



LUND UNIVERSITY

Copyright and Artificial Intelligence - with a focus on the area of music

Axhamn, Johan

Published in:
Festskrift til Jørgen Blomqvist

2021

Document Version:
Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):
Axhamn, J. (2021). Copyright and Artificial Intelligence - with a focus on the area of music. In M. Rosenmeier, T. Riis, J. Schovsbo, & H. Udsen (Eds.), *Festskrift til Jørgen Blomqvist* (1 ed., Vol. 1, pp. 33-86). Ex Tuto Publishing.

Total number of authors:
1

Creative Commons License:
CC BY-NC-ND

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Festskrift til
Jørgen Blomqvist



MORTEN ROSENMEIER, THOMAS RIIS,
JENS SCHOVSBO & HENRIK UDSEN (RED.)

Festskrift til
Jørgen Blomqvist

ExTuto
PUBLISHING
www.extuto.com

Morten Rosenmeier, Thomas Riis, Jens Schovsbo & Henrik Udsen (red.)

Festskrift til Jørgen Blomqvist

Første udgave, første oplag

Denne bog er udgivet i maj 2021 af EX TUTO PUBLISHING A/S. Grafisk tilrettelæggelse og sats af MERE.INFO A/S, som har anvendt LibreOffice/Linux samt skrifterne Baskerville Original og Cronos designet af henholdsvis FRANTIŠEK ŠTORM i 2000 og ROBERT SLIMBACH i 1996. JAN TRZASKOWSKI har stået for forlagsredaktion. KATE GILBERT (engelsk) og LINO VOGT (dansk) har været ansvarlige for korrekturlæsning. Bogen er trykt på Munken Pure 100 g/m² af NARAYANA PRESS, der ligger på Gyllingnæs syd for Odder. Indbindingen er udført af BUCHBINDEREI S.R. BÜGE GMBH i Celle. Bogen er fagfællebedømt.

Ex Tuto A/S er medlem af Forening for Boghaandværk, og vi støtter bæredygtig skovforvaltning ved at anvende FSC-certificeret papir.

Copyright © 2021 the editors and contributing authors severally

Printed in Denmark 2021

ISBN 978-87-420-0041-0

Ex Tuto Publishing A/S

Toldbodgade 55, 1.

DK-1253 København K

www.extuto.com



Bogen er udgivet med støtte fra Akademikernes Udvalg til Beskyttelse af Videnskabeligt Arbejde (UBVA) og Dreyers Fond



dreyersfond

FairPublishing

Kapitelloversigt

	Forord	xxiii
1	Forfatternes Forvaltningsselskab – skabelsen af et kollektivt forvaltningsselskab	1
	<i>Leder Henrik Faursby Ahlers, UBVA-sekretariatet, & direktør Stig von Hielmcrone, Forfatternes Forvaltningsselskab FMBA</i>	
2	Ophavsretlig specialisering – fordele og risici	19
	<i>Professor, dr.jur. Mads Bryde Andersen, Københavns Universitet</i>	
3	Copyright and Artificial Intelligence —with a focus on the area of music	33
	<i>Senior Lecturer, Jur. Dr (LL.D.) Johan Axhamn, School of Economics and Management, Lund University</i>	
4	Parodirettslig vakuum i norsk rett	87
	<i>Førsteamanuensis Irina Eidsvold-Tøien, BI Handelshøyskolen i Oslo</i>	
5	Do the Right Thing! Authors’ contracts in the 2019 copyright directive	131
	<i>President of ALAI Italia, Stefania Ercolani, SciencesPo Paris, former professor of cultural property law</i>	
6	Half-Opened “Umbrella” —Interpretation problems of Article 8 of the WCT	163
	<i>Member Mihály Ficsor, Hungarian Copyright Council, former Assistant Director General of WIPO</i>	
7	§ 35 gennem 35 år	191
	<i>Advokat og partner Terese Foged, Lassen Ricard advokatfirma</i>	

8	Intellectual Property Norms in the CETA: An Important Step for Canada	231
	<i>Professor Ysolde Gendreau, Faculty of Law, Université de Montréal</i>	
9	Conundra of the Berne Convention Concept of the Country of Origin	253
	<i>Jane C. Ginsburg, Columbia University School of Law</i>	
10	Vederlag for privatkopiering – fanget mellem politik og jura	269
	<i>Konsulent Martin Gormsen</i>	
11	Some thoughts on Text and Data Mining in the European Union	283
	<i>Professor Emeritus Frank Gotzen, KU Leuven, President of ALAI International</i>	
12	Journalisters overdragelse af ophavsrettigheder	295
	<i>Advokat Anders Sevel Johnsen, Dansk Journalistforbund</i>	
13	Stort og småt om fortolkning af aftaler om overdragelse af ophavsrettigheder	327
	<i>Advokat, ph.d. Hanne Kirk, Gorrissen Federspiel</i>	
14	Ophavsretlig beskyttelse af tøj og sko	343
	<i>Professor (mso), LL.M, ph.d. Torsten Bjørn Larsen, Juridisk Institut, Syddansk Universitet.</i>	
15	A Phonogram, to be or not to be?	367
	<i>Professor Dr. Silke von Lewinski, Max-Planck-Institute for Innovation and Competition, Munich</i>	
16	Kort rättspolitiskt inlägg till skyddet av fotografiska bilder	381
	<i>Ordförande Jukka Liedes, Upphovsrättsliga Föreningen i Finland</i>	
17	Anne Black-sagen	403
	<i>Professor, ph.d. Bent Ole Gram Mortensen, Syddansk Universitet</i>	
18	Danser la vie	419
	<i>Victor Nabhan</i>	
19	EU-rettens stigende indflydelse på reglerne om overdragelse af rettigheder	421
	<i>Juridisk konsulent Dan Stausholm Nielsen, UBVA</i>	

20	Ophavsret og ytringsfrihed	435
	<i>Juridisk seniorkonsulent Lasse Lau Nielsen & partner Jakob Plesner, begge Ples&Lindholm</i>	
21	Universitetspersonals opphovsrett och öppen publicering – finsk synpunkt	459
	<i>Professor Rainer Oesch, University of Helsinki</i>	
22	Brug af værker i undervisningen – licenskonstruktioner	471
	<i>Direktør Anders Rasch & afdelingschef Martin Kyst, begge Copydan Tekst & Node</i>	
23	Treaty Interpretation and Treaty Making	485
	<i>Professor Emeritus Sam Ricketson, Melbourne Law School, Victoria, Australia</i>	
24	Værksbegreb og fikseringskrav i EU-ophavsretten	507
	<i>Professor, dr.jur. Thomas Riis, CIIR, Københavns Universitet</i>	
25	The RAAP Decision of the CJEU —What Happened to Reciprocity?	525
	<i>Professor, dr.juris Ole-Andreas Rognstad, University of Oslo</i>	
26	The Rome Convention, WPPT and a right to remuneration —Details of the RAAP case	549
	<i>Professor Emeritus, Dr. Jan Rosén, Stockholm University</i>	
27	Hvor bred er den ophavsretlige beskyttelse efter Painer-dommen?	569
	<i>Professor, ph.d. Morten Rosenmeier, CIIR, Københavns Universitet</i>	
28	Æres den som æres bør – EU-harmonisering af ophavsftaleretten	597
	<i>Professor, dr.jur., ph.d. Jens Schovsbo, CIIR, Københavns Universitet</i>	
29	Linking after VG Bild-Kunst: Essential functionality and never-ending story?	623
	<i>Associate Professor, PhD Sebastian Felix Schwemer, CIIR, University of Copenhagen</i>	
30	DSM-direktivets artikel 17 – en ny eneret eller en ny undtagelse?	641
	<i>Advokat Peter Schönning</i>	

31	Operationalizing Vigeland —2 x 2 Public Order and Morality Arguments	653
	<i>Professor dr. Martin Senftleben, IViR, University of Amsterdam</i>	
32	Paratexts: Copyright in the Typographical Arrangement of Published Editions	693
	<i>Associate Professor, PhD Stina Teilmann-Lock, Copenhagen Business School</i>	
33	Mellemmandsoverføring?	707
	<i>Professor, dr.jur. Henrik Udsen, CIIR, Københavns Universitet</i>	
34	Ophavsrettens adgang til at gengive billeder i aviser	729
	<i>Adjunkt, ph.d. Jøren Ullits, Syddansk Universitet</i>	
35	Titelbeskyttelsen i dansk ret	745
	<i>Advokat (L), ph.d. Knud Wallberg</i>	

Copyright and Artificial Intelligence—with a focus on the area of music

*Senior Lecturer, Jur. Dr (LL.D.) Johan Axhamn,
School of Economics and Management, Lund University*

1. Introduction¹

The technological developments of recent years have led to increased possibilities to collect, analyse and transmit data. This, in turn, has made possible connected products and services, as well as automated information processing, automated decision-making and what is increasingly referred to as Artificial Intelligence (AI). An example of the

1. The article is based on research presented by the author at a workshop organised by the The Swedish Network for European Legal Studies in August 2020, and at The Artificial Creativity virtual conference hosted by the research lab Medea, the School of Arts and Communication, and the Data Society research programme at Malmö University in November 2020. The article is thus primarily based on sources made available before 15 August 2020. Sources made available after this date have been added to the text during the proofing stage.

latter is ‘creativity’ based on self-learning algorithms that are provided with data (*computational creativity* or *algorithmic creativity*).²

These advances have had far-reaching impact on a number of markets and other areas. From the perspective of legal science (Sw. *rättsvetenskap*), a fundamental question is whether and to what extent existing rules and principles need to be adapted to new technological and commercial conditions. The question is general but becomes concrete in the studies of different specific areas of law.

An area of law that throughout its history has been strongly influenced by technological development is copyright, i.e. the legal protection of literary and artistic works and related or neighbouring subject matters. The law of copyright has been developed and adapted with regard to everything from the advent of the printing press and the ability to record audio and video on various media, through the ability to broadcast radio and television signals, to the ability to make copyright-protected content available via the Internet.³

Recent developments have brought about the question of whether and to what extent established and fundamental copyright concepts have to be updated to take into account the development of algorithmic creativity. The answer to this question includes an analysis and assessment of whether existing copyright rules can be applied to situations where a human author creates with the support of artificial intelligence (algorithmic creativity). Is it possible to draw a line between human (intellectual) creativity and algorithmic creativity? In the longer perspective, the question arises as to whether fundamental copyright concepts such as ‘work’ (i.e. that the end result such as a painting reflects a certain level of intellectual/human creativity) and ‘author’ (which according to current copyright rules has to be a human person) are still relevant in the context of artificial intelligence. Is it necessary to introduce a new form of (copyright) protection for ‘works’ created by artificial intelligence? What impact might the development of algorithmic creativity have on the relevance and legitimacy of copyright?

2. See, for example, Veala & Cardoso (eds), *Computational Creativity: The Philosophy and Engineering of Autonomously Creative Systems* (Springer 2019).

3. See Blomqvist, *Primer on International Copyright and Related Rights* (Edward Elgar 2014).

Based on a legal scientific method, analysis and assessment, this contribution will focus on these and related questions.

The contribution is structured as follows. The next section, section 2, will provide a general overview of the technology referred to as artificial intelligence, with a special focus on the area of music. Section 3 will relate the technology to general copyright rules and principles, such as issues of authorship in AI-generated subject matter (again with a focus on the area of music). Section 4 provides some conclusions and final thoughts, including a discussion of the feasibility of introducing a new (related right) protection for AI-generated subject matter.

2. Artificial intelligence

2.1. General

The technology known as AI is gaining increasing attention, not only in the research and business communities, but also among legislators and other decision-makers. The European Commission, in its *White Paper on Artificial Intelligence*, has the following to say about the new technology's potential impact:

‘Artificial Intelligence is developing fast. It will change our lives by improving healthcare (e.g. making diagnosis more precise, enabling better prevention of diseases), increasing the efficiency of farming, contributing to climate change mitigation and adaptation, improving the efficiency of production systems through predictive maintenance, increasing the security of Europeans, and in many other ways that we can only begin to imagine.’⁴

AI is thus expected to have profound implications for a whole range of sectors.⁵ It is sometimes spoken of as part of the so-called Fourth In-

4. European Commission, ‘White Paper on Artificial Intelligence: a European approach to excellence and trust’, COM(2020) 65 final, Brussels, 19 February 2020, p. 1 [cit White Paper on AI].

5. See, for example, Iglesias *et al.*, ‘Intellectual Property and Artificial Intelligence – A literature review’ (2019), *Publications Office of the European Union*, p. 1.

dustrial Revolution, a phase of industrial development characterised by the *Internet of Things*, robotics—and *artificial intelligence*.⁶ That technological advances might eventually lead to something in the way of artificial intelligence has long been speculated upon. As an academic discipline and field of research AI was institutionalised as early as the 1950s.⁷

The recent revival of interest in the subject is due mainly to advances in data processing technologies and the increased availability of data.⁸ Put simply, AI is a collection of technologies that combine data, algorithms and computing power.⁹ Algorithms are fed with data (*input*) and then perform calculations and make predictions (*output*). A prediction describes a pattern that can be discerned from the input data. AI-based systems can be entirely software based, functioning in the virtual world (e.g., as voice assistants, image analysis software, search engines, speech and facial recognition systems), or they can be embedded in hardware (e.g., advanced robots, self-driving cars, drones or Internet of Things applications).¹⁰

AI has been described and defined in a multitude of contexts—however, no generally accepted definition has yet been established. In a document from May 2020, the UN specialized agency for intellectual property rights—the World Intellectual Property Organization (WIPO)—refers to AI as ‘a discipline of computer science that is aimed at developing machines and systems that can carry out tasks considered to require human intelligence, with limited or no human intervention’.¹¹ Similar generic descriptions have been employed elsewhere—including in a research report funded by the European Commission (the Com-

6. WIPO (2019), *WIPO Technology Trends 2019: Artificial Intelligence* (Geneva: World Intellectual Property Organization), p. 120 [cit. WIPO 2019].

7. See, e.g., McCarthy *et al.*, A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence August 31, 1955. Later published in AI Magazine Vol. 27, No. 4 (2006). Available at <<https://www.aaai.org/ojs/index.php/aimagazine/article/download/1904/1802>>.

8. White Paper on AI, p. 2.

9. White Paper on AI, p. 2.

10. Communication from the Commission, ‘Artificial Intelligence for Europe’, SWD/2018/237 final [cit. Communication on AI] and WIPO 2019, p. 21.

11. WIPO Secretariat, ‘Revised issues paper on intellectual property policy and artificial intelligence’, WIPO/IP/AI/2/GE/20/1 REV, May 21, 2020 [cit. WIPO 2020].

mission),¹² by the Commission’s High-Level Expert Group on AI,¹³ and by the Commission itself in its communication from 2018, titled ‘Artificial Intelligence for Europe’.¹⁴

A common denominator among descriptions (and definitions) of AI is that of *computer programs behaving in ways that correspond to (or are similar to) human behaviour*. This is typically expressed in terms of passing the so-called Turing test, meaning the program can independently perform actions comparable to human actions—for example, acquire knowledge, plan and reason and draw logical conclusions based on facts and modelling.¹⁵ It is the *degree of independence* that sets AI apart from earlier technologies—sometimes called expert systems¹⁶ or decision support systems—which are rule based (programming code).¹⁷

The lack of an agreed definition of AI is a symptom of underlying uncertainty and disagreement about the very nature of the subject matter.¹⁸ The ambivalence stems, in part, from the fact that the technology is in its infancy, and that it is a matter of debate whether human intelli-

-
12. Joint Research Centre, ‘Artificial Intelligence – A European perspective’, p. 19. The report is available at <<https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf>>.
 13. The definition and source are given in White Paper on AI, p. 18, footnote 47.
 14. Communication on AI. See also Hartmann *et al.*, ‘Trends and Developments in Artificial Intelligence: Challenges to the Intellectual Property Rights Framework – Final report’ (2020), *Publications Office of the European Union*, p. 21 *et seq.* [cit. Hartmann *et al.* 2020].
 15. See Turing, ‘Computing Machinery and Intelligence’, *Mind* (1950), pp. 433 *et seq.*
 16. See, e.g., Leondes, *Expert Systems: The Technology of Knowledge Management and Decision Making for the 21st Century* (Academic Press, 2001), Ginsburg & Budiardjo, ‘Authors and Machines’, *Berkeley Technology Law Journal*, Vol. 34, No. 2, 2019 [cit. Ginsburg & Budiardjo 2019] and Knight, ‘The Dark Secret at the Heart of AI’, *MIT Technology Review*, 11 April 2017 [cit. Knight 2017].
 17. Joint Research Centre, ‘Artificial Intelligence – A European perspective’, p. 20. The report is available at <<https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf>>.
 18. See, e.g., WIPO 2019, ‘Ministry of Enterprise and Innovation, National approach to artificial intelligence’, N2018.14, p. 4, footnote 1, and Joint Research Centre, ‘Artificial Intelligence – A European perspective’, p. 19. The report is available at <<https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf>>.

gence can be fully described and simulated.¹⁹ In its White Paper on AI, the Commission notes that in any new legal instrument in the area, the definition of AI will need to be sufficiently flexible to accommodate technical progress while being precise enough to provide the necessary legal certainty.²⁰

The absence of a generally accepted definition of AI further means that the term is currently attached to discrete phenomena that are related to each other but do not completely overlap, such as machine learning, deep learning and neural networks.²¹ *Machine learning* is commonly seen as a subset of AI and involves identifying patterns in pre-existing data, which can then be applied to new data.²² The technique is based on algorithms that are fed large quantities of data (*big data*), so-called training data, in order to comprehend connections and correlations. *Deep learning* is, in turn, a field (subset) of machine learning where the algorithms update and adapt during the training process;²³ the learning is ‘deep’ because the algorithms are working in layers.²⁴ Deep learning is considered to be highly independent (autonomous) from human control. The self-learning component makes it almost impossible for a person to anticipate the end result (the prediction out-

19. Câmara, *Creativity and Artificial Intelligence* (Mouton de Gruyter 2007), p. 10. Intelligence is sometimes described as ‘the ability to acquire and apply knowledge and skills’ (see <<https://en.oxforddictionaries.com/definition/intelligence>>) or ‘the mental quality that consists of the abilities to learn from experience, adapt to new situations, understand and handle abstract concepts, and use knowledge to manipulate one’s environment’ (see Sternberg, *Encyclopedia of Human Intelligence* (New York: Simon & Schuster Macmillan, London, Simon & Schuster and Prentice Hall International 1995); <<https://www.britannica.com/topic/human-intelligence-psychology>>).

20. White Paper on AI, p. 18.

21. Kiseleva, ‘What is artificial intelligence and why does it matter for Copyright’, *4iP Council* (2019) [cit. Kiseleva 2019]. Available at <<https://www.4ipcouncil.com/research/what-artificial-intelligence-and-why-does-it-matter-copyright>>. See also Hartmann *et al.* 2020, p. 24 *et seq.*

22. Communication on AI.

23. Knight 2017.

24. See, e.g., Bathaee, ‘The Artificial Intelligence Black Box and the Failure of Intent and Causation’, *Harvard Journal of Law & Technology* 2018, p. 902 [cit. Bathaee 2018].

come).²⁵ For this reason, it has been said that deep learning algorithms lack transparency and explainability—it is difficult or impossible to determine how the algorithm arrives at a given result, an issue sometimes called the ‘black box problem’.²⁶ An example of deep learning is a (artificial) *neural network*, a series of self-learning algorithms that try to mimic the functions of biological neural networks (e.g., the human brain) in processes such as learning and creativity—implying, among other things, that the network can act independently, without human intervention.²⁷

The literature distinguishes between three types of AI learning techniques: supervised, unsupervised, and reinforcement learning. In *supervised* learning, the algorithm extrapolates from a set of labelled input data which has been allocated by a human trainer. In *unsupervised* learning, the algorithm is assigned unlabelled input, i.e., a dataset without any pre-existing labels or explicit instructions on what to do with it. The algorithm can thereby extract and mimic functions that a human would have difficulties distinguishing. In *reinforcement* learning, the algorithm is trained using a reward system, adapting over time in order to maximize its cumulative reward.²⁸

Reinforcement learning is increasingly common in the AI systems that are used to generate content such as text, images and music in the literary and artistic fields. Compared to its supervised counterpart, reinforcement learning allows the AI more autonomy to find and identify patterns and features in the input data. As a result, the program is better placed to capture the diversity and variation in the training material.²⁹ In reinforcement learning the AI gets feedback—positive or negat-

25. Ginsburg & Budiardjo 2019, p. 406 f.

26. See, e.g., Kiseleva 2019, Bathaee 2018, p. 894 f., and Ginsburg & Budiardjo 2019. See also Iglesias, *Intellectual Property and Artificial Intelligence – A literature review* (2019), p. 20 *et seq.*

27. Guadamuz, ‘Artificial intelligence and copyright’, *WIPO Magazine*, October 2017 [cit. Guadamuz 2017].

28. High-Level Expert Group on Artificial Intelligence, *A definition of AI: Main capabilities and scientific disciplines* (2019) [cit. High-Level Group 2019]. Available at <<https://www.aepd.es/sites/default/files/2019-12/ai-definition.pdf>>.

29. See, e.g., <<https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>>.

ive—about how well it performs a task, which helps it to perform the same or similar tasks with better results (or more often good results) in the future.³⁰

In the literature it has also been remarked (or objected) that what we call AI bears little actual resemblance to human intelligence.³¹ In this connection a distinction is commonly drawn between strong and weak AI. According to proponents of *strong* AI, all human thought processes are ‘algorithmic’; one day it will be possible to fully emulate them and, by extension, human consciousness as well. Proponents of *weak* AI in contrast hold that algorithms are, at best, only capable of *simulating* the human mind—a view which rules out the possibility of ‘human’ intelligence and ‘human’ creativity ever being artificially achieved.³²

The AI that is employed in the arts and literature is often described as weak, in the sense that the technology is presently used as a creative aid to artists and authors, rather than as a substitute for their creativity. It is frequently pointed out that (in its present state) AI is unable to fully replace human creativity because, among other things, it does not yet have any functional equivalents to human understanding, aspiration and consciousness. As long as AI lacks such corresponding capabilities, its actions will be circumscribed by the framing and input that come from human beings.³³

A further distinction is made within AI between general and narrow AI. By *narrow* AI is meant techniques and applications that are programmed to carry out specific tasks in specific contexts. Such systems only simulate human cognitive ability—a human has chosen what data to use and how the algorithm is configured.³⁴ *General* AI describes the

30. See, e.g., <<https://business.blogthinkbig.com/how-ai-is-revolutionising-the-classical-music-industry-an-analysis-of-the-musical-ai-by-aiva-technologies/>>.

31. Ginsburg & Budiardjo 2019.

32. Schönberger, ‘Deep Copyright: Up – and Downstream Questions Related to Artificial Intelligence (AI) and Machine Learning (ML)’, in de Were (ed.), *Droit d’auteur 4.0 / Copyright 4.0* (Schulthess Editions Romandes 2018) [cit. Schöneberger 2018].

33. See, e.g., <<https://business.blogthinkbig.com/artificial-intelligence-very-human/>> and <<https://software-development.blog/2019/04/09/artificial-intelligence-and-music/>>.

34. High-Level Group 2019.

capacity of a system to exhibit the same general intelligence as humans’, or an intelligence that is not focused on a particular task.³⁵ Today’s manifestations of AI are all narrow AI. General AI is unlikely to be achieved in the foreseeable future.³⁶ For the time being, it exists only in the realm of science fiction.³⁷

A field of application with relevance for copyright is that of so-called *computational creativity*.³⁸ Computational creativity encompasses (‘artistically’) creative behaviour in AI: the generation³⁹ of subject matter⁴⁰ that would, if created by humans, qualify as artistic and literary works.⁴¹ The technology currently available in this regard can, to use the schema introduced above, be described as *weak* and *narrow*, with a growing *component of reinforcement learning* and *deep learning*.

In the academic and policy communities, opinions differ widely on the implications of artificial intelligence for copyright law. Some authors see the development of artificial intelligence as a gradual process, to be dealt with, like earlier technologies, through incremental adaptation of the copyright framework.⁴² For others, artificial intelligence represents so fundamental an innovation—a *disruptive technology*,⁴³ a

35. WIPO 2020 and Schöneberger 2018.

36. Kiseleva 2019 and Ginsburg & Budiardjo 2019.

37. Council of Europe, ‘History of Artificial Intelligence’, <<https://www.coe.int/en/web/artificial-intelligence/history-of-ai>>.

38. Ginsburg & Budiardjo 2019.

39. In this account, the term ‘generation’ is used instead of ‘creation’ to describe the AI process that leads to an end result (output). The term ‘creation’ has an established meaning in copyright law and has within its sights creative human activity in the literary and artistic fields.

40. In this account, the terms ‘subject matter’, ‘material’ or ‘content’ are used in place of ‘work’ to describe the end result (output) which an AI generates. ‘Work’ has an established meaning in copyright law, denoting the result of human creativity in the literary and artistic fields.

41. WIPO 2020 and Rosati, ‘Copyright as an Obstacle or an Enabler? A European Perspective on Text and Data Mining and its Role in the Development of AI Creativity’, *Asia Pacific Law Review*, Vol. 27, Iss. 2, 2019 [cit. Rosati 2019] and Schöneberger 2018.

42. Ginsburg & Budiardjo 2019.

43. See, e.g., WIPO 2019.

paradigm shift, a *game changer*,⁴⁴ an *apocalypse*⁴⁵—that it threatens to shake copyright law to its very foundations.⁴⁶

2.2. Artificial intelligence in the arts and literature

2.2.1. General

Computer technology has been part of the creative palette of authors (writers, painters, composers) for decades. An example from 1957 is the *Illiac Suite*,⁴⁷ a musical composition produced through the application of stochastic rules. Another early example is AARON,⁴⁸ in the field of visual art. More recently, the pace of development has been rapid, with the technology moving from an assistive role (a tool helping human creators), towards increasing autonomy⁴⁹—the computational creativity described above. Examples of the latter include *The Painting Fool*,⁵⁰ *The Next Rembrandt*⁵¹ and *Quakebot*.⁵²

44. Kiseleva 2019.

45. See, e.g., Parkinson, ‘AI can write just like me. Brace for the robot apocalypse’, *the Guardian*, 15 February 2019. Available at <<https://www.theguardian.com/commentisfree/2019/feb/15/ai-write-robot-openai-gpt2-elon-musk>>.

46. Ramalho, ‘Will Robots Rule the (Artistic) World? A Proposed Model for the Legal Status of Creations by Artificial Intelligence Systems’, *Journal of Internet Law*, July 2017 [cit. Ramalho 2017]. See also Cubert & Bone, ‘The law of intellectual property created by artificial intelligence’, and de Cock Buning, ‘Artificial intelligence and the creative industry: new challenges for the EU paradigm for art and technology by autonomous creation’, both in Barfield & Pagallo (eds), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018).

47. See, e.g., Sandred *et al.*, ‘Revisiting the Illiac Suite – a rule based approach to stochastic processes’. Available at <http://www.sandred.com/texts/Revisiting_the_Illiac_Suite.pdf>.

48. See <<http://aaronshome.com/aaron/index.html>>.

49. Hristov, ‘Artificial intelligence and the copyright dilemma’, *IP Law Review*, Vol. 57, No. 3, 2017, Guadamuz 2017 and Schöneberger 2018.

50. Examples of material generated by The Painting Fool are *The Dancing Salesman Problem*, *Portrait of a girl* and *Uneasy*: see <<http://www.thepaintingfool.com>>.

51. The Next Rembrandt produces paintings in the style of Rembrandt by analysing a large number of the painter’s existing works: see <<https://www.nextrembrandt.com/>>.

52. Quakebot is a virtual reporter that generates literary news items in text form about earthquakes in the USA: see <<https://slate.com/technology/2014/03/quakebot-los>>.

The process of computational creativity can be broken into four stages:⁵³

1. Input
2. Learning algorithm
3. Trained algorithm
4. Output

In the first stage, the system is fed with datasets that consist of pre-existing works—e.g., musical compositions or visual artworks.⁵⁴ These can be selected according to precise criteria or at random. For example, *The Next Rembrandt* is based solely on Rembrandt's works (346 paintings), whereas *The Painting Fool* draws on a wider range of artworks taken from Google, Facebook and similar sources.⁵⁵ During the second, learning, stage, the system analyses the input in order to identify and compare patterns. From such analytical processing it generates prediction rules, which form the basis for the next stage. The third stage sees the running of an algorithm made during the second stage; this algorithm is usually unique. The end result is generated during this part of the process. The final product (output) is the content delivered by the system in the fourth stage.

None of the techniques described here is completely independent from human input and control. For all that AI systems are capable of generating subject matter which is unexpected, surprising or, to human eyes, creative, the technology is designed, trained and otherwise circumscribed by human beings.

2.2.2. AI in music

That machines have the potential to 'compose' music was recognised as early as the 1840s, and computers have been used as a tool for music composition ever since the first devices appeared. The earliest known

angeles-times-robot-journalist-writes-article-on-la-earthquake.html>.

53. See Fjeld & Kortz, 'A Legal Anatomy of AI-generated Art: Part I', *Harvard Journal of Law & Technology*, 21 November 2017 [cit. Fjeld & Kortz 2017]. Available at <<https://jolt.law.harvard.edu/digest/a-legal-anatomy-of-ai-generated-art-part-i>>.

54. Guadamuz 2017.

55. See Fjeld & Kortz 2017.

example of computer-assisted composition is the abovementioned *Illiatic Suite* from 1957. Another example often highlighted in the literature is *Musikalisches Würfelspiel* (Musical Dice Game), a random re-ordering of musical fragments.⁵⁶ In the 1990s, David Bowie was one of the collaborators behind *Verbasizer*, an application that made new song lyrics from existing lines of text via the use of a random word generator.⁵⁷ In 2016, Sony's *Flow Machines* software generated a melody in the style of the Beatles, which a human composer then turned into a song—*Daddy's Car*.⁵⁸

Today, there are numerous applications with AI aspirations in the music field.⁵⁹ Besides *Flow Machines*, these include IBM's *Watson Beat*, Google's *Magenta*, *Jukedek* and *Amper Music*. Most of the systems work by using deep learning neural networks reliant on the analysis of large amounts of (input) data, comprising as a rule pre-existing works of music. The systems look for patterns, e.g., in chords, tempo, length and how notes relate to one another, from which they learn to generate their own melodies. There are differences between systems, including in how results are formatted—some deliver MIDI while others deliver audio. While the output of some systems is guided purely by their input data, others rely on hard-coded rules drawn from musical theory. The applications named above are described in more detail in the following.

Amper is based on a catalogue of existing works, from which it generates new music according to the user's choice of genre and mood. The output is in the form of an audio file which allows the user to change tempo or key, or to mute individual instruments. The system gives the user a relatively high degree of control over the final product.⁶⁰

Google's *Magenta* project develops deep learning and reinforcement learning algorithms—for music (the *NSynth* algorithm) but also for images and drawings, etc. *Magenta* also builds applications (*Magenta*

56. See, e.g., Nierhaus, *Algorithmic Composition: Paradigms of Automated Music Generation* (Springer 2009).

57. <<https://www.theverge.com/2018/8/31/17777008/artificial-intelligence-taryn-southern-amper-music>>.

58. <<https://soundcloud.com/user-547260463>> and <<https://www.theverge.com/2018/8/31/17777008/artificial-intelligence-taryn-southern-amper-music>>.

59. Cf. Briot *et al.* (eds), *Deep Learning Techniques for Music Generation* (Springer 2020).

60. See <<https://www.ampermusic.com/music/>>.

Studio) for composers wishing to employ such algorithms in their own music creation, for example to generate variations of music they input themselves.⁶¹ The user can also set output parameters—and this can be reiterated to take the output in a desired direction.⁶²

Jukedeck is an algorithm that employs deep learning and reinforcement learning.⁶³ With its help, users have generated over 500,000 works of music, mainly different types of background music—in particular for Internet video.⁶⁴ Users are able to customise genre, instrument, length and tempo, among other things. The output is delivered as an audio file. It is possible for the user to acquire the right to use the music.⁶⁵

AIVA⁶⁶ (*Artificial Intelligence Virtual Artist*) is another algorithm based on deep learning and reinforcement learning processes, which so far has focused on classical music. AIVA—or more correctly, a legal entity behind AIVA—is registered with SACEM, the rights management society,⁶⁷ its music has been released as an album; and its compositions are used, inter alia, for soundtracks in film, commercials and video games.⁶⁸

61. See <<https://magenta.tensorflow.org/>>, <<https://medium.com/syncedreview/google-ai-music-project-magenta-drops-beats-like-humans-515de6e5f621>>, <<https://music-tomorrow.com/2019/11/google-magenta-going-forward-with-ai-assisted-music-production/>> and <<https://www.technologyreview.com/2017/03/29/152905/google-brain-wants-creative-ai-to-help-humans-make-a-new-kind-of-art/>>.

62. <<https://www.technologyreview.com/2017/03/29/152905/google-brain-wants-creative-ai-to-help-humans-make-a-new-kind-of-art/>>.

63. <<https://www.theguardian.com/small-business-network/2017/aug/29/computer-write-music-jukedeck-artificial-intelligence>>.

64. <<https://www.theguardian.com/small-business-network/2017/aug/29/computer-write-music-jukedeck-artificial-intelligence>>.

65. See Alex Marshall, 'From Jingles to Pop Hits, A.I. Is Music to Some Ears', *New York Times*, 22 January 2017. Available at <<https://www.nytimes.com/2017/01/22/arts/music/jukedeck-artificialintelligence-songwriting.html>>. See also <<https://www.theguardian.com/small-business-network/2017/aug/29/computer-write-music-jukedeck-artificial-intelligence>>.

66. See <<https://www.aiva.ai/>>.

67. See <<https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>>.

68. See <<https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>> and <https://www.vice.com/en_us/article/neaqmq/an-ai-completes-an-unfinished-composition-115-years-after-composers-death>.

According to its creators, the system has learned music composition by reading a large collection of existing works (scores) by composers such as Bach, Beethoven and Mozart. By analysing and comparing the scores in its database, the algorithm identifies patterns, which it then combines to make new compositions.⁶⁹ AIVA generates its output in the form of musical notation.⁷⁰ Whether an AIVA composition merits keeping or not is always determined by at least one natural person.⁷¹

Since 2019, the company behind AIVA has offered users a commercial version of the software, *Music Engine*, which it describes as a creative assistant. Music Engine can generate shorter pieces (up to three minutes) in various genres—rock, pop, jazz, etc. The user is able to influence the output by selecting a desired mood, tempo, style and time period.⁷² It is also possible to provide the algorithm with an example of a musical composition to use as a template for a new piece.⁷³ Often several ‘iterations’ are needed before a satisfactory result is achieved.⁷⁴ The company behind AIVA considers itself to be the first owner of the music generated via Music Engine, but it is possible for individuals to acquire rights to the music.

IBM’s *Watson Beat* is also based on a deep learning and reinforcement learning algorithm.⁷⁵ When, during the training stage, the system was oriented in music theory—at least within what can be termed Western music⁷⁶—works were broken down into their core elements, includ-

69. See <<https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>>.

70. See <<https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>>.

71. See <<https://www.datainnovation.org/2019/05/5qs-for-pierre-barreau-ceo-of-aiva/>>.

72. See, e.g., <<https://www.thepatent.news/2019/10/21/aiva-a-software-that-compose-original-music-pieces/>>.

73. See <<https://www.datainnovation.org/2019/05/5qs-for-pierre-barreau-ceo-of-aiva/>>.

74. <See <https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer>>.

75. See <https://www.vice.com/en_us/article/d7yddq/watson-beat-ibm-music> and <https://medium.com/@anna_seg/the-watson-beat-d7497406a202>.

76. See <<https://business.blogthinkbig.com/big-data-ai-changing-music-game-ib/>> and <https://medium.com/@anna_seg/the-watson-beat-d7497406a202>.

ing pitch, rhythm, chord progression, note sequences and instrumentation. This information was linked to information about mood and genre. The aim was to give the system a set of reference points. To generate new music with Watson Beat, the user has to provide approximately ten seconds of music in MIDI format and specify what mood and rhythm the output should have by, e.g., adjusting variables such as drums, baseline and chords, as well as time signature and tempo.⁷⁷ Watson Beat also delivers output to the user in MIDI format.

Like the other algorithms described here, *Orb Composer* is designed to help composers in their creative process; the program is sometimes touted as the first AI for music composers.⁷⁸ Based on general input from the user—regarding the desired environment (orchestral, strings, piano, electro, pop-rock or ambient) and overall structure of the composition, and so forth—the system makes suggestions which the user can develop further, for example, by adding and removing instruments, modifying chords and changing tempo and ‘intensity’.⁷⁹

Folk RNN is the name of a reinforcement learning algorithm, in this case called a recurrent neural network, which has been developed on a dataset consisting of a vast number of traditional works from Ireland and Britain transcribed in a shorthand designed for folk music. The algorithm has been trained to predict what will/should come next based on the input data; it can, after a fashion, repeat and vary patterns in ways that are characteristic of this kind of music. The algorithm is available free to all online.⁸⁰ It has been used, inter alia, by researchers at KTH Royal Institute of Technology to produce, it is claimed, over 100,000 new folk tunes. Following further refinement, several of the pieces generated in the KTH project were included in an album by an Irish folk band, which featured both existing works and music drawing on output from Folk RNN. The algorithm is steered by the user’s choice of generation parameters, for instance which ‘temperature’ (mood) the output should have. The generated output is in MIDI-

77. See <<https://www.businessinsider.com/ibm-watson-beat-creates-songs-from-thin-air-2016-7?r=US&IR=T>>, <<https://www.ibm.com/case-studies/ibm-watson-beat>> and <<https://www.t-3.com/thinking/making-music-ibm-watson-beat/>>.

78. <<https://www.pluginboutique.com/products/6108-Orb-Composer-Pro-S-1-5>>.

79. <<https://www.pluginboutique.com/products/6108-Orb-Composer-Pro-S-1-5>>.

80. See <www.folkrnn.org>.

format with symbol sequences which can be rendered as musical notation, and which usually require modification by the user—although such work has to be done manually, not being supported by Folk RNN. As a rule, the user also needs to make a selection (curate) from the large amount of output produced by the algorithm.⁸¹

Another example of AI in the field of music is *Bot Dylan*, a Celtic music generator.⁸² A particular challenge facing AI systems in this field is how to generate content that sounds coherent to human ears, i.e., maintains its structure over time. The people behind *Morpheus* claim that their AI has this functionality.⁸³

To sum up, there are currently a number of different (AI-)technologies in the field capable of generating music semi-autonomously, but as yet there is no system with the ability to compose music with full autonomy. The output of existing systems relies largely on the interventions of the programmer and on the input data and other variables (such as key, pitch and tempo) that are supplied to the system by a user or another person. It is not uncommon for the AI's output to require extensive reworking and development by, for instance, the end user. The technology may thus be regarded, wholly or partly, as a tool or extension of human creativity. This observation has consequences for how we should assess AI-generated subject matter for the purposes of copyright law, an issue which is addressed in more detail in section 3.4.

81. See, e.g., <<https://www.kth.se/aktuellt/nyheter/over-100-000-folkmusiklatar-skapade-med-hjalp-av-artificiell-intelligens-1.850922>> and Sturm & Oded (2018), 'Let's Have Another Gan Ainm: An experimental album of Irish traditional music and computer-generated tunes', <<http://kth.diva-portal.org/smash/get/diva2:1248565/FULLTEXT02.pdf>>. See also <<https://www.dn.se/kultur-noje/sa-har-en-artificiell-intelligens-skapat-100000-folkmusiklatar/>>, <<https://storytech.se/2019/04/17/artificiell-intelligens-skapar-folkmusik-over-100-000-latar/>> and <<https://www.voister.se/artikel/2018/11/musik-ska-byggas-av-ai/>>.

82. See, e.g., WIPO 2019 and Geslani, Meet Bot Dylan, the AI computer that can write its own folk songs, *Consequence of Sound*, May 26, 2017. Available at <<https://consequenceofsound.net/2017/05/meet-bot-dylan-the-ai-computer-that-can-write-its-own-folk-songs/>>.

83. See Herremans & Chew, *Morpheus: Automatic music generation with recurrent pattern constraints and tension profiles*, *IEEE Transactions on Affective Computing* (2016).

3. AI-generated subject matter and copyright

3.1. General starting points and principles

A number of copyright issues are raised by generative AI and revolve around what are sometimes called the question of AI as creator (*the output, or downstream, problem*) and the question of AI as infringer (*the input, or upstream, problem*). Although concerned with separate stages in the genesis of AI subject matter—the process and result, respectively—these questions are intimately connected, both practically and legally, since the requirements of protection and infringement can be seen as two sides of the same coin.⁸⁴ The two questions are examined below, following a section on AI as a legal entity.

3.2. AI as a legal entity

In Swedish law, only natural or legal persons may qualify as legal subjects, i.e., be both holders of rights, able to possess property and to incur debts and obligations; and actors under the law, competent to perform juristic acts—to sell, enter into contracts, and so forth (Sw. *rättskapacitet* and *rättshandlingsförmåga*). A computer program or algorithm is not a legal person. An AI system cannot, therefore, bear rights or obligations. Nor, by the same token, may it be the holder of copyright or be held liable for infringing the copyright of others.

The question of whether to grant legal capacity to artificial intelligence has been raised, inter alia, by the European Parliament. In May 2016 the Parliament's Committee on Legal Affairs, when addressing the civil-law challenges posed by robotics, proposed that an 'intellectual creation' produced by a computer or robot should receive IP protection.⁸⁵ The European Parliament's Plenary Session, in January 2017, expressed support for this idea.⁸⁶

84. See, e.g., Karnell, 'Verksbegrepp och upphovsrätt', *TJR* 1968, pp. 401 *et seq.*

85. European Parliament, Committee on Legal Affairs, 'Draft report with recommendations to the Commission on Civil Law Rules on Robotics' (2015/2103(INL)), 31 May 2016, <<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE582.443+01+DOC+PDF+V0//EN>>.

Establishing AI as a legal entity throws up several central issues of jurisprudence which cannot be considered fully here.⁸⁷ It is, for instance, hard to see how sanctions, e.g., damages, penalties and fines—crucial building blocks supporting substantive rules on rights and obligations—might work in relation to an AI system. Those advocating legal subjectivity for AI sometimes point out that legal persons are legal subjects and that, ipso facto, it would not be alien to the legal system to confer legal subjectivity to AI—and with it, eligibility for authorship. The comparison with legal persons is not entirely appropriate. Legal persons depend on there being natural persons who can act on their behalf; they do not make automated decisions for themselves.

3.3. Use of existing works as input data

3.3.1. Does an AI's analysis of existing works “count” for copyright purposes?

Even though an AI is not a legal subject and already for that reason cannot be held liable for any infringement, it is nevertheless relevant for this investigation to describe and analyse whether the use of existing works as input data is likely to affect the copyright in those works.

By technical necessity, an AI's study of existing works (see section 2.1) involves making temporary copies of them.⁸⁸ Temporary copies are

86. European Parliament, Plenary Sitting, ‘Report with recommendations to the Commission on Civil Law Rules on Robotics’ (2015/2103(INL)), 24 January 2017, <<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=%2F%2FEP%2F%2FNONSGML%2FBREPORT%2BA8-2017-0005%2B0%2BDOC%2BPDF%2BV0%2F%2FEN>>.

87. Cf., e.g., van den Hoven van Genderen, ‘Legal personhood in the age of artificially intelligent robots’, in Barfield *et al.* (eds), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018), p. 213 *et seq.*, Schöneberger 2018, Guadamuz 2017 and Wolters Kluwer, ‘IP Professor Bernt Hugenholtz Reflects on Authorship in the Digital Era’, 9 July 2019. Available at <http://www.kluwerlaw.com/article/ip-professor-bernt-hugenholtz-reflects-on-authorship-in-the-digital-era/?doing_wp_cron=1593629523.1408588886260986328125>.

88. See, e.g., Lizzarralde, ‘Upstream problems in the realm of AI and Copyright’, *Media Laws*, 22 April 2020 [cit. Lizzarralde 2020]. Available at <<http://www.medialaws.eu/upstream-problems-in-the-realm-of-ai-and-copyright/>>. See also See, for example, Iglesias, *Intellectual Property and Artificial Intelligence – A literature review*

made during technical processes, for example, when the system's cameras or other sensors scan the existing works. The bottom line is that such temporary copies bring copyright into play; that is, they fall within the scope of the copyright owner's exclusive right to each of the works laid out in Section 2 of the Swedish Copyright Act (SCA). According to the second paragraph of Section 2, the right of reproduction includes any direct or indirect, *temporary* or permanent preparation of copies of the work, in whole or in part, by any means and in any form.

That the exclusive right extends to temporary copies was clarified during the Swedish implementation of the so-called Infosoc Directive,⁸⁹ in 2005.⁹⁰ Article 2 of the Directive states that temporary as well as permanent reproductions are covered by the exclusive right. No such requirement can be inferred from the international treaties in the copyright area, and the question was among the most contentious during negotiations for the WIPO Copyright Treaty (WCT), in the mid 1990s.⁹¹ In fact and in principle, it matters greatly whether or not temporary copies fall within the scope of the exclusive right from the outset.⁹² In a digital environment, the common assumption is that tempor-

(2019), p. 10 *et seq.*

89. 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, OJ L 167, 22 June 2001, paras 10–19.

90. See Gov. Bill 2004/05:110, pp. 49 *et seq.*

91. Article 1(4) WCT states that Contracting Parties shall comply with Articles 1 to 21 and the Appendix of the Berne Convention. According to a so-called agreed statement concerning Article 1(4) the reproduction right as set out in Article 9 of the Berne Convention 'fully applie[s] in the digital environment, in particular to the use of works in digital form. It is understood that the storage of a protected work in digital form in an electronic medium constitutes a reproduction within the meaning of Article 9 of the Berne Convention'. However, the statement does not make clear whether temporary forms of reproduction count for copyright purposes, as it leaves open the meaning of the term 'storage', i.e., whether or not temporary forms of reproduction are also included in the exclusive right. It is nevertheless clear that the WCT, being a so-called special agreement under Article 20 of the Berne Convention, cannot impose any binding limits on the obligations arising from the Berne Convention.

92. See, e.g., European Commission, 'Legal Advisory Board's reply to the green paper on copyright and related rights in the information society', *Computer Law and Security Report*, Vol. 12, No. 3, 1996, p. 145.

ary copies are generated as a matter of course for the technology to function as intended.⁹³

If an AI is to draw inspiration and learn from earlier works it therefore needs to make temporary copies of them.⁹⁴ The situation is unlike one where a natural person reads and studies existing works—by itself, the act of viewing or listening to a work in analogue form, e.g., reading a book or listening to the radio, does not count for copyright purposes (as reproduction). Humans store the works as electromagnetic traces in the brain, but that storage falls outside the copyright domain.⁹⁵

If the AI practice of copying existing works is to be allowed, it either needs to be covered by an authorisation (consent, e.g., a license) or have a legal basis. Authorisation may take the form of an individual contract or a collective license, e.g., an extended collective license. Where the necessary authorisation is not forthcoming for the use of the works (the input data), copying may still be allowed, provided that it is covered by an exception or limitation. In the copyright framework today, there is only one which could be relevant here, namely the exception for certain forms of temporary copies provided in Section 11a SCA.

3.3.2. Is use covered by the exception/limitation in Section 11a of the Copyright Act?

According to Section 11a SCA, the making of copies is permissible if this activity is an integral and essential part of a technological process and if the copies are transient and have only a secondary importance in that process. The copies must not have any independent economic importance. The making of copies is permissible only if the sole purpose

93. See, e.g., Axhamn, ‘Tillfälliga framställningar av exemplar och rättsligt skydd för åtkomstspärrar i digital miljö’, in Madell *et al.* (eds), *Utblick och inblick: vänbok till Claes Sandgren* (Iustus Förlag 2011), pp. 11 *et seq.*

94. See, in this regard, e.g., Traille, ‘Study on the legal framework of text and data mining (TDM)’, March 2014, pp. 31 and 40. Available at <<https://www.fosteropenscience.eu/sites/default/files/pdf/3476.pdf>>.

95. See, e.g., Axhamn, ‘EU-domstolen tolkar originalitetskriteriet och inskränkningen till förmån för vissa tillfälliga former av mångfaldigande’, *Nordiskt Immateriellt Rättskydd* (NIR), 2010, p. 339 *et seq.*, and Axhamn, ‘Tillfälliga framställningar av exemplar och rättsligt skydd för åtkomstspärrar i digital miljö’, in Madell *et al.* (eds), *Utblick och inblick: vänbok till Claes Sandgren* (Iustus Förlag 2011), pp. 11 *et seq.*

of the making is to enable (i) a transmission in a network between third parties via an intermediary, or (ii) a lawful use, i.e., a use that occurs with the consent of the author or the author's successor in title, or another use that is not un-permissible under this Act. The provision in Section 11 SCA originates in Article 5(1) of the so-called Infosoc Directive.⁹⁶

Thus, there are a number of conditions that must be met before the provision in Section 11a SCA can apply. The Court of Justice has interpreted the provision in numerous cases, inter alia in *Infopaq I*,⁹⁷ *Infopaq II*,⁹⁸ *Premier League*,⁹⁹ *Stichting Brein* (Filmspeler)¹⁰⁰ and *Public Relations Consultants Association* (Meltwater).¹⁰¹

It must first be pointed out that the Court insists upon a strict interpretation of the conditions set out in in Section 11a, as the limitation derogates from the general principle that authorisation is required from the right holder for any reproduction of a protected work.¹⁰² Further, the interpretation of the conditions must at the same time enable the effectiveness of the resultant exception to be safeguarded and permit observance of the exception's purpose.¹⁰³ The Court has also asserted that the exception must allow and ensure the development of new technologies and safeguard a fair balance between the rights and interests of right holders, on one hand, and of users of protected works who wish to avail themselves of those technologies, on the other.¹⁰⁴

96. See Gov. Bill 2004/05:110, pp. 89 *et seq.*

97. Case C-5/08, *Infopaq International*, ECLI:EU:C:2009:465.

98. Case C-302/10, *Infopaq International*, ECLI:EU:C:2012:16.

99. Joined Cases C-403/08 and C-429/08, *Football Association Premier League and Others*, ECLI:EU:C:2011:631.

100. Case C-527/15, *Stichting Brein*, ECLI:EU:C:2017:300.

101. Case C-360/13, *Public Relations Consultants Association*, ECLI:EU:C:2014:1195.

102. See, e.g., the Joined Cases C-403/08 and C-429/08, *Football Association Premier League and Others*, para 162.

103. See the Joined Cases C-403/08 and C-429/08, *Football Association Premier League and Others*, para 163, referring to recital 31 of the InfoSoc Directive and Common Position (EC) No 48/2000, adopted by the Council on 28 September 2000 with a view to adopting said directive (OJ C 344, p. 1).

104. See the Joined Cases C-403/08 and C-429/08, *Football Association Premier League and Others*, para 164.

The exception covers certain acts of temporary reproduction that are carried out during either a *transmission in a network between third parties via an intermediary*, or *lawful use*. Recital 33 of the Infosoc Directive explains that the exception includes acts which enable browsing and caching to take place, including those which enable transmission systems to function efficiently. An AI system using existing works as its input material hardly amounts to ‘transmission in a network between third parties via an intermediary’. What should be explored further, however, is whether such activity can be deemed ‘lawful use’. ‘Lawful use’ describes use that is authorised by the right holder or not restricted by law.¹⁰⁵ A lawful use can thus take the form of a use that has the right holder’s authorisation, is based on a limitation or exception, or falls outside the scope of the exclusive rights of copyright.¹⁰⁶ The expression ‘lawful use’ was chosen in the provision to ensure, as far as possible, that the use of copyrighted material by individuals in a digital environment, where such use entails making temporary copies of the relevant copyrighted material, is put on an equal footing with the use of copyrighted material in analogue form—e.g., reading a book or listening to music on the radio. If the right holder of a work has expressly refused its use, then it is not permitted within the meaning of Section 11a SCA.¹⁰⁷

In *Infopaq II* the Court of Justice held that acts of temporary reproduction carried out during a data capture process constituted lawful use of a work. The data capture process was intended to enable drafting of summaries of newspaper articles—and this act was not judged to be covered by the author’s exclusive rights.¹⁰⁸ In *Premier League* the Court found that temporary acts of reproduction, which enabled a satellite decoder and television screen to function correctly, must be considered lawful use. For the Court, mere reception of broadcasts, that is to say, the picking up of the broadcasts and their display in private circles, did

105. See recital 33 of the InfoSoc Directive.

106. See, e.g., Traille, Study on the legal framework of text and data mining (TDM), March 2014, p. 44. Available at <https://www.fosteropenscience.eu/sites/default/files/pdf/3476.pdf>.

107. See, e.g., Traille, ‘Study on the legal framework of text and data mining (TDM)’, March 2014, p. 47.

108. See Case C-302/10, *Infopaq II*, paras 43–46.

not amount to an infringement of the exclusive right of copyright.¹⁰⁹ In *Filmspelers* the Court, with reference to the so-called ‘three-step test’, stated that temporary acts of reproduction, on a multimedia player, of copyright-protected works obtained from streaming websites belonging to third parties offering those works without the consent of the copyright holders, were not a lawful use.¹¹⁰

It is doubtful whether the temporary copying that occurs when an AI system studies existing works constitutes ‘lawful use’. The purpose of the temporary copies in such a situation is to produce, by technical means, new works that are similar to, or inspired by, the subject matter being reproduced. Here is an instance, then, of a use of a copyright work which actually or potentially competes with the interests of the authors or right holders of the works being copied.

Besides indicating that the use is not ‘lawful’, such circumstances very likely indicate that the copies have ‘independent economic importance’. The temporary copies produced during the course of an AI process presumably have independent economic importance because the economic benefit derived from carrying out the reproduction is distinct from the economic benefit of using the work in question.¹¹¹ The same is true if the temporary reproduction leads to a change in the subject matter being reproduced, as it exists when the technological process is initiated. The act of reproduction has the purpose not of facilitating the use of the original subject matter but of generating a new work.¹¹²

It must therefore be concluded that the exception for temporary copies in Section 11a SCA does not normally apply to the copying of work that takes place in connection with the generation of content by AI systems.

109. See the Joined Cases C-403/08 and C-429/08, *Premier League*, paras 170–172.

110. See Case C-527/15, *Filmspelers*, paras 69–71.

111. See Geiger *et al.*, ‘The Exception for Text and Data Mining (TDM) in the Proposed Directive on Copyright in the Digital Single Market – Legal Aspects’, CEIPI Research Paper No. 2018-02 (2018), p. 11. Available at <<https://ssrn.com/abstract=3160586>>. Cf. Schöneberger 2018.

112. Cf. Case C-302/10, *Infopaq II*, paras 48–53.

3.3.3. Is use covered by the exception in Article 4 of the DSM Directive?

The recently adopted Directive on Copyright in the Digital Single Market (DSM Directive)¹¹³ enacts new exceptions and limitations that may be relevant to the matter at hand. Article 4 of the Directive contains an exception for text and data mining (TDM) of lawfully accessible works and other subject matter.¹¹⁴

1. Member States shall provide for an exception or limitation to the rights provided for in Article 5(a) and Article 7(1) of Directive 96/9/EC, Article 2 of Directive 2001/29/EC, Article 4(1)(a) and (b) of Directive 2009/24/EC and Article 15(1) of this Directive for reproductions and extractions of lawfully accessible works and other subject matter for the purposes of text and data mining.
2. Reproductions and extractions made pursuant to paragraph 1 may be retained for as long as is necessary for the purposes of text and data mining.
3. The exception or limitation provided for in paragraph 1 shall apply on condition that the use of works and other subject matter referred to in that paragraph has not been expressly reserved by their right holders in an appropriate manner, such as machine-readable means in the case of content made publicly available online.
4. This Article shall not affect the application of Article 3 of this Directive.

Article 2(2) defines text and data mining as ‘any automated analytical technique aimed at analysing text and data in digital form in order to generate information which includes but is not limited to patterns, trends and correlations’. Although artificial intelligence differs from TDM in respect of function, when analysing data the two techniques make use of similar algorithms. The provision of Article 4 may therefore come to have implications for the creation of AI works.¹¹⁵

113. 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.

114. Article 3 of the DSM Directive provides an exception for text and data mining conducted for the purposes of scientific research. This exception has no relevance to the topic of this article.

Recital 9 in the preamble to the Directive also points out that there can be instances of text and data mining that do not involve acts of reproduction or where the reproductions made fall within Article 5(1) of the Infosoc Directive.

Article 4(3) states that the exception for TDM shall not apply if such use has been reserved by the right holder in an appropriate manner, such as machine-readable means in the case of content made publicly available online. Context for interpreting Article 4(3) is offered in recital 18 of the Directive. According to that recital, in the case of content that has been made publicly available online, it should only be considered appropriate to reserve those rights by the use of machine-readable means, including metadata and terms and conditions of a website or a service. Other uses should not be affected by the reservation of rights for the purposes of text and data mining. In other cases, it can be appropriate to reserve the rights by other means, such as contractual agreements or a unilateral declaration. The recital further notes that right holders should be able to apply measures to ensure that their reservations in this regard are respected. In addition to the possible exception under Article 4(3), Article 7 conversely states that where the parties have agreed otherwise, Article 4 does not apply. Given that Article 4 is not mandatory in nature and right holders are able to reserve the rights for TDM under Article 4(3), the exception in Article 4 is not applicable when right holders object to the text and data mining of their material in conjunction with the generation of AI-output.¹¹⁶

The importance of allowing authors and other right holders to oppose the use of their work in AI processes should not be underestimated. I will come back to this question in the concluding section 4.

115. See, e.g., Rosati 2019 and Sag, 'The New Legal Landscape for Text Mining and Machine Learning', 66 *J. Copyright Soc'y of the U.S.A.* 291 (2019).

116. See, e.g., Lizzarralde 2020.

3.4. Can AI-generated subject matter obtain copyright protection?

3.4.1. General prerequisites for copyright protection

3.4.1.1. Works and creation

The general requirements for copyright protection (of works) are set out in Section 1 SCA, which states that ‘[a]nyone who has created a literary or artistic work shall have copyright in that work [...]’. The presumption is therefore that in order to qualify for copyright protection as such, a work needs to have been *created* by *someone*, by which is meant a natural person. The copyright framework, as it pertains to works, protects the fruits of human (intellectual) creation. A work has to be the result of a personal and creative effort. During the preparation of Swedish copyright legislation in 1919, it was submitted that the work must be a product ‘raised to a certain degree of independence and originality; at least to some extent, the expression of the individuality of the author is necessary; a purely mechanical production is not satisfactory’.¹¹⁷ Through the laws of copyright, society thus provides legal protection for intellectual creation within the domain of literature and art.¹¹⁸

The abovementioned fundamentals have not changed as a result of the harmonisation of EU copyright law, as the copyright *acquis* is likewise based on the premise that the author or originator is a natural person.¹¹⁹ Copyright and other intellectual property protections also operate under the umbrella of fundamental and human rights to protection of property, recognized, *inter alia*, in the international conventions and the EU Charter of Fundamental Rights—as well as Sweden’s constitution.

117. See NJA II 1961, p. 12.

118. NJA II 1961, p. 29.

119. See, e.g., Quaedvlieg, ‘Authorship and Ownership: Authors, Entrepreneurs and Rights’, in Synodinou (ed.), *Codification of European Copyright Law. Challenges and Perspectives* (Kluwer Law International 2012), p. 207, referring, *inter alia*, to ‘Explanatory Memorandum to the proposal for a Database Directive’, COM(92) 24 final, 13 May 1992. Cf. Senftleben & Buijtelaar in *EIPR* 2020, p. 717 *et seq.*, and Hartmann *et al.* 2020, p. 67 *et seq.*

The EU's legal requirement of the 'author's own intellectual creation' conveys that to be protectable as a work for copyright purposes, subject matter should be the expression of the free and creative choices of a natural person. The language which the Court of Justice has used to describe the harmonised originality criterion reflects this line of thinking. The Court has, inter alia, held that copyright protection can be granted *if the work reflects the personality of the author*, which is the case if the author was able to *express his creative abilities in the production of the work by making free and creative choices*.¹²⁰ By making these choices, the Court says, the author stamps the work *with his personal touch*.¹²¹ The Court has furthermore stated that the criterion of free and creative choices is not satisfied if the choices are steered by technical considerations, or if the author's creative scope is subject to rules that preclude creative freedom.¹²² The prerequisites for copyright protection that follow from the case law of the Court of Justice correspond in all material respects with the requirements for protection of works—sometimes referred to as 'verkshöjd'—long established in the legal doctrine and case law of Sweden and other Nordic countries.¹²³ In practice, the threshold of originality is set low. The Court of Justice has, inter alia, acknowledged that an extract of 11 words from a literary work can be the expression of an author's individual creation.¹²⁴

When it comes to copyright protection of music, the assumption is that a musical work retains the character of a musical work whatever form it takes, be it as musical notation, a recording or a public performance.¹²⁵ When a musical work is combined with a literary work, e.g., when a poem is set to music, or music is used in melodrama, opera,

120. See Case C-145/10, *Painer*.

121. See Case C-604/10, *Football Dataco and Others*.

122. See Cases C-403/08 and 429/08, *Premier League*, and Case C-604/10, *Football Dataco and Others*.

123. See, e.g., Supreme Court's decision in NJA 2015, p. 1097. When handing down its decision, the Supreme Court stated that for a television broadcast of a sporting fixture to reach the level of originality required for copyright protection, the content of the broadcast must transcend what is set out by the actual game or competition in such a degree that it ranks as an own intellectual creation.

124. See Case C-5/08, *Infopaq*.

125. See NJA II 1961, p. 17.

operetta, or theatre, the ‘combined work’ is legally made up of independent works—i.e., the incorporated works are protected individually and on their own merits.¹²⁶

The Swedish Supreme Court had occasion to rule on musical works in NJA 2002, p. 178. The case concerned infringement of a (pop music) hook, or melody line, played by a violin and consisting of four eight-bar stanzas and a total of 42 notes. The allegedly infringing melody had the same number of stanzas, bars and notes. The situation was complicated by the fact that the second melody was purportedly inspired by a Swedish folk tune, called *Oxdansen* (Ox Dance). The Supreme Court held that in music, as in writing and visual art, the possibilities for variation were virtually endless, at least in theory; protection must accordingly be available not only for musical works of a particular extent, but also, as with e.g., personally composed book titles, for a few notes whose combination yields a sufficiently original result. The Court also argued that although the narrower field of popular music offered less room for variation, here as elsewhere even a very simple work must receive protection if found to be sufficiently original. Whether or not the melody met the threshold of originality should be judged, the Court said, according to how listeners perceived it, i.e., on an assessment of the music as a whole. On making such an assessment, the Supreme Court found that the melody line was distinctive enough to be considered an independent work. Coming to the question of infringement, the Supreme Court argued that this, too, should be determined on the basis of an overall assessment. That assessment revealed the similarities to be so striking that, to all appearances, the melodies were the same work. As to whether it could be shown that the allegedly infringing melody was created independently of the first melody (independent double creation), the Court stated that given such striking similarity between the melodies, a very high standard of evidence was required to prove a true parallel independent creation. The evidence fell short in this regard.

That the question of independent creation must be addressed even when the subject matter demonstrably falls into the sphere of protection of a previous work stems from the fact that copyright is not condi-

126. See NJA II 1961, p. 17.

tional on objective novelty but merely gives protection against copying (subjective novelty).

Originality or *verkshöjd* can be judged with the help of the so-called double-creation criterion. This can be summarised to the effect that when determining whether an object may be considered a work, one should consider the possibility that another person, separately and without knowledge of that object, could have come up with something closely alike. The originality threshold is met only when such independent creation is deemed unlikely. In NJA 2004, p. 149 the Supreme Court noted that the double-creation test cannot definitively answer whether an object qualifies as a work, although it could prove valuable when determining a work's sphere of protection. At the same time, the Court allowed, it can hardly be a matter of controversy if a product that is likely to be created by many people independently does not qualify as an original work.

What the EU's originality requirement means in practice has been expanded upon in the case law of the Court of Justice, inter alia in the *Painer* case, which concerned copyright protection for portrait photographs:

‘In the preparation phase, the photographer can choose the background, the subject’s pose and the lighting. When taking a portrait photograph, he can choose the framing, the angle of view and the atmosphere created. Finally, when selecting the snapshot, the photographer may choose from a variety of developing techniques the one he wishes to adopt or, where appropriate, use computer software.’¹²⁷

From the Court's statements in *Painer*, it thus appears that the creative effort that results in copyright-protected works can take place during the preparation phase, while the work is concretized, and during post-production. All three phases of creation can enter the picture when an AI generates subject matter, and each can have implications for how authorship, if any, is to be attributed and allocated.

127. Case C-145/10, *Painer*, para 91.

3.4.1.2. First and subsequent ownership of copyright

The copyright for a work falls to the originator of that work. This means that the first owner of the copyright is the author, composer, or artist who created the work. This is true even if he or she created the work in pursuance of a commission or in the course of employment.

Of importance in this regard are the provisions on joint copyright laid out in Section 6 SCA. This paragraph states that if a work has two or more authors, whose contributions do not constitute independent works, the copyright shall belong to the authors jointly. However, each one of them is entitled to bring an action for infringement. To be a joint work created by multiple authors, the work may not be divisible in separate works independent in themselves, e.g., comprise text and music, two works independent of each other regardless of whether they were created to form an integrated unit.¹²⁸ In joint copyright, on the other hand, each of the authors is entitled to a share in the copyright of the work. How large a share an author should own is determined on the basis of any agreement that might exist between the authors, the individual contribution of each author, and other circumstances surrounding the work.¹²⁹

Where several persons were involved, in one way or another, in the making of a work, it must therefore be determined which of them made the creative effort. Persons whose contributions take the form of technical assistance or support are not considered authors. The copyright in a literary work belongs to the person who dictated its content, even if someone else mechanically took down what was dictated and fixed it in writing. Likewise, the copyright in a photographic work does not necessarily fall to the producer of the image, i.e., the photographer. If someone other than the photographer had creative direction over the image, e.g., regarding subject choice, lighting, and so forth, then authorship can be presumed to vest in this person. However, a photographer, in the sense of the producer of the image, retains an exclusive right to the image, which exists alongside the copyright (Section 49a) (see below).

128. See SOU 1956:25, p. 142.

129. See SOU 1956:25, p. 143.

By agreement (Section 27 SCA) or through employment relationship, the right can be transferred to the contractor or employer. The contractual relationship in place between the parties determines the conditions of the transfer. In the case of works created in pursuance of a commission or in the course of employment, it can often be taken as implicit that the copyright—at least to some extent—passes to the client/contractor or employer. However, in cases where the employee has been taken on to produce copyrightable works, the contract of employment should incorporate transfer of the right of use of the works created in the course of the contractual relationship¹³⁰ or at least a right for the employer to exploit the work in the normal course of business and to an extent that was reasonably foreseeable at the time of creation.¹³¹ Computer programs created in the framework of an employment relationship are covered by a special rule (Section 40a). According to this provision, the copyright in a computer program created by an employee as a part of his duties or following instructions by the employer is transferred to the employer unless otherwise agreed in contract. It is thus a voluntary rule. It was created by legislation implementing the Computer Programs Directive into Swedish law.

Further provisions with potential importance for AI-generated subject matter are those on presumption of authorship in Section 7 SCA. According to the first paragraph, a person whose name or generally known pseudonym or signature appears in the usual manner on copies of the work or when it is made available to the public, shall, in the absence of proof to the contrary, be deemed to be its author. These provisions on presumption of authorship have been part of Swedish copyright legislation for a long time, and are based on Article 15 of the Berne Convention.¹³² The term ‘signature’ here includes designations such as initials and other identifying abbreviations and so-called marks. Which author is using the signature or pseudonym should be a matter of public knowledge. Authorship can be indicated orally or in writing when the work is made available to the public.¹³³ The second paragraph

130. SOU 1956:25, p. 277.

131. See Gov. Bill 1988/89:85, p. 21.

132. See SOU 1956:25, p. 156.

133. See SOU 1956:25, pp. 156–7, and Gov. Bill 1960:17, pp. 83–4.

of Section 7 states that if a work is published without the name of the author being indicated in the manner prescribed in the first paragraph, the editor, if he is named, or otherwise the publisher, shall represent the author until his name is stated in a new edition or in a notification to the Ministry of Justice.

The main purpose of the provisions on presumption of authorship is to assist or make it easier for authors to uphold and enforce their rights. If the circumstances are such that it is apparent that the one who is mentioned as the author is not the real author, it is—according to the preparatory works—not necessary to put forward any further proof to annul the presumption.¹³⁴ In addition, it is questionable whether someone in bad faith should be able to rely on the rules on presumption. This aspect is further developed in section 4.

3.4.2. AI-generated subject matter in the light of general copyright requirements

3.4.2.1. General

As was observed in section 2.2.2, in the music field there are various types of (AI-)technologies capable of generating music with certain degrees of autonomy, but fully autonomous AI music generation is still out of reach. The output of current AI technology is reliant on the actions of the programmer, the input data used for algorithm training, as well as the information, outlines for works etc., and other variables that a person (e.g., a user) later provides the system. In several instances the AI's output requires reworking, in its entirety or in part, by humans. Generative AI as it exists today is thus wholly or partly an *aid for human creativity*. Nonetheless there is considerable legal uncertainty surrounding how to assess AI-generated subject matter through a copyright lens—where is the requisite element of human creativity to be found and who is the first right holder?

It has long been the custom that rights to works created with the use of computer technology ordinarily fall to the author who employed the technology. The technology is seen as an aid or tool, assisting in the au-

134. See SOU 1956:25, p. 157 *et seq.*

thor's creation.¹³⁵ Less clear, however, has been whether randomly generated subject matter can be protected as a work. For similar reasons, subject matter made *exclusively* through AI is not considered a work within the meaning of the SCA.¹³⁶ Material generated solely by AI lacks physical authorship, and the basic requirement that the work must be created by a human being is not satisfied in such a situation. The requirement is not satisfied even when it is not readily apparent to the human eye or ear whether the end result—'the work'—was created by an AI or a human. It follows, then, that the copyright requirement of human creative effort makes the so-called Turing test—hinging as it does on how humans perceive interaction with an AI (see section 2.1)—unusable in the field of copyright. This is not to say we should stop speaking of 'AI'; but from a copyright perspective it is plainly a matter of *weak* AI, that is to say, technology which to some extent simulates human action rather than fully emulating it (see section 2.1).

Between seeing a technology as a creative aid for authors and seeing it as something akin to a random content generator there is a grey area where it is possible to ascertain, within the existing copyright framework, that the output of a generative AI is at least partly the creation of one or more natural persons.

Insofar as the person who programmed an AI system has a significant impact on creative elements in the final result—which the AI generates—it would seem reasonable to regard the programmer as author of the final result. The programmer may, for example, have defined arguments and other conditions necessary for the AI to produce novel output, as well as configuring the parameters and other settings through which a user of the AI can influence the final result. By the same token, the user, who, for example, directs an AI by selecting its input data or giving other instructions that are reflected as creative elements in the final result, could plausibly be considered an author.

135. Olsson, *Copyright: svensk och internationell upphovsrätt* (10th ed., Stockholm: Norstedts juridik 2018), p. 63. See also Hartmann *et al.* 2020, p. 77 *et seq.*, and Iglesias, *Intellectual Property and Artificial Intelligence – A literature review* (2019), p. 12 *et seq.*

136. Olsson & Rosén, *Upphovsrättslagstiftningen: en kommentar* (4th ed., Stockholm: Wolters Kluwer 2016), p. 63. See also Hartmann *et al.* 2020, p. 84 *et seq.*

Where both the programmer and the user have expended creative effort which is reflected in the final result, they may be deemed to have a joint copyright in the final result. On the other hand, a situation where the programmer can anticipate and restrict the user's possibilities of influencing creative elements in the final result should lead to the programmer alone being identified as the author. The opposite should apply if the programmer is unable to anticipate and limit the free and creative choices of the user—under such circumstances the AI is rather to be seen as the user's tool.

However, insofar as the AI exhibits considerable autonomy from the programmer and the person supplying the input, with the effect that the creative efforts of programmer and user do not follow through to the output, the final result is not covered by copyright. This could be the case if the causal link between the programmer's and user's creative efforts and the final result is weak or non-existent. Where an AI generates subject matter and it is impossible to trace the results back to human involvement earlier in the process—i.e., a situation exemplifying the black box problem described above—the final results cannot be protected by current copyright laws.

An assessment must be carried out in each separate case, taking into account the technology used and the human contributions made. This can prove a difficult exercise, given that AI systems are often complex and non-transparent (black boxes). That being said, the general rule is that the more independent an AI is from human intervention, the less likely it is that the output will be protected by copyright (as a work). In practice there is a sliding scale. In situations where a natural person still exerts significant influence over the final result, the technology can be presumed to be an aid for the natural person as an author. Where the technology exhibits substantial autonomy vis-à-vis natural persons, it can be presumed not to be such an aid.

By way of illustration, *Jukedeck* (see section 2.2.2) is a software programme that 'brings artificial intelligence to music composition and production' and uses 'deep neural networks to understand music composition at a granular level'. The Jukedeck user is able to influence the end result (output) by adjusting parameters such as tempo, genre, instrumentation, duration and climax. Based on these parameters, Jukedeck generates a piece of music. The user cannot, however, influence

parameters such as melody, key signature or chord structure—Jukebox generates these aspects itself from the works making up its input data. In a situation like this one, the user’s contribution can hardly be called a work—defining the tempo or genre of a piece of music may affect what kind of composition the AI outputs, but it is not decisive for the tangible (‘creative’) expression in the final result.

Situations also arise in which the output has no author at all within the meaning of the SCA, even though one or more natural persons contributed to the result. In such cases, the designer or designers of the software have exposed the system’s neural network to a training set of musical data. The programmers have, moreover, ‘fine-tuned’ the algorithm to steer the result (output) in the desired direction. The reason the programmers cannot claim authorship of the output subsequently generated by the AI is that their creative contribution is incomplete as far as the end result is concerned—they do not know in advance what the user will input to the system. Users of the AI likewise cannot be considered authors of the final result, since they have no influence over how the AI analyses and uses the inputs they have given it.

It is the latter situation which presents the copyright system with its biggest challenges. The technology generates material that to human eyes and ears is indistinguishable from creations made by people.¹³⁷ From a policy perspective, the question arises as to whether copyright should continue to withhold protection from such subject matter or whether it needs to be modified in some way to accommodate it.

An argument found in the literature is that to be ‘creative’ in its own right, an AI needs to be able to make its own judgements and use randomness within constraints—what can be called ‘self-criticism’ is said to be key.¹³⁸ In its current form, AI seems not to have such an element of self-criticism. Its inability to change through self-criticism and self-assessment puts limits on the program’s ‘creativity’. An AI is furthermore unable to ‘envisage’ what it has not previously seen, i.e., in the way of input data or patterns in the same; in other words, it ‘lacks imagination’. Added to this is the fact that the AI systems of today have no will, aspiration, ideas and desires of their own with which to direct any ima-

137. See, e.g., WIPO 2019. See also Senftleben & Buijtelaar in *EIPR* 2020, p. 717 *et seq.*

138. Ramalho 2017.

gination or creativity. In order to develop and emulate human creativity, a machine would have to be programmed in a way that allowed it to challenge or remove entirely the limits on its operation.

Section 4 deals with the question of whether to adapt copyright in some way to address AI developments in the field of music.

3.4.2.2. Distinction between adaptations and new, independent works

In section 2.2 it was described how an AI relies on material in the form of existing works (*input*) in order to be able to generate (similar) material of its own (*output*). A question that arises here is at what point does the AI's output exhibit sufficient independence from the input to avoid infringing it. In principle, the answer can be read from the general copyright provisions on the different treatment of adaptations and new and independent works in Section 4 SCA. Adaptation entails the retention of essential aspects of the original work. According to the second paragraph of Section 4, if a person, by freely using another work, has created a new and independent work, his copyright shall not be subject to the right in the original work. Under the requirement of independence, the work should be created in free association with, and without being excessively influenced by, other works. Yet independence from works need not be interpreted too rigidly—it is permissible to build on and draw inspiration from the endeavours of others. The boundary between adaptation and new and independent work is fluid.

The question of how to draw the demarcation line between an adaptation and a new work was examined in NJA 2017, p. 75 (*Svenska syndabockar*). An artist had made an oil painting from a portrait photograph, transposing its subject to a landscape with a goat in the background—the latter inspired by the artist William Holman Hunt's painting *The Scapegoat*, from 1854. The Supreme Court stated that in considering the similarity or otherwise of the respective works, the decisive question was how the newer work was 'meant to be perceived by those who take part of it'. An assessment should be made on the basis of 'the subjective perception that is likely shared by the majority'. The level of originality exhibited in the first work has a bearing on the assessment, which may vary between different forms of expression and techniques. In conclusion, the Court found that the painting conveyed a different

meaning than the original work and was therefore to be regarded as an independent work.

When only parts of a protected work are used, the question turns to whether these represent the whole work. In NJA 2002, p. 178, (*Drängarna*), the Supreme Court found that copying had taken place, even though only a few notes were involved. According to the Court, the assessment had to allow for the importance that listeners of popular music attached to being able to recognize, use and remember the music.

For AI-generated material, as for other subject matter, an assessment must be undertaken in each case to determine whether it is an adaptation (that is dependent on the copyright in the first work) or a free use that is not subject to the copyright in the first work. Section 2.2 described how AI machines in the copyright field tend to need ‘training’ on input data containing large quantities of works. This means that even if similarities can be discerned between AI-generated content and one or more existing works, the sheer quantity of works forming the input data makes it unlikely that the AI’s output can be found sufficiently like, or similar to, one older work in particular. As a general rule, it should be reasonable to assume that the more works there are in the input data, the less likely it will be that the AI’s output will infringe on a specific (/individual) existing work. A concrete assessment will, however, be needed, comparing the works used as input data with the output in its final form.

As observed in section 3.3, in most cases the use of existing works during the course of an AI process to generate new works will constitute infringement—through the unauthorised making of temporary copies—in the copyrights of the input works (insofar as these are protected by copyright). Following the implementation of the Directive on Copyright in the Digital Single Market and the exception for text and data mining (TDM), it will continue to be possible for right holders to oppose the inclusion of their work in such AI processes.

3.4.2.3. On the copying of style and manner

Related to the question of demarcation between adaptations and new, independent works is the fact that copyright protection for works passes over aspects such as style and manner. Copyright exists in the

tangible medium of expression, leaving unprotected the techniques, styles, ideas, manners or motifs behind the work. When generating output, AIs often employ the styles of existing works (in their input data). An AI might, for instance, reproduce the style or manner of a particular author—assuming that its input is restricted to that author’s works. An example is the paintings produced in the course of the Next Rembrandt project (see section 2.2.1). As long as the output is an imitation, not of an existing work but of the style or manner of a number of such works, there is no infringement.

As noted above, right holders may generally prohibit, or make subject to specific conditions, the inclusion of their works in an AI process, because using a work as input data constitutes reproduction. Even if the end result (the material generated by the AI) does not infringe the copyright in a single, existing work, the right holders may still oppose the use of their works as input data.

3.5. Can AI-generated subject matter be protected by related rights?

In addition to protecting AI subject matter as works, the possibility has been mooted of protecting it under the existing system of related rights.¹³⁹ The purpose of copyright proper is to guard literary and artistic works, that is, the fruits of an author’s intellectual creation. However, subject matter of similar character is also produced by other persons within, for example, the fields of culture, media and information. The legal opinion in most countries, including in Sweden and elsewhere in the Nordic region, is that these individuals are not authors in the strict sense but that they make contributions which, for various reasons, also merit protection, either for being the result of a special talent or because they represent initiatives and investment in the area.¹⁴⁰ Demands for the legal protection of such contributions have gone hand in hand with technological development, as new technologies have

139. Cf. Senftleben & Buijtelaar in *EIPR* 2020, p. 717 *et seq.*, and Hartmann *et al.* 2020, pp. 88 and 94 *et seq.*

140. See, for example. SOU 1956:25 p. 354 and Gov. Bill 1960:17 p. 225 *et seq.*

given rise to new types of subject matter considered worthy of protection.¹⁴¹

These contributions are commonly seen as ‘neighbouring’ on, or ‘related’ to copyright, being intrinsically and extrinsically linked to literary and artistic activity and held to need protection on similar lines. Related rights cover, inter alia, efforts which have the function of making works and other subject matter available to the public, e.g., through performances, recordings or broadcasts. Thus, related rights are founded not on the idea that creative expression deserves protection, but on preventing others from free riding on the investments required for making recordings and the like.

In Swedish law, related rights are regulated in Chapter 5 of the SCA. Section 45 SCA sets out rules for the protection of performing artists. This pertains to natural persons who perform literary or artistic works, or expressions of folklore. These include performers, musicians and actors. Section 46 sets out rules for the protection of producers of recordings of sounds or of moving images—in effect, record companies and film studios. Section 48 sets out rules on radio and television organisations’ broadcasts. Section 49 regulates the protection of producers of catalogues and databases. Section 49a provides for those who have prepared a photographic image (photographers).

For related rights the same basic prerequisite applies as for copyright in works: eligibility is reserved for legal subjects. Consequently, an AI that performs or makes a recording or broadcast cannot be conferred any rights. In addition to the fundamental condition of legal subjectivity, the various related rights impose certain requirements that cannot be met by an AI, including those of being a natural person (for performances under Section 45) or having responsibility for a recording (for recordings of sounds and images under Section 46), a broadcast (under Section 48) or an investment (Section 49). On the other hand, it is of course possible to obtain protection for a recording (Section 46) of a performance that is given in whole or in part by an AI and where the performed subject matter (corresponding to a musical work) was generated in whole or in part by an AI.

141. See, for example, Axhamn, *Databasskydd* (2016), p. 71 *et seq.*

With respect to AI output that bears resemblance to works, it appears that such material shares with the subject matter of traditional related rights the predicament of falling short of copyright protection while often being the result of (substantial) investment. In the case of AI-generated subject matter, the investments may have been made by the person responsible for programming and training the AI, for example. On the other hand, a significant difference between AI output and the subject matter protected by related rights is that while the former can be indistinguishable from works protected under Section 1 SCA, the latter—performances, recordings, broadcasts, catalogues, photographic images—lack what might be described as ‘characteristics of a work’. Since in their present form the protection of works and the protection of related rights have different purposes, the beholder is usually able to identify the different objects of protection and draw conclusions about which rights are attached to them. This speaks against expanding the current list of related rights to include AI-generated output.

The related right closest to AI subject matter in terms of its object and relationship to actual copyright (the right in works) is the protection of photographic images under Section 49a SCA. According to this provision, anyone who has prepared a photograph has an exclusive right to make copies of the image and to make it available to the public. The right applies regardless of whether the image is used in its original form or an altered form and regardless of the technique used. An image that has been prepared by a process analogous to photography is also considered to be a photograph. For the purposes of the provision, the preparer of the image is the one who takes it, i.e., the photographer. However, in the event that a photograph is found sufficiently creative to enjoy protection as a work, the person who composed the image can be regarded as its author. That the copyright (in the photograph as a work—if applicable) subsists irrespective of the provision in Section 49a is set out in the section’s fourth paragraph.

The protection of photographic images in Section 49a of the SCA can thus be envisaged even if someone else composed the image and the photographer simply ‘pressed the button’. A parallel can be drawn between a photographer’s click of the shutter and the contribution made by a natural person operating a generative AI system. The AI might be seen as the one who arranges the various components of the

output, via its algorithms, while the natural person in some cases merely supplies the input to be processed by the AI and then ‘presses the button’. Unlike, for example, the right in works and producers’ rights under Section 46, AI subject matter and photographs have in common the fact that protection is warranted not just for the tangible final result, but also for adaptations of that result. Any new right for AI-generated subject matter would arguably need to be designed in close relation to the existing copyright protection for works, so as to minimise legal uncertainty and reduce the risk of opportunistic behaviour—e.g., natural persons claiming, with the support of Section 7 SCA, authorship of material that is almost exclusively, or to a significant degree, generated by an AI. This issue is examined further in section 4.

For databases covered by Section 49 SCA, the EU’s *sui generis* protection grants the person responsible (and bearing the risk) for a substantial investment in obtaining, verifying or presenting a database’s contents, the right to prevent others from extracting or re-using a substantial part of those contents.¹⁴² This right can be invoked in situations where a person seeks out and collects data (for example, existing works) to feed into an AI system, if that searching and collecting—i.e., obtaining—has required a substantial investment. Further, the output generated by an AI system might qualify as the result of a substantial investment in presentation if a direct (causal) link can be established between such investment and the final product. However, the protection afforded by the *sui generis* right is meant to cover not the final product as such but extractions and reutilisations of substantial parts of the contents of the database. What constitutes a substantial part can be evaluated qualitatively and/or quantitatively. Such an assessment must be carried out on a case-by-case basis, although as a starting point it seems highly unlikely (if not almost impossible) that (using) a piece of subject matter from a highly prolific AI—recall that with Folk RNN the KTH is said to have generated over 100,000 tunes (see section 2.2.2)—corresponds to the result of a substantial investment (in either quantitative or qualitative terms). In any case, the potential (*sui generis*)

142. The *sui generis* right for databases is covered by Axhamn, *Databasskydd* (2016).

rights in a database will not affect any rights subsisting in the works, etc., contained in the database.

If an AI system is supplied with input made up of works originating in a music catalogue, the use of the work will constitute—in addition to the infringement of the work—infringement of the database right as well. Here the relationship is the reverse of the one just described: the greater the number of works from an existing catalogue (database) are used as input data for an AI, the more likely it is that the use of the work will infringe upon the rights (*sui generis*) in the database.

Another right in the SCA that may be useful for comparison purposes is that conveyed in Section 44a, on certain rights around the publishing or making public of a work not published within the “normal” term of protection. The provision states that where a work has not been published within the term (referred to in Sections 43 and 44), the person who thereafter for the first time publishes or makes public the work shall benefit from such a right in the work which corresponds to the economic rights of the copyright. The right subsists until the end of the twenty-fifth year after the year in which the work was published or made public. The provision in Section 44a is based on Article 4 of the so-called Copyright Term Directive¹⁴³ and aims to incentivise publishing of previously unpublished works.¹⁴⁴

The question of whether a new related right should be introduced for AI-generated subject matter is considered in section 4.

3.6. International outlook

3.6.1. General

The introductory article of the Berne Convention states that the Union exists ‘for the protection of the rights of authors in their literary and artistic works’; yet the Convention does not define the word ‘author’. This, according to the WIPO guide to the Convention, is due to the

143. Council Directive 93/98/EEC of 29 October 1993 harmonising the term of protection of copyright and certain related rights.

144. See Gov. Bill 1994/95:151 and Ramalho 2017.

fact that Union countries diverge so widely on the question.¹⁴⁵ Although not explicit, the Convention's presumption that an author must be a natural person can nevertheless be inferred from other provisions, e.g., those on moral rights and the term of protection.

The issue of copyright protection for computer-generated works has been considered by WIPO. In preparations for a possible Model Copyright Law, a 'computer-produced work' was defined as 'one generated by a computer where identification of authors is impossible because of the indirect nature of individual contributions'. The original owners of the moral and economic rights in such a work would be either be the entity 'by whom or by which the arrangements necessary for the creation of the work are undertaken', or the entity 'at the initiative and under the responsibility of whom or of which the work is created and disclosed'. WIPO's Committee of Experts involved in the preparation of the Model Law, however, concluded that further study was needed.¹⁴⁶

A comparison of how different jurisdictions have approached the matter of whether and, if so, how to protect AI output under copyright law, reveals three broad tendencies. The majority of countries, including continental Europe, Australia and the USA, insist on human creativity as a prerequisite for copyright protection (of works). A group of countries historically influenced by British copyright tradition, inter alia the UK, Ireland, South Africa, New Zealand and India, allow for the possibility that computer-generated output may be protected. A third approach is taken by Japan, which is exploring a system that would reward the investment put into the generation of content, and China, whose case law has found AI-generated output to be copyrightable under certain circumstances.¹⁴⁷

An overview of the regulatory approach in selected jurisdictions is offered below. What follows is not comprehensive or comparative in the traditional sense; rather the intention is to illustrate how protection for

145. See Masouyé, 'Guide to the Berne Convention for the Protection of Literary and Artistic Works (Paris Act, 1971)', WIPO Publication No. 615(E), 1978, para. 16.

146. See Copyright (the former monthly review of WIPO), June 1976, p. 139 *et seq.* See also the report from the Committee of Experts on Model Provisions for Legislation in the Field of Copyright, in Copyright, September 1990, p. 241 *et seq.*

147. See, e.g., WIPO 2019.

AI-generated subject matter has been handled in a number of influential countries.

3.6.2. United Kingdom

In UK copyright law a specific provision was enacted several years ago to address works created with the aid of computer technology.¹⁴⁸ Section 9(3) of the Copyright, Designs and Patents Act (CDPA) states the following:

‘In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.’

Further, Section 178 of the CDPA defines a ‘computer-generated work’ as one that ‘is generated by computer in circumstances such that there is no human author of the work’. The aim of the provision is to create an exception from the main rule in Section 9(1) CDPA requiring a human author. It does so by rewarding the work that goes into creating a program capable of output on the level of works, even if the creative act is undertaken by the program.

However, as enacted, the provision leaves ambiguities around AI-generated works. For instance, it is unclear if and how the requirement of a person’s ‘arrangements’ should be put into practice. Who is making ‘the arrangements necessary for the creation of the work’—is it the investor behind the development of the AI, the programmer of its algorithms, or the end-user? A real-world case might see a combination of these or indeed other people.¹⁴⁹ Plainly, the question needs to be answered on a case-by-case basis. The provision also presupposes a contribution, in the form of ‘arrangements’, being made at some stage in the process; that is, it appears not to cover situations in which an AI system generates creative works without human input or intervention. In other words, the special provision for computer-generated works in UK copyright law is based around the notion that AI technology is at bottom an aid for human creativity.

148. See, e.g., WIPO 2019.

149. Ramalho 2017. Cf Senftleben & Buijtelaar in *EIPR* 2020, p. 717 *et seq.*, and Hartmann *et al.* 2020, p. 87 *et seq.*

3.6.3. USA

The matter of copyright protection for AI has been widely debated in the American legal literature. While the US Copyright Act (1976) does not explicitly require the author to be a natural person, both the Supreme Court in its case law¹⁵⁰ and the US Copyright Office in its guidance¹⁵¹ have indicated that only natural persons can be granted authorship. Consequently, the standard position in American copyright law is that AI-generated subject matter is an eligible subject for copyright only insofar as the AI can be considered a tool of a natural person in a creative process. The selection of input data for use by an algorithm might in some cases be sufficient to obtain copyright as a compilation (see, e.g., 17 U.S.C. § 101).

There is, however, one recent lower-instance decision where a court has found that authorship can extend to the final product (output), provided that the AI's algorithm is itself copyrighted and the program is chiefly responsible for the output it generates. In its ruling, the United States Court of Appeals for the Ninth Circuit held that copyright protection can extend to the computer program's output if the program 'does the lion's share of the work' in producing the output and the user's role is so marginal that the output reflects the program's contents.¹⁵² Under such circumstances, in the Court's view, the right holder of the program is the right holder of the subject matter generated by the AI.

A question discussed in American copyright literature is whether 'works made for hire' provisions can apply or be extended to AI-generated subject matter. The provisions on 'works made for hire' are set out in Sections 101 and 201 of the US Copyright Act (1976). In Section 101 the following applies:

'(1) a work prepared by an employee within the scope of his or her employment; or

(2) a work specially ordered or commissioned for use as a contribution to a collective work, as a part of a motion picture or other audiovisual

150. *Feist Publications v Rural Telephone Service Company, Inc.* 499 U.S. 340 (1991).

151. See <https://copyright.gov/comp3/chap300/ch300-copyrightable-authorship.pdf>.

152. See *Rearden LLC v. Walt Disney Co.*, 293 F. Supp. 3d 963 (N.D. Cal. 2018).

work, as a translation, as a supplementary work, as a compilation, as an instructional text, as a test, as answer material for a test, or as an atlas, if the parties expressly agree in a written instrument signed by them that the work shall be considered a work made for hire.’

Section 201 further provides that:

‘(a) Initial Ownership.

Copyright in a work protected under this title vests initially in the author or authors of the work. The authors of a joint work are coowners of copyright in the work.

(b) Works Made for Hire.

In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright.’

Works made for hire are an exception from the general rule in American law that the copyright falls to the person or persons who created the work. The idea behind the provisions is to encourage the employers or contractors, at whose instance, direction, guidance, commercial purposes or risk the work is produced, as well as to give them control over the exploitation of the work. The employer or the one who commissioned the work, rather than the creator, has responsibility for the creator’s actions in regard to, inter alia, any infringements and harm caused by the work. The works made for hire rules may be modified by agreement between the relevant parties.

In American copyright literature, it has been suggested that just as current legislation names the employer or main contractor as the author of the work, so could similar arrangements be put in place for AI-generated subject matter. The argument is that although the AI itself would be the first ‘creator’, ownership and accountability for its works should lie elsewhere, inter alia, with users of the AI system on whose initiative the work is created.¹⁵³ Against this view, the difficulty has been

153. Yanisky-Ravid, ‘Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability’, *Michigan State Law Review* (2018). Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2957722.

pointed out of clearly identifying the ‘employer’ or ‘contractor’ in such a scenario. Is it the person who programmed the AI or the one who operates and provides directions to the system in a certain, specific situation? As noted in previous sections, it may not be possible to give a universal answer to this question.

Other authors are more sceptical towards the idea of likening or equating the relationship between an AI and a person with the relationship between an employer/main contractor and an employee/subcontractor. They argue that no equivalent legal relationship with AI exists,¹⁵⁴ and that the work made for hire doctrine plainly contemplates that the author of such work is a human.¹⁵⁵

3.6.4. Japan

Japan is one of the few jurisdictions to have considered enacting specific protection for content generated by AI.¹⁵⁶ The proposed protection was built more on the lines of unfair competition law than on the traditional exclusive rights of intellectual property. The extent of protection would vary according to the visibility (or popularity) of the subject matter. The rights would fall to the person (natural or legal) who created the AI. No new legislation on the subject has (yet) been adopted.

3.6.5. China

In November 2019, a court in Shenzhen, China, ruled that original (news) articles generated by an AI (Dreamwriter) are protected by copyright as works.¹⁵⁷ The articles were found to meet the requirements for copyright protection; their rights accrued to the company responsible for the AI.

154. Ramalho 2017.

155. Butler, ‘Can a Computer be an Author – Copyright Aspects of Artificial Intelligence’, 4 *Hastings Comm. & Ent. L.J.* 707 (1982).

156. See, for example, statement from the intellectual property task force of the government of Japan (the Intellectual Property Strategy Headquarters), as reported by the Japan Times, 10 May, 2016.

157. See Nanshan District People’s Court, Shenzhen, Guangdong Province, (2019) Yue 0305 Min Chu No. 14010 Civil Judgment, November 24, 2019.

4. Conclusions and considerations

4.1. General

This account began by describing certain key concepts and the state of the art of artificial intelligence, both generally (section 2.1) and as it occurs in the field of copyright, with a particular focus on music (section 2.2). Sections followed on the applicability of the copyright framework to the generation of novel subject matter by AI, both during the learning stage (section 3.3) and in connection with the generation of output (section 3.4). A section focused on related rights (section 3.5); another looked at the international legal situation (section 3.6). This concluding section offers a summary as well as some observations based on previous sections.

As was noted at the beginning of this account, there is no generally accepted definition of AI and the technology is changing with each day. This makes it difficult or virtually impossible here to offer any precise and definitive findings and policy recommendations.

The technology that is currently available and used to generate subject matter in the area of copyright can be characterised as *weak* AI, i.e., it simulates—rather than replicates—human behaviour in certain ways. The AI employed in music making does not have complete autonomy either—it relies for its setup and application on human input.

It has long been the law that creation with a computer program is to be treated like any other creation carried out with the help of aids or tools. This standpoint is also largely applicable in the case of generative AI. What distinguishes AI from earlier technologies is its level of autonomy—it can, in many cases, be difficult or impossible to predict or determine the AI's outputs (see section 3.4.2). In copyright terms this means that under certain circumstances, the technology can no longer be seen as an instrument assisting the user. In certain cases, the programmer of the AI may be considered the author of its output.

Section 3.4.2 found that insofar as the person who programmed the AI has had a significant say in creative elements in the final result—which the AI generates—it would seem reasonable to consider the programmer to be the author of the final result. In the same vein, a user who, e.g., provides an AI with stimulus by selecting input data or giv-

ing other instructions that are reflected as creative elements in the final result, could plausibly be considered an author. Where both the programmer and the user have expended creative effort which is reflected in the final result, they may be deemed to have a joint copyright in the final result. On the other hand, a situation where the programmer is able to predict and limit the user's possibilities to influence creative elements in the output should lead to the programmer alone being identified as the author. The opposite should apply if the programmer cannot predict and limit the free and creative choices of the user—under such circumstances the AI is rather to be seen as the user's tool.

However, to the extent that the AI exhibits considerable autonomy from both the programmer and the person feeding the system with input, the final result is not covered by copyright. This might be the case where the causal link between the programmer's and user's creative efforts and the final result is weak or non-existent. Where an AI generates output and it is impossible to trace the final results back to human involvement earlier in the process—i.e., an instance of the black box problem described in section 2.1—the final results cannot be protected as works by current copyright laws (authors' rights).

Assessment thus needs to be carried out in light of the technology used and the human contributions made in each individual case. Such evaluation can be tricky, given that AI systems are often complex and opaque. Nevertheless, the general rule is that the more independent an AI is from human intervention, the less likely it is that its output will be protected by copyright. In practice, there is a sliding scale.

How the copyright system should accommodate AI-generated subject matter whose ownership is not attributable to any existing party, including the programmer or user, is considered in the next section.

4.2. Considerations

For those cases where AI-generated subject matter is denied protection, e.g. because the programmer or user left no creative imprint in the final result, a number of policy options (or scenarios) are thinkable from a copyright standpoint. The different options can be weighed, *inter alia*, against the underlying objectives of copyright law—of related rights as well as authors' rights.

As highlighted in section 3.4.1.1, copyright is protected as a fundamental right in international conventions and the EU Charter of Fundamental Rights, as well as in the Swedish constitution. The grant of copyright is also justified, *inter alia*, by reference to natural law and doctrines about the right of each individual to the fruits of his or her own labour, and by utilitarian doctrines furthering socially valuable investments. When it comes to subject matter that is generated by AI and not also based on human creative involvement, protection plainly cannot be justified on the grounds of natural law; hence social welfare considerations must take centre stage instead. Nevertheless, the link drawn in the natural law perspective, between copyright protection of works and protection and encouragement of the (human) creative spirit, may be useful to bear in mind when assessing whether a possible new protection for AI-generated subject matter should go under the rubric of copyright or take form as a new related right.

The following options or scenarios are considered through a copyright lens.

1. Maintaining the current copyright framework without any amendment.
2. Amending the copyright framework to cover subject matter generated by AI, in combination with introducing legal subjectivity (legal personhood) for AI.
3. Amending the copyright framework to cover subject matter generated by AI as works, in combination with provisions on original ownership.
4. Amending the copyright framework to cover subject matter generated by AI as a related right, in combination with provisions on original ownership.

The first option, of maintaining the current copyright framework, is likely to lead to infringement disputes hinging on objections that the alleged author did not actually create the work. In this context, the presumption of authorship in Section 7 SCA will take on increased importance, as in practice it may be difficult to rebut the presumption. In the longer term, such a scheme risks undermining the legitimacy of copyright: one of the supposed grounds of the system (protection of creat-

ive spirit) will increasingly lack a basis in reality. An additional risk of this option is that it may reduce the incentive to use AI for the generation of novel subject matter. At the same time, content will be widely available which to human eyes or ears will be indistinguishable from works in the copyright sense. This is likely to create uncertainty in the marketplace. A positive outcome of this option is that output will be generated, which—at least formally—all will be free to use. On the other hand, as noted, the risk is that the presumption rule of Section 7 SCA (which stems from article 15 of the Berne Convention) will be invoked even in cases where the subject matter at issue is not a work created by a natural person. As indicated in section 3.4.1.2, it is questionable whether someone in bad faith should be able to rely on the rules on presumption. This aspect may have to be clarified in the copyright legislation. The current rules on presumption of authorship were established at a time when it was not possible to generate works with the help of AI. If information on authorship in connection with a work was incorrect, the ‘authentic’ (or actual) author or someone acting on his or her behalf could provide information which could invalidate the presumption. This is not the case when it comes to AI-generated ‘works’, as there is no ‘authentic’ author. At the same time, any amendment to Section 7 SCA must be in line with international obligations—including the mentioned article 15 of the Berne Convention, as well as article 5(2) of the same Convention which holds that the enjoyment and the exercise of copyright shall not be subject to any formality. Given the international nature of copyright, an international (global) solution is warranted.

The option of amending the copyright framework to extend protection to subject matter generated by AI systems, in combination with introducing legal subjectivity (legal personhood) for AI is the least likely scenario of the four outlined here. As discussed in section 3.2, it is highly unlikely that legal subjectivity for AI will come about in the foreseeable future, and such a path would be beset with challenges, not least around the question of enforcement, i.e., how the sanctions system should function in relation to an AI.

The option of amending the copyright framework to protect AI-generated subject matter as works is, I believe, a feasible alternative. The copyright system is no stranger to allocating rights in works to entities

other than the originator—in this case the AI—of the work. Under Swedish law, provisions with similar effect are in place for, *inter alia*, computer programs (see section 3.4.1). For all that they depart from the fundamental principle that the rights to the work belong to the person who created it, the rules on computer programs represent a pragmatic solution to a practical problem. Under the law of, *inter alia*, the UK and in the case law of both the USA and China, similar schemes have been established for subject matter generated by (or with the support of) AI. The critical issue in this option is deciding to whom ownership rights should be allocated. The British solution is worded in general terms, but with flexibility comes uncertainty.

A risk accompanying the copyright protection of AI output is that certain operators may produce content in very large amounts—the KTH project, for instance, generated 100,000 folk tunes (see section 2.2.2)—and on this basis look to sue for ‘infringement’ they allege results from works created at a later date by human authors. In a Swedish context at least, the so-called double-creation criterion (see section 3.4.1.1) should be able to counter such a trend. Yet for composers, the enactment of protection for AI-generated subject matter might still imply increased risk and uncertainty for the human creative enterprise—both as far as protecting the fruits of their creative effort is concerned, and as regards defending against possible allegations of copying/infringement of earlier AI output.

The option of amending the copyright framework to protect AI-generated output as a related right is in my view the most likely, and also the most reasonable, alternative. Similar legal constructions exist already in Swedish copyright law for, *inter alia*, photographic images (see section 3.5). Compared to the third scenario above, this option has the advantage of keeping ‘true’ copyright ‘free’ from the protection of AI-generated subject matter. The drawback of this option, compared to the third option, is that the criteria for protection—whether there is sufficient ‘creative expression’ in the final result—will be identical to that used for works: viewers or listeners will be unable to tell whether the art or music before them is protected as a work or as a related right. To the extent that the new protection has a similar design to that of works, this aspect will become less and less important, even though the option would lead to a dilution of the rationale behind true copyright

(of protecting the results of intellectual creation). In option four, as in option three, a question that arises is to whom ownership rights should be allocated. Option four has the advantage over option three of offering a related right that is tailored to the specificities of the AI-generative process and its results. At the same time, the rationales for protecting AI-generated works via the introduction of a related right should be substantiated or justified by stronger arguments than ‘neighbouring rights have been introduced before’. Basic questions that require answers are whether there is an apparent risk for market failure without the introduction of a neighbouring right, and if so who need (or should) be incentivised or rewarded.

Lastly, the importance must be stressed of the fact that the present copyright laws cover the making of temporary copies (see section 3.3). This gives copyright holders an opportunity to prohibit or be paid for the use of their works as input for generative AI systems. It protects against existing works of art and music being used, at least without any prospect of compensation, as the basis for generating AI output. In practical terms, it is a defence against the unauthorised use, by generative AI, of the fruits of human intellectual creation. Consequently, AI-generated art cannot (and in my view should not) catch a free ride on the creations of the human mind.