access to Content ID and not when they introduce a piece of work for proactive monitoring via Content ID. [250] The safeguard put in place by YouTube is that 'copyright owners who repeatedly make erroneous claims can have their Content ID access disabled and their partnership with YouTube terminated'. However, this is not enough since the Directive makes it clear that each request for proactive takedown should be assessed in advance.

5.2.3 CONTENT ID AND SIMILAR TOOLS ARE NOT AVAILABLE TO EVERYONE

One of the fundamental problems with Content ID (and Facebook's Rights Manager) is that this tool is not available to all users. This is while the rights envisaged in Art. 17 are granted to *all* rightholders. Any rightholder has the right to 'provide relevant and necessary information' using means 'in accordance with high industry standards of professional diligence'. Therefore, it could be argued that content recognition tools — which are currently the high industry standard— must be available to all rightholders. However, YouTube's Content ID, for example, is only available to a limited group of rightholders.[251]

Thus, on the one hand, it could be argued that the limited availability of Content ID deprives most users of exercising their rights under Art. 17. On the other hand, it could equally be argued that Art. 17 is always subject to a proportionality test and only requires 'best efforts'. Since the general availability of a powerful content recognition tool such as Content ID to all users would entail tremendous risks of abuse and harm to free speech, this tool should be exclusive to some users for the sake of practicality. Nonetheless, the requirements for giving Content ID to users still seem to be too high and in contrast with DSM Directive as the *majority* of rightholders are not entitled to gain access to such a tool. Content ID is only given to rightholders with many exclusive copyrighted works prone to frequent infringement;[252] therefore the majority of users cannot benefit from this state-of-the-art mechanism of protecting their rights.

---

[250] Google, 'Qualify for Content ID - YouTube Help' (Google) <www.support.google.com/youtube/answer/1311402> accessed 10 May 2022.

[251] Google (n 123); similar is the case of Facebook's right manager, see Facebook (n 132).

[252] Google, 'Qualify for Content ID - YouTube Help' (Google) <www.support.google.com/youtube/answer/1311402> accessed 10 May 2022.

5.2.4 WHILE DMCA TAKEDOWNS ARE MANDATORY, STILL EX ANTE ENFORCEMENT IS DEEMED A VOLUNTARY MEASURE

In all US-based OCSSPs, in addition to different copyright protection tools such as automated content recognition technologies, there is an option to file a 'complete' copyright infringement claim under DMCA.[253] Even when accessing these OCSSPs from the EU area, the same DMCA mechanism and practices are still present. While this is not problematic per se, this approach is not comprehensive in the EU. This is because, other than a DMCA copyright claim, other tools such as Content ID are deemed voluntary policy-based measures which are different from a formal and legal takedown request under DMCA. However, in the EU, given DSM Directive, the legal status of ex ante enforcement technologies could change from a mere voluntary measure to a legal requirement. Despite this, platforms maintain their traditional view; YouTube explains that 'Unlike takedowns, which are defined by law, Content ID is a YouTube system that is made possible by deals made between YouTube and content partners who have uploaded material they own to our database'.[254]

Viewing content recognition tools as voluntary has numerous practical effects. For example, the failure of platforms to comply with DMCA copyright claims would mean that they lose their safe harbour under DMCA. Now in the EU, the safe harbour may be lost if OCSSPs do not properly engage in ex ante enforcement of copyright under DSM Directive. Additionally, a successful DMCA takedown results in the infringing content being completely removed from the OCSSP's servers, meaning that it would no longer be accessible by any user from any part of the world. This is while, a Content ID takedown on YouTube, for example, does not necessarily have a worldwide effect.[255] Therefore, it might be necessary that in the EU, proactive copyright enforcement tools such as Content ID have to be given powers equal to that which is currently done as DMCA takedowns.

Additionally, as seen in Section 2, under DMCA, after a rightholder submits a claim, the alleged infringer can *merely contest the claim* (submit counter-notification), whereafter the

---

[253] See e.g. YouTube, 'What Action Does YouTube Take for Copyright Infringement?' (YouTube) <www.youtube.com/intl/en_us/howyoutubeworks/policies/copyright/#enforcing-copyright> accessed 10 May 2022; Facebook, 'How Do I Report Copyright Infringement on Facebook?' (Facebook) <www.facebook.com/help/325058084212425> accessed 10 May 2022.

[254] Google, 'The Difference Between Copyright Takedowns and Content ID Claims - YouTube Help' (Google) <www.support.google.com/youtube/answer/7002106> accessed 10 May 2022.

[255] Google, 'What Is a Content ID Claim? - YouTube Help' (Google) <www.support.google.com/youtube/answer/6013276> accessed 10 May 2022.

rightholder's only choice is to take judicial action against the user.[256] This is contrary to DSM Directive, which does not give the option for the alleged infringer to *merely contest the claim*; rather, the user will have to seek 'complaint and redress mechanism' of Art. 17.9. In other words, with the European approach, the burden of proof stays with the alleged infringing user. Thus overall, it seems that currently, the way copyright is enforced on most popular American OCSSPs is DMCA-focused, and there is little, if any, heed to the European approach to copyright enforcement. While before, this was not much of a problem given the similarity of the legal frameworks in the EU and US, now OCSSPs need to design a new system that complies with specific requirements of EU law.

5.3 SUGGESTIONS FOR TRANSPOSITION AND FUTURE LEGAL AMENDMENTS

As Art. 17 of DSM Directive by design is flexible in order to fit technological advancements and that members states are granted a rather large degree of discretion in determining many specificities of Art. 17 during transposition, there seems to be room for suggestions for transposition as well as for improvements in the future legal framework. The provided suggestions are based on the premise that the algorithm is a reality of the digitised world and its development and prevalence is an inevitable future.

5.3.1 INCREASED ALGORITHMIC TRANSPARENCY AND ENCOURAGING PUBLIC PARTICIPATION

This differs from transparency in the operation of OCSSPs and refers to the transparency in the algorithm they use[257]. Since algorithms are already here and in use, any legislation should seek to bolster the transparency of such systems. Although transparency alone is by no means a panacea, along with other measures that increase algorithmic accountability, transparency would act as a starting point. If we intend to regulate algorithms and adapt them according to legal principles —or adapt legal principles according to the algorithm in certain cases— a

---

[256] 17 U.S. Code § 512 (g)(2) & (3).

[257] The transparency in algorithm is subdivided into multiple areas, see: McGregor, Lorna, Murray, Daragh, and, Ng, Vivian, 'International Human Rights Law as a Framework for Algorithmic Accountability' (2019) 68(2) International and Comparative Law Quarterly <https://doi.org/10.1017/s0020589319000046> accessed 20 April 2022, p. 321: 'Transparency in this context can relate to information regarding why and how algorithms are developed, the logic of the model or the overall design, the assumptions underpinning the design process, how the performance of the algorithm is monitored, how the algorithm itself has changed over time, and factors relevant to the functioning of the algorithm, such as data inputs (including proxies), and the relative weight attributed to inputs'.

meaningful degree of understanding of algorithms is imperative. Similarly, the way and amount OCSSPs use algorithms, the percentage of their successful or failed use and all other relevant information, including the number of requests received, should be clear. While OCSSPs already voluntarily share information, this is not sufficient as these reports are often cherry-picked and biased.[258]

However, it is important that at all times, a proper balance is maintained with regard to transparency obligations. Imposing stifling transparency obligations on OCSSPs and practically taking away any freedom of choice would be in no one's interest. If OCSSPs feel that they are operating in an insecure environment, they would enforce copyright in an inefficient and overcautious manner, which would be against the principle of balancing rights required in copyright enforcement. At the same time, transparency should not be merely understood as an obligation of OCSSPs. True transparency should come from a transparent ecosystem in which OCSSPs —as one of the stakeholders— act responsibly and transparently. However, this form of transparency is only actualised when all other stakeholders are also involved in a communicative and collaborative manner. In this regard, Perel and Elkin-Koren, suggest algorithm 'tinkering'[259] stemming from the ideas of Felten to have the 'freedom to understand, discuss, repair, and modify the technological devices you own'.[260] Tinkering in the context of OCSSPs relates to regular testing of algorithmic systems and documenting the results in order to understand the practical functioning of automated systems.[261] This would mean that regardless of how exactly the code is written, the *actual way* code is complying with the law is monitored continuously. Given that tinkering is a real-time method, it is very useful in keeping up with the ongoing machine learning developments.[262] Conducting tinkering would virtually in all cases be against terms of use of OCSSPs since tinkering by nature involves the manipulation of OCSSPs technologies and algorithms. If not already covered by the right to reverse engineering, a legislative measure could protect such practices which are performed by 'researchers, journalists, and activists acting in good faith to test compliance by platforms'.[263]

---

[258] Perel and Elkin-Koren (n 195) p. 529.

[259] Elkin-Koren and Perel (n 174); Perel, Maayan, and Elkin-Koren, Niva, 'BLACK BOX TINKERING: Beyond Transparency in Algorithmic Enforcement' (2016) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.2741513> accessed 20 April 2022.

[260] Felten, Ed, 'The New Freedom to Tinker Movement' (Freedom-to-Tinker, 21 March 2013) <www.freedom-to-tinker.com/2013/03/21/the-new-freedom-to-tinker-movement> accessed 10 May 2022.

[261] Elkin-Koren and Perel (n 174) p. 676.

[262] ibid p. 677.

[263] ibid p. 678.

5.3.2 INCREASED AND ONGOING COLLABORATION

For various reasons discussed in the present work, including different rights involved, it seems that any successful legislation should be built on the mindset that all stakeholders should have a say. A top-down method of legislation with strict obligations does not seem to be the right choice in today's digitised world. The collaboration here concerns at least two stages, first in legislation and second in its implementation. Also, in the stage of development of the code, close communication between the legislature and OCSSPs as well as other actors would ensure that an efficient and practical legal initiative is taken. For example, by analysing the vast amount of data from previous years regarding methods used in enforcing copyright, the lawmaker can opt for one or some of the methods in order to standardise the best practices. Also, dialogues between actors in the field would ensure that OCSSPs and rightholders who have more experience and expertise than the legislature are actively involved.

In this regard, Art. 17 of DSM Directive calls for a short-term set of dialogues in order to prepare a guidance on best practices to be used during transportation. While this is a good innovation that involves all stakeholders, including users' organisations, equally important is that this collaboration continues indefinitely to guarantee the best form of implementation and timely amendments. This is because users change behaviour[264], OCSSPs create new technologies, and rightholders employ new means of detecting infringing content and enforcing their rights. It is argued that in this dynamic environment, legislation should be sufficiently flexible with internalizing cooperation and communication as ongoing elements. Moreover, this maintains the required balance at all times, and algorithmic enforcement of copyright would be accompanied by the necessary accountability in both algorithmic and operative layers. Therefore, it is suggested that the European legislature continually engage with OCSSPs and other stakeholders and actively evaluate the practices used to enforce copyright online.

5.3.3 SUPERVISORY AUTHORITIES AND NGOs

Both increased transparency, as well as collaboration necessitate expanding regulatory authority. To achieve this, specific groups designated to monitor the mode of operation of OCSSPs as well as to assess the impact they leave on users' rights should be established. However, this role should not be limited to public authorities only. NGOs also can greatly improve the environment and safeguard fundamental rights. Such organisations already existing

---

[264] To read more about 'creative choices' by users see: Yu, Peter K, 'Can Algorithms Promote Fair Use?' (2020) 14(2) FIU Law Review <https://doi.org/10.25148/lawrev.14.2.12> accessed 20 April 2022, p. 354.

should be further supported; it is reported that the majority of EU Member States do not even have sufficient information about the amounts of spending on such organisations and projects.[265] Additionally, it is advisable that organisations also are given the required immunity in order to be able to carry out the algorithmic 'tinkering' described above.[266] In Europe, there are organisations such as noyb[267] and European Digital Rights (EDRi)[268] missioned to support users' rights, specifically privacy and data protection in the digital environment. However, the missing part seems to be a specific focus on holding automated enforcement systems accountable and assessing compliance with DSM Directive and its Art. 17. The concerns should, among others, be whether OCSSPs engage in ex ante protection of copyright only relating to manifestly infringing contents while not interfering with other forms of content and whether the rights given to rightholders under Art. 17 is available to all copyright owners or only to those with huge revenues and influence.

One organisation which, as one of its core missions, is focused on thorough auditing of OCSSPs is Electronic Frontier Foundation (EFF)[269]. As an example, since '[b]ogus copyright and trademark complaints have threatened all kinds of creative expression on the Internet'[270] EFF started a project called 'Takedown Hall of Shame', which facing false copyright claims 'collects the worst of the worst'[271] and takes reports from users who believe their rights have been violated. While EFF is an international non-profit organisation, it is primarily concerned with American copyright law, including impact assessment relating to the principle of fair use. Therefore, having an equivalent in the EU which appraises OCSSPs from the prism of European copyright and fundamental right might be a valuable contribution in protecting the rights of EU internet users.

Additionally, already at the stage of developing algorithms for enforcing copyright, there is a need for supervisory groups. Developing algorithms exclusively by OCSSPs would mean reinstating all the biases those platforms have into the code and, more obviously, designing the

---

[265] European Union Agency for Fundamental Rights 'Challenges Facing Civil Society Organisations Working on Human Rights in the EU' (2017) <fra.europa.eu/sites/default/files/fra_uploads/fra-2018-challenges-facing-civil-society_en.pdf> accessed 20 April 2022.

[266] Perel and Elkin-Koren (n 258).

[267] Noyb, 'NOYB Enforces Your Right to Privacy Everyday' <www.noyb.eu/en> accessed 10 May 2022.

[268] EDRi, 'European Digital Rights (EDRi)' (EDRi) <www.edri.org> accessed 10 May 2022.

[269] EFF, 'The Electronic Frontier Foundation' (eff.org) <www.eff.org> accessed 10 May 2022.

[270] EFF, 'Takedown Hall of Shame' (Electronic Frontier Foundation, 9 April 2019) <www.eff.org/takedowns> accessed 10 May 2022.

[271] ibid

code per their interest. The algorithm has to be designed impartial and be executed impartially; 'impact assessments should be conducted during each phase of the algorithmic life cycle'[272]. When the algorithm is being developed, it should be assessed by different stakeholders and supervisory authorities in order to provide 'an opportunity to modify the design of an algorithm at an early stage [and] to build in human rights compliance'.[273]

5.3.4 INCREASING THE ROLE AND RESPONSIBILITY OF THE USER

In line with the same principles, users' role in protecting and enforcing copyright should be bolstered. While users traditionally have had an ex post role in enforcement by reporting copyright-infringing content, given the paradigm-level change, users' participation in ex ante protection of copyright should be increased. For example, users' expanded involvement can be during the upload. YouTube has stated on its website that its Content ID does not take into account fair use or copyright exception. [274] To protect users against unfair takedown of their content in cases of expectations and limitations of copyright, users could be given an option to declare in advance that they believe the uploading content falls under exceptions and limitations of copyright, for example, by marking a checkbox during upload. When this option is activated, the uploaded content should be excluded from ex ante review by content recognition technologies and instead should be assessed by a traditional N&TD system with a human agent deciding the case. Of course, if such an option is offered, there should be appropriate safeguards to prevent abuse, for instance, removing users' accounts who repeatedly have used such an option bogusly.

Furthermore, as it was seen above[275], in an alternative liability regime created by DSM Directive, users would likely concern themselves little with whether a copyrighted work is actually permissible to be uploaded or not. This means that only an over-enforcing ex ante protection could ensure that users thoroughly consider licensing obligation beforehand, which itself would create a chilling effect on lawful content as well. Instead, minimalistic enforcement accompanied by clarifying the liability of infringing users would be a helpful option. Not only

---

[272] McGregor, Murray, and, Ng (n 257) p. 330.

[273] ibid

[274] Google, 'Frequently Asked Questions About Fair Use - YouTube Help' (Google) <www.support.google.com/youtube/answer/6396261> accessed 10 May 2022.

[275] DeLisa (n 229).

this would have a harmonisation and balancing effect, but it also would counter an 'upload first, assess later paradigm'[276] or otherwise over-enforcement by OCSSPs.

5.3.5 OCSSPS SHOULD USE MORE ALREADY-AVAILABLE SOPHISTICATED TECHNOLOGIES

As seen in Section 3, currently, automated copyright enforcement —even in its most advanced form— is using relatively simpler technologies. The most complex of these technologies employs AI only in order to detect the audio and visual similarity of two pieces of content together. While this is useful in ordinary cases, these technologies vastly fail to detect fair use or copyright exceptions and limitations. This is why OCSSPs should put more effort and investment in deploying more advanced technologies with a better judgment capacity, which are already available and in use in other areas.[277]

Yu opines that automated tool such as Content ID 'has yet to realize the full potential generated by [big data, machine learning, and artificial intelligence]'.[278] Understanding many copyright exceptions depends on comprehending the intent of the user and the context of use. In this regard, NLP[279] and other language processing technologies can come to aid. Already platforms are using AI with language processing power to counter violent, hateful or extremist content.[280] Therefore, OCSSPs should be encouraged to embed such more complex and efficient technologies into automated copyright enforcement as well. This would improve the issues regarding copyright exceptions and would be, in fact, in line with the 'high industry standard' requirement of Art. 17 of DSM Directive as well.

---

[276] ibid

[277] Tóth (n 144) p. 372; Elkin-Koren, Niva, 'Fair Use by Design' (2017) 64(22) UCLA Law Review <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=3217839> accessed 20 April 2022.

[278] Yu, Peter K, 'Can Algorithms Promote Fair Use?' (2020) 14(2) FIU Law Review <https://doi.org/10.25148/lawrev.14.2.12> accessed 20 April 2022, p. 342.

[279] Markou and Deakin (n 165).

[280] See Langvardt, Kyle, 'Regulating Online Content Moderation' (2017) SSRN Electronic Journal <https://doi.org/10.2139/ssrn.302473> accessed 20 April 2022, p. 1362, the author writing about moderating hateful, violent, and extremist content on platforms: 'Increasingly, the work is done by algorithms—artificial neural networks that have been trained to achieve a high rate of "accuracy' in categorizing offensive content'; See also Facebook, 'How Facebook Uses Super-Efficient AI Models to Detect Hate Speech' (Facebook, 19 November 2020) <www.ai.facebook.com/blog/how-facebook-uses-super-efficient-ai-models-to-detect-hate-speech> accessed 10 May 2022; Facebook, 'Community Standards Report' (Facebook, 13 November 2019) <www.ai.facebook.com/blog/community-standards-report> accessed 10 May 2022: Facebook is using AI and a technology named 'Whole Post Integrity Embeddings' (WPIE); YouTube Team, 'An Update on Our Commitment to Fight Violent Extremist Content Online' (Blog.Youtube, 18 October 2017) <www.blog.youtube/news-and-events/an-update-on-our-commitment-to-fight> accessed 10 May 2022.

6 CONCLUSION

Algorithm is a reality in our world today. Every day, we are witnessing that algorithm is increasingly impacting our lives with the unprecedented integration of digital and physical worlds with concepts such as algorithmic society[281] and Society 5.0[282]. Facing the realities of cyberspace, platforms found no other option than seeking algorithm's help. The number of internet users and generally internet traffic has risen exponentially in the past years, and the same substantial change holds true for the behaviour of users online. We are no longer living in a society where the internet is merely used for the dissemination of classic forms of data, but rather entertainment is now at its core; 'More than 70% of internet traffic during peak hours now comes from video and music streaming'[283]. At the same time, the way piracy works has significantly changed, piracy is not necessarily secretly exchanging pirated content, but nowadays, pirates might publicly upload unauthorised content on OCSSPs such as YouTube and gain profits as long as the content is up. These changes have to be recognised; content should be sufficiently protected and, equally important, distributed seamlessly.

However, the legal system, for the most part, lagged behind these trends. E-Commerce Directive in the EU and Section 512 of DMCA traditionally have been the relevant legislation for the liability of the online platforms. In both legal systems, platforms bore no responsibility for ensuring that the uploads on their platforms are lawful content in terms of copyright. As a result, there was no duty to actively monitor the uploaded materials in order to find illegal content, and they have used a traditional system of copyright enforcement based on users' detection and reporting of unauthorised content. However, this system did not work efficiently, rightholders (such as Viacom)[284] were dissatisfied, and the integrity of platforms was in danger. Hence, online platforms, led by YouTube, took the initiative to fix the deficiencies of law by creating a decentralised voluntary system of their own. This new system went well beyond the traditional N&TD mechanism, where the role of automation was as much as merely automatically deleting the reported uploads. The new system has used more complicated technologies such as hashing and fingerprinting in order to proactively look for uploaded

---

[281] Balkin (n 5).

[282] Society 5.0 (n 1).

[283] D'Onfro, Jillian, 'More Than 70% of Internet Traffic During Peak Hours Now Comes From Video and Music Streaming' (Business Insider, 8 Dec. 2015) <www.businessinsider.com/sandvine-bandwidth-data-shows-70-of-internet-traffic-is-video-and-music-streaming-2015-12?r=US&IR=T> accessed 10 May 2022.

[284] Viacom v YouTube (n 119).

material similar to those the algorithm was told to compare. Content ID as the quintessential example very well demonstrates how YouTube has emerged acting as the new legislature with a vastly voluntary regime of automated copyright enforcement with interesting internal policies such as the 'copyright strike'[285].

This voluntary system, however, brought numerous challenges with it. First is the primary problem of the rule of law. Traditionally, in tyrannies, all the power, including the power to set rules, judge based on those rules, and execute those rules, have been accumulated in the hands of one person or a group of few people. We have witnessed the severe costs of such power accumulation, and that is where the principle of distribution of power finds its true meaning. Nowadays, perhaps equally threatening to our societies is the similar problem of private entities with the power to be legislators, judiciaries, and governments. Not only this is against the abovementioned principle, but also threatens the rule of law as the democratic volition of all citizens. Such concerns are exacerbated when we notice that this power is granted to algorithm, then there could be deep worries about our potentially lost autonomy against a system that we can barely comprehend how it operates when it becomes so complex that functions in a 'black box'.

In light of all these trends, the EU took the initiative and spearheaded a set of swingeing yet almost timely amendments in its system, inter alia with DSM Directive. The Directive deals with issues much more than the scope of this thesis; however, Art. 17 of the Directive has been most interesting to our purpose. With Art. 17 EU has forgone the traditional system where online sharing platforms could enjoy the revenues generated from unauthorised content in the safe harbour. The EU legislature now holds platforms liable for copyright-infringing content unless they employ the best efforts to counter unauthorised materials using best techniques or technologies possible proportionate to each particular case. DSM Directive now ideally wants that copyright infringement be tackled at its roots, before the content goes online. Although the concerns of the EU legislature were mostly financial with the DSM Directive, a human rights assessment of the Directive could not be dispensed with. That is why we asked the question that facing the associated human right concerns, was DSM Directive 'extra pain or a cure?'

---

[285] Google, 'Community Guidelines Strike Basics - YouTube Help' (Google) <www.support.google.com/youtube/answer/2802032> accessed 10 May 2022.

Some have criticised DSM Directive for censoring the internet, taking away free speech, or disrupting online business.[286] However, this thesis argued that we are no longer at the world that E-Commerce Directive or DMCA emerged in. The Internet has expanded greatly, and sharing platforms have been profiting from unauthorised content, or otherwise, they were already proactively monitoring and filtering; these were the realities before DSM Directive. Thus, as far as fundamental rights are concerned, DSM Directive is by no means extra pain, rather it was able to regulate the unorganised world of OCSSPs and protect users' right through various safeguards, including introducing new mandatory exceptions and limitations of copyright, as well as limiting proactive enforcement of copyright only to 'manifestly infringing' materials. Thus, the Directive facing fundamental rights issues is indeed a tonic, if not a cure. However, the primary concern of Art. 17 of the Directive is not fundamental rights; the most important objective for that article is obliging OCSSPs to obtain licenses or overall creating a fair ecosystem where rightholders can also financially benefit. It was argued that by creating the special liability regime in Art. 17, the Directive would likely fail its all-works-licensed ideal, and we would still live in the 'upload first, assess later paradigm'[287]; however, the overall goal of a fair financial distribution would be achieved in any case and therefore the Directive and Art. 17 are by no means a failure.

Subsequently, this thesis engaged in analysing the degree of OCSSPs' compliance with the Directive. Perhaps it is too soon to judge, or perhaps it is reasonable to expect at least a more complete plan from OCSSPs to abide by the provisions of the Directive. Whatever the case may be, it is clear that except for YouTube, no other OCSSPs published any plans, and even for YouTube, the plan contains nothing new other than the mechanisms already in-use on YouTube. However, we analysed that those mechanisms do not fully comply with the Directive and need some modification. In particular, OCSSPs are currently removing materials that go beyond the manifestly-infringing requirement and also tools such as Content ID are only available to a limited category of rightholders. All of these in addition to some deficiencies identified in the current legal framework, led this thesis in the final part to suggest increasing transparency of algorithms should go hand-in-hand with increased public participation. In the EU, there is a need for NGOs specifically focused on algorithmic accountability and tinkering algorithm, with such organisations continuously assessing compliance with Art. 17. Users' roles should be increased as well. When we speak of collaboration, this should contain all

---

[286] Frosio and Mendis (n 205); Senftleben (n 206).
[287] DeLisa (n 229).

stakeholders, including users; users should be incentivised to participate in creating a healthy online ecosystem. Finally, it is not clear why online platforms are using rather simpler AI technologies when enforcing copyright, as compared to for example their fight against extremism or hate speech. Platforms should employ more complex technologies such as NLP for copyright in order to discern copyright exceptions and limitations; in other words, having intelligent automated copyright enforcement agents.

Now this work concludes by inviting us to accept algorithms as a necessary phenomenon while not accepting all of their consequences. A realistic approach and broader utilisation of algorithms in different layers of life would likely lead to its development and resolution of many of the problems we are witnessing today. That said, the route to improvement is never-ending, solving one problem creates many new others; that, however, cannot stop us from moving forward.