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# Copyright Protection for Artificial Intelligence Output

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# Copyright Protection for Artificial Intelligence Output

Considerations de lege lata and de lege ferenda under Swiss law

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## **Abstract**

The aim of this thesis is to examine whether paintings, music or texts produced by Artificial Intelligence (AI output) are protected under Swiss copyright law *de lege lata* and whether these should be protected *de lege ferenda*. Firstly, the basics of AI generated output are examined and classified under Swiss copyright law. Secondly, the classification is analyzed on a comparative legal basis. Thirdly, different lines of argument for and against the protection of AI output are discussed and different implementation options are considered. The result of these analyses shows that AI output *de lege lata* does not enjoy copyright protection in Switzerland because AI output does not have sufficient human input and therefore the definition of a work is not met. There are various arguments for and against the copyright protection of AI output, as well as ways in which a protection could be implemented. For Switzerland *de lege ferenda* there is a good argument for granting copyright protection to AI output based on incentives and practicability arguments, even if this is associated with a paradigm shift away from the human centrality of Swiss copyright law. Furthermore, it is argued here that the best solution is to assign the copyright to the user of the AI.



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CH	BGE 116 II 354 “Mitteilungen aus dem Jenseits”
CH	BGE 125 III 328 “Hobby Kalender”
CH	BGE 130 III 168 “Bob Marley”
CH	BGE 130 III 714 “Meili”
CH	BGE 134 III 166 “Arzneimittelkompendium”
CH	BGE 136 III 225 “Guide Orange”
CH	BGE 143 III 373 “Barhocker”
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Swiss Federal Act on Copyright and Related Rights (CopA, SR 231.1).

Swiss Federal Act on the Amendment of the Swiss Civil Code (The Code of Obligations) (Co, SR 220).

Swiss Ordinance on Copyright and Related Rights (SR 231.11).

United Kingdom, Copyright, Designs and Patents Act 1988.

United States Copyright Act of 1976.

WIPO Copyright Treaty (WCT, SR 0.231.151).

WIPO Performance and Phonograms (WPPT, SR 0.231.171.1).

## List of Abbreviations

AI	Artificial Intelligence
AIPPI	International Association for the Protection of Intellectual Property
art.	Article
AU	Australia
BBI	Federal Journal of the Swiss Confederation (“Bundesblatt der Schweizerischen Eidgenossenschaft”)
B.C. L. Rev.	Boston College Law Review (Boston)
BGE	Decisions of the Swiss Federal Supreme Court (“Entscheidungen des Schweizerischen Bundesgerichts”)
BGBI.	Bundesgesetzblatt (Germany)
BSK	Basler Kommentar
BTLJ	Berkeley Technology Law Journal (Berkeley)
Cardozo L. Rev.	Cardozo Law Review (New York)
cf.	compare (“confer”)
CH	Switzerland (“Confoederatio Helvetica”)
cit.	cited as
CJEU	Court of Justice of the European Union
CLSR	Computer Law & Security Review (Portsmouth)
CO	Federal Act on the Amendment of the Swiss Civil Code (The Code of Obligations)
Co.	company
Colum. J.L. & Arts	Columbia Journal of Law & the Arts (New York)
Colum. Sci. & Tech. L. Rev.	Columbia Science and Technology Law Review (New York)
CONTU	Commission on New Technological Uses of Copyrighted Works
CopA	Federal Act on Copyright and Related Rights
CR PI	Commentaire romand Propriété intellectuelle
Diss.	Dissertation
E.	Consideration (“Erwägung”)

e.g.	for example (“ <i>exempli gratia</i> ”)
ed.	editor
eds.	editors
EIPR	European Intellectual Property Review (Hebden Bridge)
EJLT	European Journal of Law and Technology (Belfast)
EJRR	European Journal of Risk Regulation (Cambridge)
et al.	and others (“ <i>et alia</i> ”)
et seq.	the following one (“ <i>et sequens</i> ”)
et seqq.	the following ones (“ <i>et sequentes</i> ”)
etc.	and the rest (“ <i>et cetera</i> ”)
EU	European Union
GAN	Generative adversarial networks
GE	Germany
GRUR	Gewerblicher Rechtsschutz und Urheberrecht. Zeitschrift der Deutschen Vereinigung für gewerblichen Rechtsschutz und Urheberrecht (Cologne)
GRUR Int.	Gewerblicher Rechtsschutz und Urheberrecht. Zeitschrift der Deutschen Vereinigung für gewerblichen Rechtsschutz und Urheberrecht. Internationaler Teil (Cologne)
i.e.	in other words (“ <i>id est</i> ”)
ibid.	in the same source (“ <i>ibidem</i> ”)
IBM	International Business Machines (Company)
IIC	International Review of Intellectual Property and Competition Law (Munich)
Inc.	incorporated
Iowa L. Rev.	Iowa Law Review (Iowa)
J. Leg. Stud	The Journal of Legal Studies (Chicago)
JEP	Journal of Economic Perspectives (Pittsburgh)
JIPLP	Journal of Intellectual Property Law & Practice (Oxford)
LDMA	Literary, dramatic, musical or artistic
Mich. St. L. Rev.	Michigan State Law Review (East Lansing)
Mizan L. Rev.	Mizan Law Review (Addis Abeba)

N	Section (“Note”)
NJW	Neue Juristische Wochenschrift (Frankfurt on the Main)
NZZ	Neue Zürcher Zeitung (Zurich)
p.	page
pp.	pages
para.	paragraph
Rich. J.L. & Tech.	Richmond Journal of Law & Technology (Richmond)
Rutgers U. L. Rev.	Rutgers University Law Review (Newark)
SR	Swiss Systematic collection of laws (“Systematische Rechtssammlung”)
Serv.	Service
SHK	Stämpflis Handkommentar
sic!	Zeitschrift für Immaterialgüter-, Informations- und Wettbewerbsrecht (Zurich)
SIWR	Schweizerisches Immaterialgüter- und Wettbewerbsrecht
STLR	Stanford Technology Law Review (Stanford)
Tel.	telephone
U. Pa. L. Rev.	University of Pennsylvania Law Review (Pennsylvania)
U. Pitt. L. Rev.	University of Pittsburgh Law Review (Pittsburgh)
UFITA	Archiv für Medienrecht und Medienwissenschaft
URG	Federal Act on Copyright and Related Rights (“Urheberrechtsgesetz”)
UK	United Kingdom
US	United States of America
vs.	versus
WCT	WIPO Copyright Treaty
WIPO	World Intellectual Property Organization
WMFH	works made for hire
WPPT	WIPO Performance and Phonograms
WRP	Wettbewerb in Recht und Praxis (Frankfurt on the Main)
ZGE	Zeitschrift für geistiges Eigentum (Tübingen)

# 1 Introduction

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## 1.1 Topic and Problem Definition<sup>1</sup>

The following title appeared in newspaper article in the New York Times on October 25, 2018: “AI Art at Christie’s Sells for \$432’500”.<sup>2</sup> It described that the painting “Edmond de Belamy, from La Famille de Belamy” was the first painting created by an Artificial Intelligence (“AI”) to be sold at an auction. However, this is not a sole exception. The use of AI in the creation of art can be found not only in paintings but also in music, film and journalism. In a copyright regime such as the one in Switzerland, where the author is typically assumed to be a natural person, various questions arise from a legal point of view. In particular, the question arises as to how copyright law deals and should deal with the protection of such AI outputs<sup>3</sup>.

The relevancy of that topic is not only reflected in the number of international publications, but also in the fact that various institutions took steps to address it. In the beginning of 2019, for instance, the European Commission published a call for studies to investigate the extent to which the current European Intellectual Property Rights Framework meets the challenges posed by AI.<sup>4</sup> Another example is the International Association for the Protection of Intellectual Property (“AIPPI”), which examined in one of its Study Questions 2019 the topic of AI and copyright.<sup>5</sup> However, the current situation in Switzerland does not seem to be addressed with in the same intensity.<sup>6</sup>

Therefore, the present thesis addresses first and foremost the following research question: *To what extent is the output of AI de lege lata protectable under Swiss copyright law and to what extent should it be protectable de lege ferenda?* To answer this research question, Swiss as well as international literature is analyzed. Wherever necessary or useful, analyses from other jurisdictions are included to better reflect on the situation in Switzerland

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<sup>1</sup> At this point, thanks are due in particular to all persons who contributed to the success of this thesis through valuable discussions, tips and opinions. In particular: Prof. Dr. Hürlimann, M. Bigler, J.-A. Bötticher, Y. Frommherz.

<sup>2</sup> GABE; see for a coverage in Swiss media: INGOLD.

<sup>3</sup> The term “AI output” is used in this thesis for paintings, music, films and texts and other art produced by AI. The term “work” is omitted to avoid a corresponding anticipated classification.

<sup>4</sup> See <<https://ec.europa.eu/digital-single-market/en/news/trends-and-developments-artificial-intelligence-challenges-intellectual-property-rights>> (last accessed December 18, 2019); see also ZECH, p. 1145.

<sup>5</sup> AIPPI, Resolution; AIPPI, Study Question; see also RAGOT ET AL.

<sup>6</sup> See recent publications relating to AI and Swiss copyright law: ROHNER; SCHÖNBERGER; analysis of AI in Swiss patent law: FABIÁN.



## 1.2 Structure and Thematic Restrictions

The thesis is structured as follows: in chapter two, the background is set out and, after a brief historical outline, a technical overview of artificial intelligence and fields of application in art are provided. Chapter three examines the extent to which AI outputs can be protected under current Swiss copyright law. The fourth chapter considers how other selected jurisdictions deal with the situation. The fifth chapter examines the extent to which protection for the output of AI is necessary at all. Finally, the sixth chapter highlights various possibilities to approach the protection of such outputs on an international level, and in particular in Switzerland.

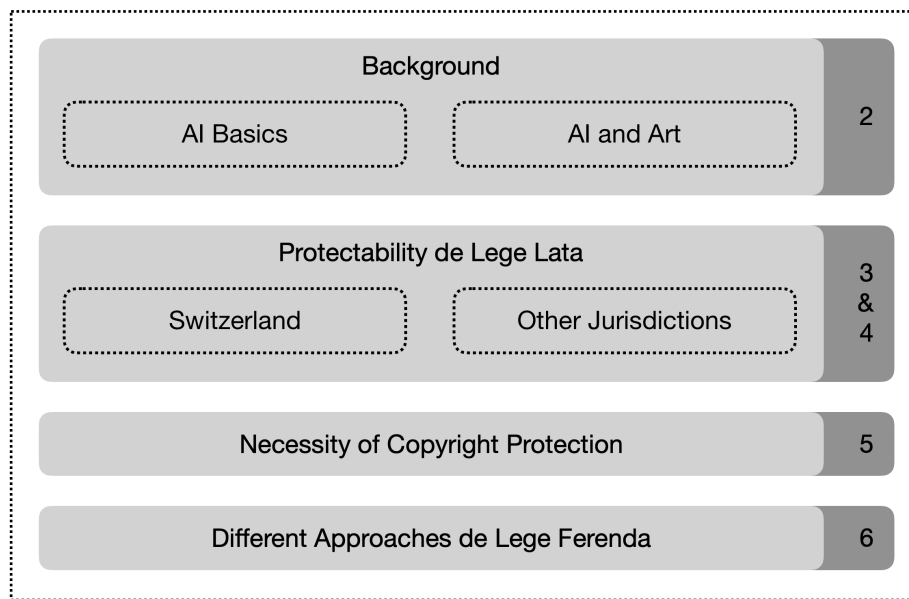


Figure 1: Structure of the thesis

With regard to thematic restrictions, the following should be taken into account. While various legal issues arise with respect to copyright and artificial intelligence, the present work, focuses only on one specific area: the protectability of the output. Therefore, and due to its limited scope, this thesis cannot claim to cover every part with the maximum depth of analysis.

## 2 Background

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This chapter provides an introduction to the basics necessary for the following analysis. The topic is first placed in a historical context. Afterwards, a technical overview of AI is provided and finally it is demonstrated where AI can be found in art today.

### 2.1 General Historical Development and Background

The use of tools to create art is not new.<sup>7</sup> The discussion about the copyrights granted to works created with the help of technology is also not novel.

The photograph serves as a first example. The question that has stood and stands in the foreground here is to what extent mechanics predominate in a photograph compared to human input. At the early ages of photography, copyright protection was denied on the grounds that a photograph was only a copy of real life without additional creative human input.<sup>8</sup> In Switzerland, the Federal Supreme Court issued a number of decisions concerning the protectability of photography.<sup>9</sup> In this regard, reference should also be made here to the current revision of Swiss copyright law, which states in the new art. 2 para. 3<sup>bis</sup> that photographs are considered works even if they do not have an individual character.<sup>10</sup> Thus, the copyright for photographs is thereby materially extended.<sup>11</sup>

With the introduction of computers, several questions arose. There was the question of how to deal with a work which was created with the assistance of a computer. Mainly the use of the computer for creating art was regarded as very critical.<sup>12</sup> These discussions also laid the foundations for today's debates. In addition, there was the question of the protectability of software. In 1991, WIPO held a symposium in Stanford tackling this question under the title "Intellectual Property Aspects of Artificial Intelligence".<sup>13</sup> In Switzerland, there was a discussion about how computer software should be

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<sup>7</sup> DE COCK BUNING, pp. 316 et seqq.; LAUBER-RÖNSBERG, p. 244; see also BRIDY, evolution, p. 395.

<sup>8</sup> DE COCK BUNING, p. 317.

<sup>9</sup> See, e.g., BGE 130 III 714 "Meili"; BGE 130 III 168 "Bob Marley", E. 4.5.; see also SENN, with a critical examination of these judgements.; VON BÜREN/MEER, Werkbegriff, N 340.

<sup>10</sup> Draft CopA 2018, p. 693; see also Dispatch CopA 2018, pp. 603, 608, however, the legal integration of the protection was controversial.

<sup>11</sup> Dispatch CopA 2018, pp. 614, 619 et seqq.

<sup>12</sup> See DE COCK BUNING, p. 318.

<sup>13</sup> See LAUBER-RÖNSBERG, pp. 244 et seq.; LAUBER-RÖNSBERG/HETMANK, p. 570.

protected. A commission of experts to advise the legislator argued for a *sui generis* protection.<sup>14</sup> Nevertheless, from 1992 onwards, the law put software on the same basis as works of art.<sup>15</sup>

Jean Tinguely was a Swiss artist who produced a machine that could automatically draw images.<sup>16</sup> This is comparable with Aaron, a machine that generated paintings with real paint on real canvas, developed by Harald Cohen, who has been working in this field since 1973.<sup>17</sup> The computer in this case was programmed with descriptions, lists of objects and basic rules regarding the relationship between such objects.<sup>18</sup> Cohen has developed the code for the machine over many years to increase Aaron's artistic capacity.<sup>19</sup> Aaron's works have been exhibited in museums around the world.<sup>20</sup> There is no question that Cohen is the author of the code.<sup>21</sup> However, it is not easy to answer whether Cohen or Aaron is the author of Aaron's pictures or whether no one is.<sup>22</sup> Similar questions arise as to AI output today.

Finally, there is the Monkey-Selfie case which became particularly well-known. A British photographer trained monkeys in an Indonesian national park to take portraits of themselves.<sup>23</sup> This resulted in hundreds of photographs, three of which were selected by the photographer.<sup>24</sup> Thereafter, an animal welfare organization filed a lawsuit on behalf of the monkeys to claim the copyrights for such photographs on the monkeys behalf.<sup>25</sup> The complaint was dismissed by the court due to the lack of the animal welfare organization's standing.<sup>26</sup> However, the case would probably not have been successful according to the United States ("US") law, even on substantive grounds, since works created by an animal are not eligible for protection.<sup>27</sup> This would also be the case under Swiss law.

## 2.2 Introduction to Artificial Intelligence

Today, the term "AI" is used in various ways and is hard to define precisely.<sup>28</sup> The reasons for that are, among others, that there is already a lack of clarity about the term "intelligence" and, in addition, re-

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<sup>14</sup> DESSEMONTET, N 34.

<sup>15</sup> Ibid.

<sup>16</sup> See <<https://www.tinguely.ch/de/information.html>> (last accessed December 18, 2019).

<sup>17</sup> BROWN, p. 9; DENICOLA, pp. 262 et seq.; SCHÖNBERGER, p. 151.

<sup>18</sup> DENICOLA, p. 263; see also RAMALHO, p. 2.

<sup>19</sup> BRIDY, evolution, p. 397; RAMALHO, p. 2.

<sup>20</sup> BRIDY, evolution, p. 397.

<sup>21</sup> Ibid.

<sup>22</sup> See BRIDY, evolution, p. 298.

<sup>23</sup> See IHALAINEN, p. 726; LAUBER-RÖNSBERG, p. 245.

<sup>24</sup> LAUBER-RÖNSBERG, p. 245.

<sup>25</sup> Ibid.

<sup>26</sup> BROWN, p. 31.; LAUBER-RÖNSBERG, p. 245.

<sup>27</sup> BROWN, p. 31; IHALAINEN, p. 726; LAMBERT, p. 4; LAUBER-RÖNSBERG, p. 245.

<sup>28</sup> KAPLAN, p. 1; KREUTZER/SIRRENBURG, p. 3; RUSSELL/NORVIG, pp. 1 et seqq.; SÖBBING, p. 1; see also DREXL ET AL., pp. 12 et seq., with an overview of different terms.

search in the field of AI is occurring in a variety of areas.<sup>29</sup> According to KAPLAN, most definitions are aligned around the concept of “creating computer programs or machines capable of behavior we would regard as intelligent if exhibited by humans”.<sup>30</sup> The definition of RICH, KNIGHT and NAIR goes in the same direction: “Artificial Intelligence is the study of how to make computers do things at which, at the moment, people are better”.<sup>31</sup> A good overview can also be found in RUSSELL and NORVIG.<sup>32</sup> According to them, in addition to human-centered definition approaches, a rationalist approach can be identified, which emphasizes mathematical and engineering aspects more.<sup>33</sup>

The important distinction from a classical, rule-based system is that the AI can develop independently and can steadily achieve better results on the basis of the experience gained.<sup>34</sup> One can say, that with AI, a computer is no longer programmed to be smart, but to learn smart.<sup>35</sup> There are various types and forms of AI, depending on the problems to be solved.

### 2.2.1 Development of Artificial Intelligence

The term “AI” was first coined in 1955 by John McCarthy at a conference in Dartmouth.<sup>36</sup> At this conference which lasted several weeks, programs were presented that can play chess, theorems were proved and texts were interpreted.<sup>37</sup> After this conference, interest in the field of AI grew rapidly and research was carried out in various areas.<sup>38</sup> In the 90s, the International Business Machines (“IBM”) computer “Deep Blue” beat the world chess champion.<sup>39</sup> In 2011, IBM’s “Watson” computer became the champion in the Jeopard game show.<sup>40</sup> Since 2012, machine learning, deep learning and neural networks have been used more and more widely in various fields.<sup>41</sup> In 2017, the AI system “AlphaGo” created by Google was able to beat the world champion in Go, which is a complex old Chinese strate-

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<sup>29</sup> KREUTZER/SIRRENBURG, p. 3; SÖBBING, p. 1.

<sup>30</sup> KAPLAN, p. 1; see also JOSHI, p. 4; YANISKY-RAVID, p. 673.

<sup>31</sup> RICH/KNIGHT/NAIR, p. 3; cited also in KREUTZER/SIRRENBURG, p. 3.

<sup>32</sup> RUSSELL/NORVIG, pp. 1 et seqq.

<sup>33</sup> RUSSELL/NORVIG, p. 2.

<sup>34</sup> JORDAN; KREUTZER/SIRRENBURG, p. 5; YANISKY-RAVID, p. 675; see also PEARLMAN, p. 28, stating: “Advanced AI programs using neural networks and deep learning start out as a dumb set of models that improve through training.”; see also below, 2.2.1, for explanations on previous use of the term.

<sup>35</sup> SCHÖNBERGER, p. 161.

<sup>36</sup> <<http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html>> (last accessed December 18, 2019); see also IRIONDO; KAPLAN, p. 13; SÖBBING, p. 3.

<sup>37</sup> SÖBBING, p. 3.

<sup>38</sup> See KAPLAN, p. 17.

<sup>39</sup> DENICOLA, p. 253; KAPLAN, p. 40.

<sup>40</sup> DENICOLA, p. 253.

<sup>41</sup> DEVARAPALLI, pp. 2 et seq.; IRIONDO.

gy game.<sup>42</sup> Today, computers make investment decisions for clients, enter into contracts, drive cars and staff hotels.<sup>43</sup>

AI is therefore nothing new, but it is especially its recent growth that has changed the significance of AI so dramatically.<sup>44</sup> This made it possible for the machines themselves to “learn” and to no longer have to be explicitly programmed for one task (see 2.2.3).<sup>45</sup> The current widespread penetration of AI and machine learning is mainly due to the emergence of large data sets and the increase in computer power.<sup>46</sup>

In this context, it is also interesting to see how the understanding of AI has changed over time. In addition to the definition approaches already mentioned above (see 2.2), it can be added that today not everything that used to be considered AI would still be considered AI, such as a chess game on a computer.<sup>47</sup> Many of these technologies are more likely to be quasi-AI technologies, because they are not really “intelligent”, but rather simply execute predefined program steps.<sup>48</sup> There are several ways in which types of AI can be subdivided, some important ones are presented below (see 2.2.2 et seq.).<sup>49</sup>

### 2.2.2 Strong and Weak Artificial Intelligence

In the literature, a distinction between strong and weak AI can be found.<sup>50</sup> The aim of this differentiation is to distinguish whether a system can only solve a single specific problem or whether it has a general intelligence for different problems.<sup>51</sup>

Weak AI, on the one hand is used to solve specific problems.<sup>52</sup> This kind of AI is used in particular to support human thinking.<sup>53</sup> For instance, weak AI can play chess, provide information to customers or analyze huge data sets in real time.<sup>54</sup> The application of AI today is predominantly weak AI.<sup>55</sup>

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<sup>42</sup> DENICOLA, p. 253; KAPLAN, p. 43.

<sup>43</sup> DE COCK BUNING, p. 312; DENICOLA, pp. 253 et seq.

<sup>44</sup> BROWN, p. 7; DELTRON/MACREZ, p. 4; see also DE COCK BUNING, p. 314; IHALAINEN, p. 724.

<sup>45</sup> BROWN, p. 7; ORY/SORGE, p. 710; see also DE COCK BUNING, p. 310.

<sup>46</sup> DREXL ET AL., p. 4; see also ZECH, p. 1146, with further comments on the technical developments.

<sup>47</sup> IRIONDO.

<sup>48</sup> YANISKY-RAVID, p. 674.

<sup>49</sup> See DREXL ET AL., p. 3.; However, the explanations remain on the surface. For more in-depth (mathematical) information, the relevant literature must be consulted, e.g., JOSHI.

<sup>50</sup> See, e.g., KREUTZER/SIRRENBURG, p. 20; SCHÖNBERGER, p. 149; see also KAPLAN, p. 68, with critical remarks on this distinction.

<sup>51</sup> KAPLAN, p. 68; see also SÖBBING, p. 4, with further remarks on another concept: super intelligence.

<sup>52</sup> KAPLAN, p. 68; KREUTZER/SIRRENBURG, p. 20.

<sup>53</sup> SÖBBING, p. 4.

<sup>54</sup> KREUTZER/SIRRENBURG, p. 20.

<sup>55</sup> Ibid.

Strong AI, on the other hand, is to some extent capable of solving all sorts of problems.<sup>56</sup> The idea of strong AI is based on the assumption that all human thoughts are algorithmic and can therefore be reproduced and replaced by AI.<sup>57</sup> It is expected that it will be possible for the self-learning ability of a strong AI to exceed a certain limit and subsequently to overcome its own problem-solving behavior without external support solely on the basis of experience gained.<sup>58</sup> KREUTZER and SIRRENBURG explain that such an intelligence could emancipate itself from human intelligence and could come up with different solutions than the ones humans have so far thought out.<sup>59</sup>

### 2.2.3 Neural Networks and Machine-Based Learning Methods

The particularly important conceptual terms and concepts in this case are related as follows.

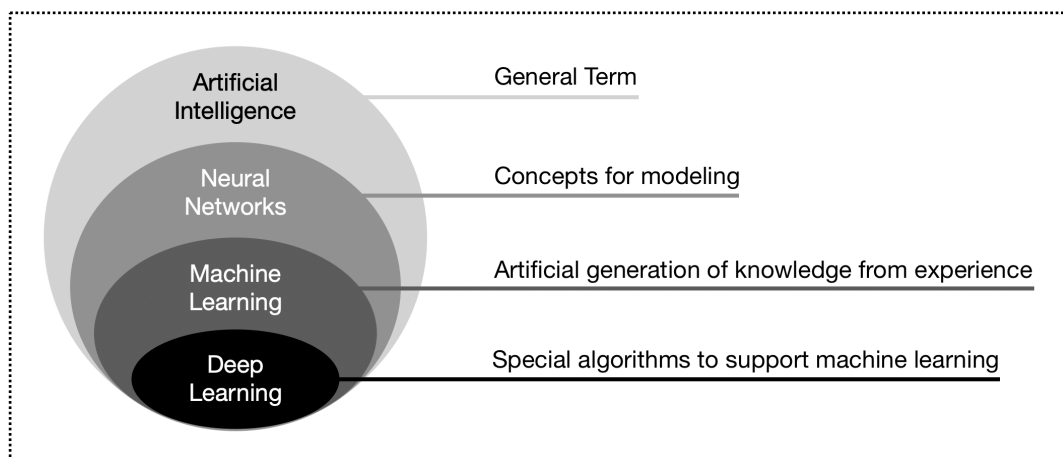


Figure 2: Components of artificial intelligence<sup>60</sup>

Neural networks are one element of AI. This term, which originally comes from the neurosciences, describes how AI try to recreate the neural connections in the human brain.<sup>61</sup> The crucial characteristic of artificial neural networks is that information is not processed via linear functions, but that parallel processing of information takes place over several layers.<sup>62</sup> In this way, the artificial neural networks can learn independently based on the original information.<sup>63</sup>

<sup>56</sup> KAPLAN, p. 68.

<sup>57</sup> SCHÖNBERGER, pp. 149 et seq.; see also SÖBBING, p. 3.

<sup>58</sup> KREUTZER/SIRRENBURG, p. 20.

<sup>59</sup> Ibid.

<sup>60</sup> Own illustration, based on KREUTZER/SIRRENBURG, p. 4; However, this illustration should be taken with caution, as not all machine learning approaches are based on neural networks.

<sup>61</sup> BROWN, p. 7; JOSHI, p. 44; KREUTZER/SIRRENBURG, p. 4; YANISKY-RAVID, pp. 675 et seq.

<sup>62</sup> KREUTZER/SIRRENBURG, p. 4; SCHÖNBERGER, pp. 161 et seq.; see also HARTMANN/PRINZ, pp. 1432 et seq., with further technical explanations.

<sup>63</sup> DE COCK BUNING, p. 312; KREUTZER/SIRRENBURG, p. 5.



A neural network contains several layers and works in the following way: the first layer (input layer) contains the raw data.<sup>64</sup> This layer can be compared with the optic nerves of human visual processing.<sup>65</sup> Each subsequent layer (hidden layer) receives the output of the previous layer.<sup>66</sup> Similarly, the neurons in the human system that are further away from the optic nerve receive signals from the neurons that are closer to them.<sup>67</sup> A very large number of hidden layers can be used to process this data.<sup>68</sup> Ideally, the AI learns from the transition from one layer to the other.<sup>69</sup> The last layer (output Layer) generates the output of the AI system.<sup>70</sup>

One of the most common methods of AI is machine learning.<sup>71</sup> Machine learning means that machines are capable of learning from their experiences.<sup>72</sup> The term refers to the fact that a computer program can learn a behavior for which it was not explicitly programmed by the author of the program (see 2.2).<sup>73</sup> Large amounts of data are examined, and common patterns and differences are explored.<sup>74</sup> For instance, probability distributions of the occurring characteristics can be defined and inserted into models.<sup>75</sup> The AI uses this data in order to adapt and generate its own new algorithms.<sup>76</sup> For this purpose, special algorithms are used which can learn independently and thus master tasks better and better without having to be reprogrammed.<sup>77</sup>

Machine learning can be divided into three types of learning.<sup>78</sup> Firstly, in supervised learning, the AI produces a specific output for a given input and can adapt the algorithms so that the answers can be derived as precisely as possible from the existing data set.<sup>79</sup> In this method, humans have to label each element of the training data and define the output variables.<sup>80</sup> A classic example is an AI that is capable of classifying a data set into different given categories.<sup>81</sup> This method is currently the most common form of machine learning.<sup>82</sup> Secondly, unsupervised learning means that the AI does not have

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<sup>64</sup> KREUTZER/SIRRENBURG, p. 5; see also DREXL ET AL., p. 5.

<sup>65</sup> KREUTZER/SIRRENBURG, p. 5; SÖBBING, pp. 55 et seq.

<sup>66</sup> JOSHI, pp. 44 et seqq.; KREUTZER/SIRRENBURG, p. 5.

<sup>67</sup> KREUTZER/SIRRENBURG, p. 5; see also SÖBBING, pp. 31 et seqq.

<sup>68</sup> KREUTZER/SIRRENBURG, p. 5.

<sup>69</sup> KREUTZER/SIRRENBURG, p. 5; see also DREXL ET AL., p. 5.

<sup>70</sup> KREUTZER/SIRRENBURG, p. 5; SÖBBING, p. 34.

<sup>71</sup> DREXL ET AL., p. 3; JOSHI, p. 4; SÖBBING, 28; for the distinction between AI and machine learning, see also IRIONDO.

<sup>72</sup> DEVARAPALLI, 2; KREUTZER/SIRRENBURG, p. 6.

<sup>73</sup> JOSHI, p. 4.

<sup>74</sup> IRIONDO; DREXL ET AL., p. 4.

<sup>75</sup> ORY/SORGE, p. 710.

<sup>76</sup> KREUTZER/SIRRENBURG, p. 6; ORY/SORGE, p. 710.

<sup>77</sup> KREUTZER/SIRRENBURG, p. 6.

<sup>78</sup> DREXL ET AL., pp. 7 et seqq.; JOSHI, p. 10; SCHÖNBURGER, pp. 162 et seqq.; see also HARTMANN/PRINZ, p. 1433, with further differentiation criteria.

<sup>79</sup> IRIONDO; JOSHI, p. 10.; KREUTZER/SIRRENBURG, p. 7.

<sup>80</sup> JOSHI, p. 10.; KREUTZER/SIRRENBURG, p. 7.

<sup>81</sup> JOSHI, p. 10.

<sup>82</sup> DREXL ET AL., p. 7.

predefined target values, but recognizes similarities and patterns of the data independently.<sup>83</sup> From unlabeled data sets, the algorithm identifies data groups that exhibit similar behavior or similar characteristics that may be beyond what was previously humanly imaginable.<sup>84</sup> An example of this is the analysis of customer data to form groups of their purchasing power.<sup>85</sup> Thirdly, reinforcement learning is characterized by the fact, that at the beginning of the learning phase there is no optimal solution process, but that the system independently tries out solution paths through trial and error processes.<sup>86</sup> Reinforcement learning is fundamentally different from the other two categories.<sup>87</sup> The machine learns from its environment based on observations.<sup>88</sup> In this process, “rewards” and “punishments” can be used.<sup>89</sup> When learning a game, for example, the AI can play against itself or others and perceive wins and losses as rewards or punishments and thereby learn.<sup>90</sup>

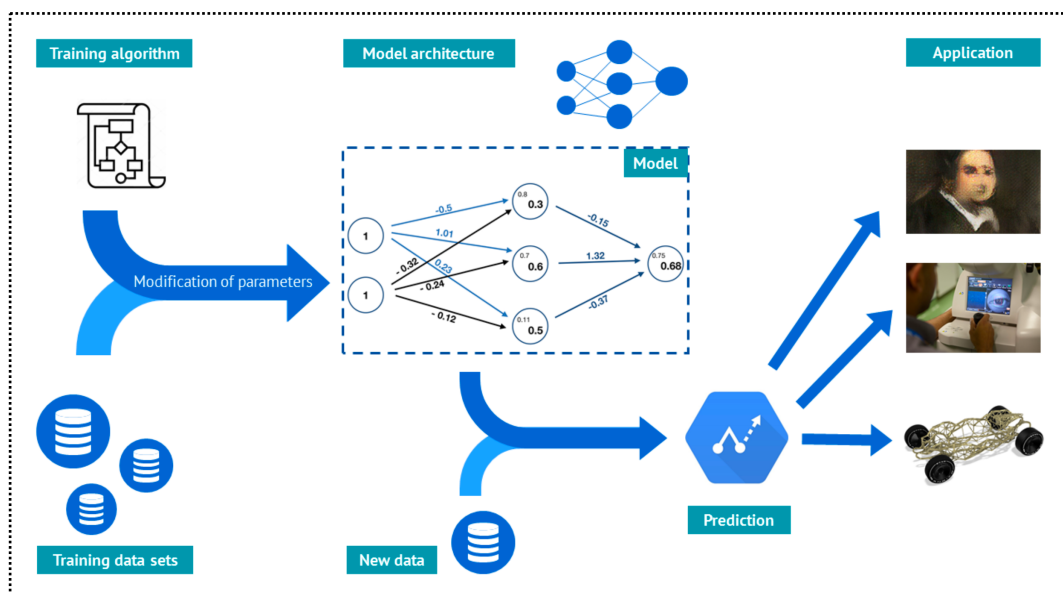


Figure 3: Basic machine learning and output process<sup>91</sup>

A subdivision of machine learning is deep learning, which is one of the most developed subfields.<sup>92</sup> The term “deep” refers to the large number of layers in the neural network.<sup>93</sup> Deep learning can pro-

<sup>83</sup> DREXL ET AL., p. 8; IRIONDO; JOSHI, p. 11; KREUTZER/SIRRENBURG, p. 7.

<sup>84</sup> DREXL ET AL., p. 8; IRIONDO; KREUTZER/SIRRENBURG, p. 7.

<sup>85</sup> DREXL ET AL., p. 8.

<sup>86</sup> JOSHI, pp. 93 et seq.; KREUTZER/SIRRENBURG, p. 8; see also DREXL ET AL., p. 8.

<sup>87</sup> JOSHI, p. 93.

<sup>88</sup> IRIONDO; JOSHI, p. 11.

<sup>89</sup> KREUTZER/SIRRENBURG, p. 8; YANISKY-RAVID, p. 675.

<sup>90</sup> KREUTZER/SIRRENBURG, p. 8.

<sup>91</sup> DREXL ET AL., p. 5.

<sup>92</sup> DREXL ET AL., p. 3; GERVAIS, p. 5; KREUTZER/SIRRENBURG, p. 8; SÖBBING, 28.

<sup>93</sup> DREXL ET AL., p. 6; KREUTZER/SIRRENBURG, p. 8; SÖBBING, pp. 30 et seq.

cess a wider range of data resources and requires less data pre-processing by humans.<sup>94</sup> It can therefore often deliver more accurate results than traditional machine learning approaches, especially with large amounts of data.<sup>95</sup> One example of the use of deep learning is handwriting recognition, which is practically impossible with classical programming.<sup>96</sup> Deep learning can also be used, for example, to automatically create a smile in a portrait.<sup>97</sup>

Another type of machine learning are generative adversarial networks (“GAN”), in which the interaction of a discriminative and a generative model is in the foreground.<sup>98</sup> Thus, two neural networks are used at the same time.<sup>99</sup> The discriminative model is trained to determine whether a piece of data is real or has been generated by an algorithm.<sup>100</sup> The generative model then creates its own outputs which imitate the real data.<sup>101</sup> Both models can train each other in a type of circular process.<sup>102</sup>

Such a processes can now be imagined as follows. By analyzing common patterns in millions of photos of bicycles, a neural network can learn to label data.<sup>103</sup> When the training is finished, the AI is basically able to judge from unlabeled photos whether a bike is depicted on it, or not.<sup>104</sup>

## 2.2.4 Possible Developments in the Future

It is not possible to predict how exactly AI will develop in the future. Nevertheless, some possible trends can be mentioned. Various authors, studies and surveys arrive at the conclusion that AI will make enormous progress in various fields in the foreseeable future with corresponding changes for the affected areas.<sup>105</sup> HRISTOV for instance states that, “[...] creative machines and other forms of AI will likely take center stage in the creativity process, becoming then main drivers of creativity and innovation”.<sup>106</sup> In the context of these developments, a mention of Moor’s Law is appropriate.<sup>107</sup> The core statement of this concept is that the number of transistors that can be integrated into a chip doubles

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<sup>94</sup> KREUTZER/SIRRENBURG, p. 8.

<sup>95</sup> Ibid.

<sup>96</sup> KREUTZER/SIRRENBURG, p. 8; see also IRIONDO.

<sup>97</sup> SÖBBING, p. 28.

<sup>98</sup> DREXL ET AL., p. 8.

<sup>99</sup> See ROHNER, p. 51.

<sup>100</sup> DREXL ET AL., p. 8; see also ROHNER, p. 51.

<sup>101</sup> DREXL ET AL., p. 8.

<sup>102</sup> Ibid.

<sup>103</sup> METZ.

<sup>104</sup> See DREXL ET AL., p. 5; PEARLMAN, p. 28.

<sup>105</sup> See, e.g., DENICOLA, pp. 255 et seqq.; ZECH, p. 1147; see also STAATSSSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION, Herausforderungen, pp. 55 seqq. with data in particular on the situation in Switzerland.

<sup>106</sup> HRISTOV, 434.

<sup>107</sup> DENICOLA, p. 254.

every year.<sup>108</sup> Even though this development has slowed down in recent years, it clearly shows how fast the respective technologies can evolve.<sup>109</sup>

In economic terms, there are various estimates of the impacts that AI will have.<sup>110</sup> For example, it is estimated that investment in AI will increase from \$60 million in 2016 to \$37 billion in 2025.<sup>111</sup>

## 2.3 Artificial Intelligence in the Art Sector Today

Already in 1998 it was written that the field of application of computers in art is extraordinarily large and that the application possibilities of the computer with regard to the creation of art can constantly be extended by innovation.<sup>112</sup> Today AI is actually part of the art creation process.<sup>113</sup>

AI systems are able to simulate art so well that the difference between human output and AI output is often imperceptible.<sup>114</sup> An experiment carried out by Rutgers University in 2017 showed that students in a blind test could not distinguish AI output from human-made works and that AI works were sometimes even perceived as superior.<sup>115</sup> SCHÖNBERGER points out, however, that passing this test should not be seen as proof that the computer is actually creative (see 3.2.4, 4.4).<sup>116</sup>

### 2.3.1 Method for Artificial Intelligence Art Production

Complementary to the technical explanations in the previous chapter, in the following, the process of AI in the field of art is briefly explained. The process of generating output in the field of art through AI can be divided into several steps, since the basic procedure for any kind of art is similar.<sup>117</sup>

In the first step, the code of the AI is written, which is mainly done by humans.<sup>118</sup> However, it is unlikely to be long before machines can write their own code.<sup>119</sup>

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<sup>108</sup> Ibid.

<sup>109</sup> See DENICOLA, p. 254; <<https://openai.com/blog/ai-and-compute/>> (last accessed December 18, 2019), showing the AI developments in connection with Moor's Law.

<sup>110</sup> Compare for a broad overview: CHUI ET AL.

<sup>111</sup> See DEVARAPALLI, pp. 2 et seq.

<sup>112</sup> NEFF/ARN, p. 181.

<sup>113</sup> See DENICOLA, p. 257; GUADAMUZ, Quarterly, p. 1; GUADAMUZ, WIPO; see also PEARLMAN, p. 32; PFEIFER, pp. 222 et seqq.

<sup>114</sup> BROWN, p. 3; KREUTZER/SIRRENBURG, p. 246; LAUBER-RÖNSBERG, p. 250; SCHÖNBERGER, p. 150.

<sup>115</sup> LAUBER-RÖNSBERG, p. 250 citing this experiment and with further information on this subject, which is generally referred to as the "Turing-Test"; See for the basics of the term: TURING; see also GRUBOW, 405.

<sup>116</sup> SCHÖNBERGER, pp. 152 et seq.

<sup>117</sup> See GERVAIS, pp. 5 et seqq.; YANISKY-RAVID, p. 677 while dividing the steps slightly differently.; see also the working example in the context of the study AIPPI, Resolution, p. 2.

<sup>118</sup> GERVAIS, p. 5; see also DREXL ET AL., p. 10.

<sup>119</sup> DE COCK BUNING, p. 310; GERVAIS, pp. 3, 5; GROTHAUS.

In the second step, based on the code and the method of machine learning and deep learning, the AI can get to work.<sup>120</sup> The algorithm is presented with multiple works and maybe their correct classification.<sup>121</sup> The AI tries to recognize certain patterns in myriad musical compositions, images or texts.<sup>122</sup> This happens by dividing the data into small electronic signals that are not visible to humans.<sup>123</sup> Thus, the AI can recognize the handwriting of the artists in these works.<sup>124</sup> The patterns and similarities that the machine now identifies are no longer entirely comprehensible to humans and programmers.<sup>125</sup> In this step the machine can be continuously improved and trained with new data and the training partner does not necessarily have to be a human but could be a machine.<sup>126</sup>

The third step then represents the actual production of the output.<sup>127</sup> The recognized patterns can be used to create new works.<sup>128</sup> Based on the analysis of countless musical works, for instance, the machine can produce its own potential hit.<sup>129</sup> In doing so, the AI uses its own insights.<sup>130</sup> Based on the neural networks the AI now makes its own “decisions” on what the output should look like.<sup>131</sup>

The possibilities of the AI are reflected in various areas of art.<sup>132</sup> For example, Google has started a project called Magenta, which deals with deep learning and reinforcement learning algorithms to research and produce songs, images, drawings and other material.<sup>133</sup> In the next chapters some examples are provided.

### 2.3.1 Examples in the Area of Music and Film

In the music sector, AI is used from creation to distribution.<sup>134</sup> Basically, using AI to create music is nothing new, but what is new is that it happens in public.<sup>135</sup> For example, in 2018 Taryn Southern released an album in 2018 called “I AM AI” for which it is claimed that it was completely composed and produced by AI.<sup>136</sup> In the process, Taryn Southern has worked with various AI music programs.

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<sup>120</sup> DELTRON/MACREZ, p. 17; GERVAIS, p. 5.

<sup>121</sup> DELTRON/MACREZ, p. 17; GUADAMUZ, WIPO; SCHÖNBERGER, p. 162; YANISKY-RAVID, p. 676.

<sup>122</sup> DELTRON/MACREZ, p. 17; GERVAIS, p. 5; KREUTZER/SIRRENBURG, p. 246.

<sup>123</sup> YANISKY-RAVID, p. 676.

<sup>124</sup> KREUTZER/SIRRENBURG, p. 246; YANISKY-RAVID, p. 676.

<sup>125</sup> YANISKY-RAVID, p. 677.

<sup>126</sup> Ibid.

<sup>127</sup> GERVAIS, p. 6.

<sup>128</sup> DEVARAPALLI, p. 2; KREUTZER/SIRRENBURG, p. 246.

<sup>129</sup> GERVAIS, p. 6; METZ.

<sup>130</sup> GERVAIS, p. 7.

<sup>131</sup> DEVARAPALLI, p. 2.

<sup>132</sup> See for overviews in: BROWN, pp. 2 et seqq.; DEVARAPALLI, p. 3; GERVAIS, p. 1-2; KREUTZER/SIRRENBURG, pp. 246 et seqq.

<sup>133</sup> <<https://ai.google/research/teams/brain/magenta/>> (last accessed December 18, 2019).

<sup>134</sup> STURM ET AL., p. 2, with remarks that AI, in addition to creating music, is used by services such as Spotify or Shazam for recommending or receiving information about music.; see also DELTRON/MACREZ, p. 5; DENICOLA, p. 264.

<sup>135</sup> DELTRON/MACREZ, pp. 3 et seqq.; STURM ET AL., p. 2.

<sup>136</sup> See DELTRON/MACREZ, p. 3.

One of them was Google’s “Magenta Music” (see 2.3.1).<sup>137</sup> In this project, for example, Google made it possible for their AI to produce very long piano pieces.<sup>138</sup> The AI was trained with thousands of piano recordings from YouTube.<sup>139</sup>

Furthermore, the Project “Flow Machines” is worth mentioning.<sup>140</sup> Flow Machines is a project by Sony which received funding from the European Research Council and is an AI that can develop compelling, professional-quality music.<sup>141</sup> The AI was given 15’000 songs which were then analyzed by the AI according to their probability of certain chord progressions, melodic sequences and rhythms.<sup>142</sup> Based on this, the AI can then create new, possible variations.<sup>143</sup> An example of such a production is a summer upbeat song in the style of “The Beatles”.<sup>144</sup>

Another illustrative example of AI which composes music works is “folkRNN”.<sup>145</sup> In this project, different AI models were trained with data from thousands of transcriptions of folk music.<sup>146</sup> Based on this, new transcriptions can now be created online directly by a user.<sup>147</sup>

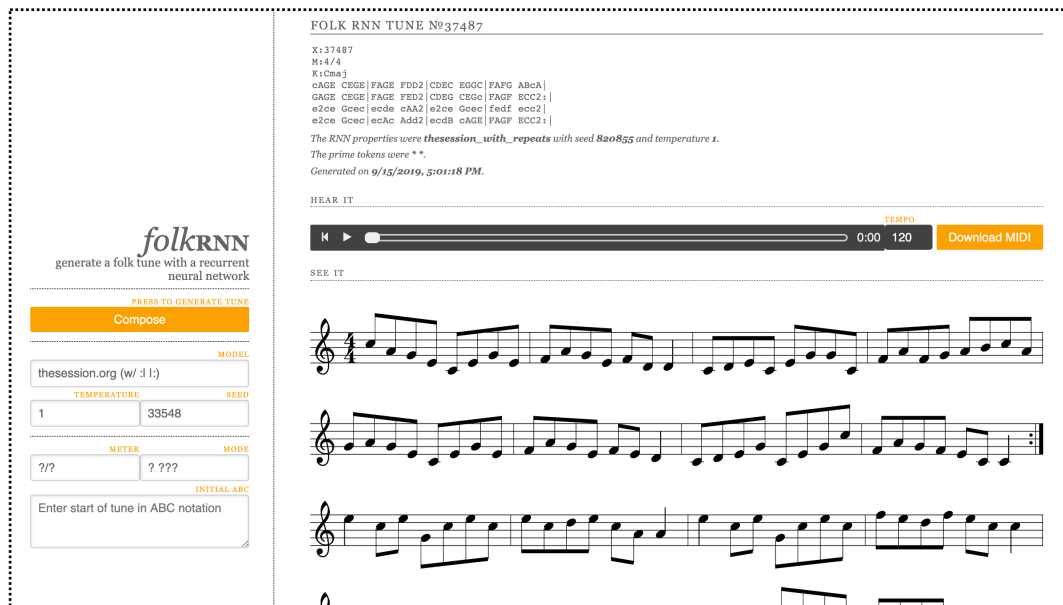


Figure 4: Interface of the “folkRNN” website<sup>148</sup>

<sup>137</sup> <<https://magenta.tensorflow.org/>> (last accessed December 18, 2019); see also SCHÖNBERGER, p. 152.

<sup>138</sup> <<https://magenta.tensorflow.org/piano-transformer/>> (last accessed December 18, 2019).

<sup>139</sup> Ibid.

<sup>140</sup> <<https://www.flow-machines.com/>> (last accessed December 18, 2019); see also IHALAINEN, p. 724; SCHÖNBERGER, p. 152.

<sup>141</sup> See JORDAN.

<sup>142</sup> Ibid.

<sup>143</sup> See IHALAINEN, p. 724; JORDAN.

<sup>144</sup> <[https://www.youtube.com/watch?v=LSHZ\\_b05W7o](https://www.youtube.com/watch?v=LSHZ_b05W7o)> (last accessed December 18, 2019); see also JORDAN.

<sup>145</sup> <<https://folkrnn.org/>> (last accessed December 18, 2019).

<sup>146</sup> <<https://folkrnn.org/>> (last accessed December 18, 2019); see also: STURM ET AL., p. 2 et seq.

<sup>147</sup> Ibid.

### 2.3.2 Examples in the Area of Visual Arts

As mentioned in the introduction, AI is also applied in the field of visual arts.<sup>149</sup> The artwork “Edmond de Belamy” was created using an artificial neural network and was auctioned in 2018.<sup>150</sup> The AI has created the painting, based on a large pool of images fed into the system. In particular, GAN technology (see 2.2.3) was used for this work.<sup>151</sup> Thus, the painting can be said to be new, but still within the characteristics identified by the AI.<sup>152</sup>



Figure 5: The painting "Edmond De Belamy"<sup>153</sup>

Another example is “The Painting Fool”.<sup>154</sup> In this case, the AI was designed to produce paintings of the guests during an exhibition in 2013 and 2014.<sup>155</sup> Its painting style was determined by its current “mood”.<sup>156</sup> Its mood, in turn, resulted from the analysis of newspaper articles it had read.<sup>157</sup> The AI set

<sup>148</sup> <<https://folkrrnn.org>> (last accessed December 18, 2019).

<sup>149</sup> See DENICOLA, p. 262; SCHÖNBERGER, p. 100.

<sup>150</sup> <<https://obvious-art.com/edmond-de-belamy.html>> (last accessed December 18, 2019).; see also LAUBER-RÖNSBERG, p. 244; ORY/SORGE, p. 710.

<sup>151</sup> See ROHNER, p. 51.

<sup>152</sup> See ORY/SORGE, p. 710 et seq.

<sup>153</sup> <[https://www.christies.com/img/LotImages/2018/NYR/2018\\_NYR\\_16388\\_0363\\_000\(edmond\\_de\\_belamy\\_from\\_la\\_famille\\_de\\_belamy\).jpg](https://www.christies.com/img/LotImages/2018/NYR/2018_NYR_16388_0363_000(edmond_de_belamy_from_la_famille_de_belamy).jpg)> (last accessed December 18, 2019).

<sup>154</sup> <<http://www.thepaintingfool.com/index.html>> (last accessed December 18, 2019); see also DE COCK BUNING, p. 313; SCHÖNBERGER, p. 152.

<sup>155</sup> See DE COCK BUNING, p. 313.

<sup>156</sup> Ibid.

<sup>157</sup> Ibid.

itself a goal for each painting, determining the style in which it wanted to paint the painting.<sup>158</sup> After the creation, the AI reviewed if the goal was achieved, and, if not it produced another painting.<sup>159</sup>

In “DeepDream”, images were given to the algorithm to inspect and recognize hidden shapes or images in the image and then create a new work with these images.<sup>160</sup> The programmers taught the machine to make decisions based on millions of data points it had previously been fed and not based on a set of rules.<sup>161</sup>

The painting “the Next Rembrandt” was developed in 2016 in a partnership between art historians, developers, engineers, data scientists and an advertising agency.<sup>162</sup> More than 300 works by the painter, who died in 1669, were analyzed.<sup>163</sup> Based on the 15 terabytes of information collected, a new painting in Rembrandt’s style was created and printed as a 3D print.<sup>164</sup> The portrait finally consisted of 148 million pixel and was based on 168’263 fragments of Rembrandt’s works stored in a purpose-built database.<sup>165</sup>

### 2.3.3 Example in the Area of Text Creation

AI is also used in the field of text production, for example in journalism, for writing books or poetry.<sup>166</sup> In 2016, a short novel written by a Japanese AI reached the second round of a national literary prize.<sup>167</sup> The AI did not write the novel without any human help, but the AI produced the final submission.<sup>168</sup> In the field of journalism, the algorithm “Quill” is an example.<sup>169</sup> Quill is a software that generates news stories and reports based on the analysis of data and the identification of relevant facts.<sup>170</sup>

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<sup>158</sup> Ibid.

<sup>159</sup> Ibid.

<sup>160</sup> <<https://deepdreamgenerator.com>> (last accessed December 18, 2019); see also BROWN, p. 10; GUADAMUZ, WIPO, p. 9; SCHÖNBERGER, p. 152; In this case Google has published the code behind DeepDream as Open Source: <<https://github.com/google/deepdream>> (last accessed December 18, 2019).

<sup>161</sup> See BROWN, p. 10.

<sup>162</sup> <<https://www.nextrembrandt.com>> (last accessed December 18, 2019); see also BROWN, p. 4; LAUBER-RÖNSBERG, p. 244; GUADAMUZ, WIPO.

<sup>163</sup> See GUADAMUZ, WIPO; LAUBER-RÖNSBERG, p. 244.

<sup>164</sup> See DEVARAPALLI, p. 3; GUADAMUZ, WIPO; LAUBER-RÖNSBERG, p. 244; SCHÖNBERGER, p. 152.

<sup>165</sup> See GUADAMUZ, WIPO.

<sup>166</sup> See, e.g., BOYDEN, pp. 380 et seq.; DENICOLA, p. 257; GUADAMUZ, WIPO; MONTAL/REICH, pp. 829 et seq., with an overview of previous publications; RAMALHO, pp. 1 et seq.; YU, p. 1247.

<sup>167</sup> <<https://www.smithsonianmag.com/smart-news/ai-written-novella-almost-won-literary-prize-180958577/>> (last accessed December 18, 2019); see also GUADAMUZ, WIPO; IHALAINEN, p. 725.

<sup>168</sup> IHALAINEN, p. 725.

<sup>169</sup> <<https://narrativescience.com/products/quill/>> (last accessed December 18, 2019); see also DENICOLA, p. 257; see for other examples in the area of bulletins and sports reports: GERVAIS, p. 2; LAUBER-RÖNSBERG, p. 244.

<sup>170</sup> See DENICOLA, p. 257.



The articles are written in a natural language and are no longer distinguishable from articles written by humans.<sup>171</sup> The software allows to choose between different stylistic tones.<sup>172</sup>

AI can also write poems. An example is “POEMPORTRAITS”, a project which was also created in collaboration with Google.<sup>173</sup> For example, if one enters the word “Thankful” on the website, the AI creates the following poem:

“Thankful of the winds where the stars are seen,  
This night was thrown by the sea.”

The AI behind POEMPORTRAIT was trained with over 25 million words by 19th century poets.<sup>174</sup> Based on this training data set, the AI then developed a complex statistical method to produce new poems.<sup>175</sup> According to the developer of the AI, the poems are sometimes very poignant, but can be merely nonsense.<sup>176</sup>

## 2.4 Challenges and Questions in Copyright Law

Based on the explanations in the previous chapters, there are several questions that come to the foreground from a copyright perspective. Certainly, the issues are slightly different depending on the type of art, but in general the questions are the same.<sup>177</sup>

Especially with reference to historical developments, the questions surrounding the use of tools in copyright law are not new, but they are of much greater relevance with the advent of AI.<sup>178</sup> GERVAIS poses the question in the following way: “[The Machines] are far enough already to force us to ask the genuinely hard and complex question, one that intellectual property scholars and courts will need to answer soon, namely whether copyrights should be granted to productions made not by humans, but by machines”.<sup>179</sup> YANISKY-RAVID also goes in the same direction, asking whether our current legal system can cope with such questions at all.<sup>180</sup> In particular, the following complexes exist:

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<sup>171</sup> See DENICOLA, pp. 258, 260.

<sup>172</sup> DENICOLA, p. 258.

<sup>173</sup> <<https://artsexperiments.withgoogle.com/poemportraits>> (last accessed December 18, 2019).

<sup>174</sup> See DEVLIN.

<sup>175</sup> Ibid.

<sup>176</sup> Ibid.

<sup>177</sup> See NEFF/ARN, p. 181.

<sup>178</sup> BOYDEN, pp. 377 et seq.; BRIDY, coding, N 1 et seq.; BROWN, pp. 7, 40; DENICOLA, pp. 264, 269; LAUBER-RÖNSBERG, pp. 244 et seq.; LAUBER-RÖNSBERG/HETMANK, p. 570; MONTAL/REICH, p. 833; ZIBNER, p. 1; cf. GRUBOW, 388; RAGOT ET AL., pp. 578 et seq.

<sup>179</sup> GERVAIS, p. 4.

<sup>180</sup> YANISKY-RAVID, pp. 664, 678.

(1) A field of questions is whether the output of AI can get copyright protection.<sup>181</sup> This question is also referred to by the term “downstream”.<sup>182</sup>

(2) If there is or should be a protection, the question arises as to whom the copyright should be assigned to.<sup>183</sup>

(3) A field of questions deals with the copyright of the works used to train the AI.<sup>184</sup> The question arises, to what extent, for example, the consent of the copyright holders of the works fed into the AI is necessary.<sup>185</sup> In contrast to the first thematic area, the term “upstream” is used here.<sup>186</sup>

(4) In this context one can also deal with the question to what extent the code of the AI can be protected, especially in case the AI develops its own code.<sup>187</sup>

(5) Questions of liability also arise.<sup>188</sup> For instance, it must be clarified who is liable if a copyright is infringed by the AI because, for example, part of another work has been copied.<sup>189</sup>

As already mentioned in the introduction chapter, this thesis focuses solely on the first two questions of whether the output can and should be protected. The other questions mentioned here will not be looked at further.

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<sup>181</sup> BRIDY, *evolution*, p. 396; DELTRON/MACREZ, p. 7; GUADAMUZ, *Quarterly*, pp. 1 et seq.; LAUBER-RÖNSBERG/HETMANK, p. 572; MONTAL/REICH, pp. 833 et seq., with a literature review; STURM ET AL., pp. 4 et seq.; for a structuring of the questions arising with this topic: GRIMMELMANN, *No Such Thing*, p. 404; RAGOT ET AL; see also STAATSSSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION, *Herausforderungen*, p. 40.

<sup>182</sup> SCHÖNBERGER, p. 160.

<sup>183</sup> DELTRON/MACREZ, pp. 1, 7; DEVARAPALLI, p. 1, 4; GUADAMUZ, *Quarterly*, pp. 1 et seq.; see also STAATSSSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION, *Herausforderungen*, p. 40.

<sup>184</sup> See, e.g., GRIMMELMANN, *Literate Robots*; ORY/SORGE, pp. 712 et seq.; SCHÖNBERGER, with remarks on this topic and in particular the argument that more research should be done on the topic.; STURM ET AL., p. 5; see also STAATSSSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION, *Herausforderungen*, pp. 40, 96.

<sup>185</sup> See, e.g., STURM ET AL., p. 5.

<sup>186</sup> SCHÖNBERGER, p. 161.

<sup>187</sup> See, e.g., SPINDLER, p. 1049; see also with remarks on this question: Berger, cited in: MINDER, p. 149; see also BROWN, pp. 23 et seq.; HARTMANN/PRINZ; ZECH, p. 1146.

<sup>188</sup> See, e.g., STURM ET AL., p. 5; YANISKY-RAVID, p. 682.

<sup>189</sup> STURM ET AL., p. 5; see also PFEIFER, pp. 228 et seq.; YANISKY-RAVID, pp. 682 et seq.

### 3 Protectability under Swiss Copyright Law de Lege Lata

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This chapter analyzes the extent to which AI output is protected under Swiss copyright law de lege lata. At present, there is no law or court decision in Switzerland that specifically deals with AI output.<sup>190</sup> In this chapter, first, the relevant laws are explained, then the extent to which AI output meets the concept of a work is examined, and the question of authorship of AI output is discussed. Due to its similarity, references to German copyright law appear frequently; and some other jurisdictions are also mentioned (see also below, 4). Finally, individual further concepts are taken up under which AI works could possibly be subsumed.

#### 3.1 Relevant Copyright Law

In Switzerland, the Federal Act on Copyright and Related Rights<sup>191</sup> (“CopA”) regulates copyright law. The law dates back to 1992 and has undergone several revisions since then.<sup>192</sup> There is also an ordinance that regulates certain details of the law.<sup>193</sup> It should also be mentioned that certain areas of the CopA are currently being revised (see 2.1).<sup>194</sup> In addition to these laws, the decisions of the Federal Supreme Court are also decisive at the Swiss level. Since 1923, there have been about 250 published cases concerning copyright.<sup>195</sup>

The question arises as to the extent to which provisions exist at an international level. Generally, the term international copyright law can only be used to a limited extent.<sup>196</sup> Copyright is mostly granted based on the principle of territoriality, which can be explained historically.<sup>197</sup> The national laws define the conditions, ownership, transferability, scope, duration of protection and content.<sup>198</sup> However, many international harmonization efforts are taking place.<sup>199</sup> The reservation of international treaties also results from art. 1 para. 2 CopA, whereby this provision has only declaratory character.<sup>200</sup>

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<sup>190</sup> RAGOT ET AL., p. 574; However, it must be added here that not all court decisions are published and therefore this issue cannot be answered conclusively.

<sup>191</sup> SR 231.1

<sup>192</sup> See Dispatch CopA 1989, p. 477; DESSEMONDET, N 10; REHBINDER, N 22 et seqq.

<sup>193</sup> SR 231.11

<sup>194</sup> See Dispatch CopA 2018, however, the term “artificial intelligence” does not appear anywhere in any of the documents.

<sup>195</sup> DESSEMONDET, N 13; see already above: since not all decisions are published, it is difficult to verify the correctness of this number.

<sup>196</sup> HILTY, Urheberrecht, N 62.

<sup>197</sup> HILTY, Urheberrecht, N 62; GORDON, N 0.2.

<sup>198</sup> GORDON, N 0.2.

<sup>199</sup> See DESSEMONDET, N 10; HILTY, Urheberrecht, N 62.

<sup>200</sup> CHERPILLOD, N 157.

The following international legal sources are basically relevant: Revised Berne Convention<sup>201</sup> (last revision in Paris in 1971), Universal Copyright Convention<sup>202</sup> (Geneva version of 1952 with additional protocols of 1971), Convention for the Protection of Producers of Phonograms Against Unauthorized Duplication of Their Phonograms<sup>203</sup> (1971), Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations<sup>204</sup> (1961), Brussels Convention Relating to the Distribution of Programm-Carrying Signals Transmitted by Satellite<sup>205</sup> (1971), Agreement on Trade-Related Aspects of Intellectual Property Rights<sup>206</sup> (1995), WIPO Copyright Treaty<sup>207</sup> (WCT, 1996), WIPO Performance and Phonograms<sup>208</sup> (WPPT, 1996). The Berne Convention and the Universal Copyright Convention provide a minimum level of protection and contain mandatory substantive provisions which are directly applicable in the contracting states, also the Rome Convention, the WCT and WPPT contain directly applicable provisions.<sup>209</sup> The Geneva and Brussels Conventions do not contain directly applicable provisions but only bind the contracting states.<sup>210</sup> The direct applicability of the TRIPS standards is controversial.<sup>211</sup> The Berne Convention as well as the Universal Copyright Convention and the Rome Convention are based on the principle of national treatment, according to which beneficiaries from all contracting states are granted the same protection as nationals.<sup>212</sup> However, in the multilateral treaties there is no legal definition of the concept of a work under copyright law.<sup>213</sup>

With regard to the examination of the protectability of AI output *de lege lata* in Switzerland, therefore mainly the applicable Swiss legal provisions are relevant. For the protectability, protection requirements and provisions about the author art. 2 CopA, which deals with the requirements of a work and art. 6 CopA, which regulates the conditions about the author, must be considered in particular.

### 3.2 Concept of the Work (Art. 2 CopA)

In art. 2 para. 1 CopA the legal definition of a work can be found: “Works are literary and artistic intellectual creations with an individual character, irrespective of their value or purpose” (“Werke sind,

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<sup>201</sup> SR 0.231.15

<sup>202</sup> SR 0.231.01

<sup>203</sup> SR 0.231.172

<sup>204</sup> SR 0.231.171

<sup>205</sup> SR 0.231.173

<sup>206</sup> SR 0.632.20

<sup>207</sup> SR 0.231.151

<sup>208</sup> SR 0.231.171.1

<sup>209</sup> CHERPILLOD, N 159; THOUVENIN/BIRCHER/FISCHER, pp. 122 et seqq.

<sup>210</sup> CHERPILLOD, N 159.

<sup>211</sup> See CHERPILLOD, N 159.

<sup>212</sup> CHERPILLOD, N 160; HILTY, Urheberrecht, N 64, 67, 70; THOUVENIN/BIRCHER/FISCHER, pp. 122 et seqq.

<sup>213</sup> VON BÜREN/MEER, Werkbegriff, N 162; see also DELTRON/MACREZ, p. 8, with comments on the fact that, according to the Berne Convention, it is the freedom of the individual countries to define the minimum threshold a work must met.; GINSBURG, pp. 131 et seq., with comments that there was nevertheless a certain consensus among the member states of the Berne Convention as to what authorship meant.

unabhängig von ihrem Wert oder Zweck, geistige Schöpfungen der Literatur und Kunst, die individuellen Charakter haben“). The requirements “intellectual creations”, “individual character” and “literary and artistic” are necessary for a work to be recognized as a work.<sup>214</sup> These criteria are examined in the next chapters. Since references to German law are often made, it is worth having the German definition of a protected work in mind, too. Under German law, copyright protection is granted for personal intellectual creations (“Werke im Sinne dieses Gesetzes sind nur persönliche geistige Schöpfungen.”; see § 2 para 2 of the German Copyright Act<sup>215</sup>).<sup>216</sup>

### 3.2.1 Intellectual Creation

The requirement intellectual creation can be further subdivided into intellectual, creation and perception.<sup>217</sup> According to the federal supreme court intellectual means, that the work needs to be based on a human will and be the expression of a thought of this human.<sup>218</sup> It is not decisive whether the intellectual creation is conscious or unconscious, but it must occur (this, because creation is a real act (“Reallakt”)).<sup>219</sup> Also the doctrine demands human intellectual activity or human participation in the act of creation.<sup>220</sup> The human requirement is further defined in art. 6 CopA (see 3.3).<sup>221</sup> For that reason, output created by animals or machines is per definition not protected by copyright.<sup>222</sup>

The decisive question is therefore, until when there is sufficient human participation. ROHNER uses the term creator threshold (“Schöpfungsschwelle”) for this.<sup>223</sup> In general, the following can be said about this boundary.

(1) The requirements of human will should not be overinterpreted.<sup>224</sup> It should therefore be sufficient to consciously choose, present or combine what has been found or produced randomly.<sup>225</sup>

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<sup>214</sup> BARRELET/EGLOFF, pp. 11 et seq.; see also CHERPILLOD, in: SHK-CopA, art. 2, N 1 et seq.; RAGOT ET AL., pp. 576 et seq.; THOUVENIN/BIRCHER/FISCHER, p. 89; The term “irrespective of their value or purpose” can also be regarded as a further requirement, however, this does not appear to be problematic in the present case and will not be dealt with further. For general information see VON BÜREN/MEER, Werkbegriff, N 190 et seq.; ZÜLLIG, p. 109, with an overview of different doctrines on the concept of work.

<sup>215</sup> <<https://www.gesetze-im-internet.de/urhg/>> (last accessed December 18, 2019).

<sup>216</sup> See BISGES, p. 23; LAUBER-RÖNSBERG, p. 245; LAUBER-RÖNSBERG/HETMANK, p. 573; ORY/SORGE, p. 711; SCHULZE, N 8.

<sup>217</sup> However, even these distinctions do not seem to be made uniformly between different authors and the boundaries which requirements result from which part are floating.

<sup>218</sup> BGE 130 III 168 “Bob Marley”, E.4.5; CHERPILLOD, in: SHK-CopA, art. 2, N 9, with criticism regarding the ambiguity of this term.; see also Dispatch CopA 1989, p. 521; RAGOT ET AL., pp. 574 et seq.; VON BÜREN/MEER, Werkbegriff, N 169.

<sup>219</sup> BGE 116 II 354 “Mitteilungen aus dem Jenseits”, E.2. b); HILTY, Urheberrecht, N 84; VON BÜREN/MEER, Werkbegriff, N 166, 169.

<sup>220</sup> VON BÜREN/MEER, Werkbegriff, N 171; see also ROHNER, pp. 66 et seq., with critical remarks on the fact that requirements are already placed on the author during the definition of the work.; ZÜLLIG, p. 108, with an overview of the doctrines.

<sup>221</sup> Dispatch CopA 1989, p. 521.

<sup>222</sup> BARRELET/EGLOFF, p. 12; REHBINDER/VIGANÒ, p. 36; ROHNER, p. 37; THOUVENIN/BIRCHER/FISCHER, 92.

<sup>223</sup> ROHNER, pp. 42 et seqq.

(2) The use of randomness does not generally exclude sufficient human involvement. As early as 1987, DEGGINGER drew the conclusion that randomness is only a voluntary self-restriction which does not lead to an absence of individuality.<sup>226</sup> According to DEGGINGER, the authors only makes randomness a factor in his strategy and retains the essential freedom of choice to use it or to interrupt it.<sup>227</sup> However, there are also opinions to the effect that there can be no protection for products of randomness.<sup>228</sup> The solution seems to be in the middle. If authors use randomness as a conscious element of their work, the threshold is probably crossed.<sup>229</sup> If, however, the complete creation is mainly a matter of randomness, there is not enough human participation.<sup>230</sup>

The term creation means, that something which has not existed before is created.<sup>231</sup> The term should not be confused with the concept of novelty in other intellectual property rights.<sup>232</sup> Creation is to be understood as opposed to copying, although it is not necessary for the work to be completely new.<sup>233</sup> All works use pre-existing elements to a certain extent.<sup>234</sup> However, for other authors, the creation requirement means that a work must be created by a human being and must not simply be found.<sup>235</sup> In summary, therefore, no further aspects seem to emerge from the partial term creation, i.e. the aspects already mentioned above.

Finally, the creation needs to be perceptible (creative objectification) which can happen visually or acoustically, among others.<sup>236</sup> Thus, it does not matter in which form a work is expressed.<sup>237</sup> Similarly, the perceptibility does not have to be permanent, so an improvised piece of music is also eligible for being protected.<sup>238</sup>

Subsumed to the output of AI, the following must be taken into account. The requirement of intellectual is met if there is sufficient human involvement in the creation process.<sup>239</sup> Due to the scope and significance of this question, it will be dealt with separately in the next chapter. With regard to the

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<sup>224</sup> BARRELET/EGLOFF, p. 12; CHERPILLOD, in: SHK-CopA, art 2, N 9; VON BÜREN/MEER, *Werkbegriff*, N 167.

<sup>225</sup> CHERPILLOD, in: SHK-CopA, art, 2, N 9; see also BARRELET/EGLOFF, p. 12.

<sup>226</sup> DEGGINGER, p. 47; see also DESSEMONTET, in: CR PI-CopA, art. 2, N 8; VON BÜREN/MEER, *Werkbegriff*, N 298.

<sup>227</sup> DEGGINGER, p. 47.

<sup>228</sup> See HUG, in: SHK-CopA, art. 6, N 4.

<sup>229</sup> ROHNER, p. 44; see GE jurisdiction: SCHULZE, N 8.

<sup>230</sup> ROHNER, p. 44; see US jurisdiction: GRIMMELMANN, *No Such Thing*, pp. 408 et seq., arguing in the opposite direction.

<sup>231</sup> BARRELET/EGLOFF, p. 13; HILTY, *Urheberrecht*, N 85.

<sup>232</sup> HILTY, *Urheberrecht*, N 85.

<sup>233</sup> BARRELET/EGLOFF, p. 13; CHERPILLOD, in: SHK-CopA, art. 2, N 9.

<sup>234</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 9.

<sup>235</sup> DESSEMONTET, in: CR PI-CopA, art. 2, N 10, with the view that a simple selection and presentation of a (found) object would be sufficient.; VON BÜREN/MEER, *Werkbegriff*, N 165 et seqq.

<sup>236</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 4; HILTY, *Urheberrecht*, N 83; REHBINDER/VIGANÒ, p. 32; VON BÜREN/MEER, *Werkbegriff*, N 173.

<sup>237</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 4; DESSEMONTET, N 54; VON BÜREN/MEER, *Werkbegriff*, N 173.

<sup>238</sup> VON BÜREN/MEER, *Werkbegriff*, N 175; see also BARRELET/EGLOFF, p. 12.

<sup>239</sup> See RAGOT ET AL., pp. 574 et seq.

requirement creation (defined as “not copying”) it can be argued that this is fulfilled by AI output, because, as the above explanations (see 2.3) have shown, the AI does not simply copy works. The requirement of perceptibility can also be regarded as fulfilled by output of AI. The outputs listed as examples above (see 2.3) are perceptible as image, music or text and thus meet this criterion.

### 3.2.2 Computer-Aided versus Computer-Generated Works

As mentioned above (see 3.2.1), the question of the extent to which AI output has sufficient human input and thus fulfils the intellectuality requirement is dealt with in greater depth here. This is necessary because *de lege lata* the problem seems to revolve around this protection requirement in particular.

The question whether the computer (or the AI) is just used as a tool or whether it is really producing something on its own (and there is therefore not enough human involvement) is part of a controversial discussion in the (Swiss) doctrine.<sup>240</sup> The use of computers in art creation is often divided into two categories: “computer-aided” works and “computer-generated” works, although the passage is fluent.<sup>241</sup> The (older) Swiss literature often focuses on computer programs or computer graphics and there AI is rarely explicitly mentioned.<sup>242</sup> In the following, however, these terms are combined, since they essentially seem to deal with the same thing.

On the one hand, there is the category of the computer-aided works or computer-assisted works. In such a case, the computer is only used as a tool.<sup>243</sup> The use here is then comparable to the use of a brush or chisel. The 1992 dispatch on Copyright law refers already to computer works. It states that computer graphics or computer art in general are intellectual creations that are protected if they have an individual character.<sup>244</sup> The assumption behind this, however, is that the human being has a sufficient impact on the output.<sup>245</sup> These computer-aided works are therefore protected by Swiss copyright law.<sup>246</sup>

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<sup>240</sup> See NEFF/ARN, p. 181; ROHNER, p. 36; THOUVENIN/BIRCHER/FISCHER, p. 93; VON BÜREN/MEER, *Werkbegriff*, N 168, 297; see also FÁBIÁN, pp. 286 et seqq., with comments on the discussion in Swiss patent law and with the result that the AI invents independently.; GE jurisdiction: PFEIFER, pp. 226 et seq.; EU jurisdiction: LAUBER-RÖNSBERG/HETMANK, p. 573; UK jurisdiction: BOND/BLAIR, p. 423; US jurisdiction DENICOLA, pp. 269 et seq.; see also MONTAL/REICH, pp. 833 et seqq., with a literature review.

<sup>241</sup> NEFF/ARN, p. 182; REHBINDER, N 92; see also US jurisdiction: HRISTOV, p. 435 who divides only two parts: “AI as a Tool” and “AI as an Independent Actor”; there are also other authors, who divide into three categories: “computer-aided”, “computer-assisted” and “computer-generated”.

<sup>242</sup> See, e.g., for computer graphics VON BÜREN/MEER, *Werkbegriff*, N 296 f; no mention of AI in NEFF/ARN, pp. 181 et seq.

<sup>243</sup> THOUVENIN/BIRCHER/FISCHER, 93; ZECH, p. 1146; VON BÜREN/MEER, *Werkbegriff*, N 168, 297.

<sup>244</sup> Dispatch CopA 1989, p. 521.

<sup>245</sup> VON BÜREN/MEER, *Werkbegriff*, N 298.

<sup>246</sup> HILTY, *Urheberrecht*, N 84.

If, however, there is not sufficient human involvement, the output falls into the category of “computer-generated works”. Computer-generated works are not protected under Swiss copyright law because there is not enough human input and therefore no intellectual creation.<sup>247</sup> This follows from the definition of this category. Computer-generated works are objects that have not been created by human beings and therefore are not protected by copyright.<sup>248</sup> The general criteria for exceeding this limit have already been mentioned above (see 3.2.1).

Subsumed to AI output, to decide whether outputs are computer-assisted or computer-generated works the following must be taken into account.

(1) The assessment of whether there is enough human involvement in AI output is ultimately a case-by-case assessment.<sup>249</sup> Probably, it is the finest nuance that represents a corresponding crossing of the threshold. For some machines which used to be called AI it may be true that a human has contributed a sufficient part, because the machine has only done something after clearly defined steps.<sup>250</sup> However, this is not the case for many other machines.

(2) A user<sup>251</sup> of an AI can, for instance, press a button to start the AI.<sup>252</sup> This action alone is not sufficient to justify sufficient human involvement.<sup>253</sup> If the user’s actions do not go further than “[...] requesting the computer to generate a literary, artistic or musical composition [...]”, this does not constitute sufficient intellectual creation.<sup>254</sup> The actions may only be sufficient if they are intensive and contain, for instance, free and creative choices.<sup>255</sup> The output might be considered a human expression of thought if a human being selects the parameters, the data and their sequence with a view to the result and adjusts them again and again until he or she is satisfied.<sup>256</sup> If, for example, a user chooses the keys, the style or the tempo for a piece of music himself, he or she can be regarded as the author, but if he or she only presses the start button to generate a random piece of music, there is not enough human input.<sup>257</sup> For the example folkRNN (see 2.3.1) mentioned above, this results in the following. If a user

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<sup>247</sup> ROHNER, p. 42; VON BÜREN/MEER, *Werkbegriff*, p. 298; see also GE jurisdiction: SCHULZE; LAUBER-RÖNSBERG, p. 247; UK jurisdiction: LAMBERT.

<sup>248</sup> See BARRELET/EGLOFF, p. 36; see also GE jurisdiction: PFEIFER, pp. 226 et seqq.

<sup>249</sup> See RAGOT ET AL., pp. 576 et seq.; see also GE jurisdiction: DELTRON/MACREZ, p. 7, with remarks on the fact that many difficult questions open up to these boundaries.; LAUBER-RÖNSBERG, p. 247; ORY/SORGE, p. 711; US jurisdiction: GINSBURG/BUDIARDJO, pp. 438 et seq., with a graphical overview of which cases may occur.

<sup>250</sup> See RAGOT ET AL., p. 578, who classify AI as tool, but in the same document describe the copyright protection for AI output as not given; see also GE jurisdiction: SPINDLER, p. 1050; US jurisdiction: YANISKY-RAVID, p. 675.

<sup>251</sup> The user is understood in the following as this person who “runs” (presses e.g., “compose”) an AI, whereas the programmer creates the technical basis (the code) for the AI (see also, 2.2, 2.3).

<sup>252</sup> RAGOT ET AL., pp. 575 et seq.; see also EU jurisdiction: DELTRON/MACREZ, p. 10.

<sup>253</sup> RAGOT ET AL., pp. 576 et seqq.; ROHNER, p. 44, 52; see also EU jurisdiction: DELTRON/MACREZ, p. 10.

<sup>254</sup> See GE jurisdiction: SPINDLER, p. 1050; see also US jurisdiction: GINSBURG, p. 133.

<sup>255</sup> RAGOT ET AL., p. 576.

<sup>256</sup> THOUVENIN/BIRCHER/FISCHER, p. 93.

<sup>257</sup> See GE jurisdiction: PFEIFER, p. 224; ZECH, p. 1147; US jurisdiction: YANISKY-RAVID, p. 706.



only clicks on “compose”, there is not enough human involvement. However, if the user chooses parameters such as model, temperature, see, etc. himself or herself, there is probably sufficient human involvement.

(3) For a programmer to be sufficiently involved in the process, he or she would have to predefine through his or her code what the work will be like, however, this is often not the case with AI output.<sup>258</sup> As explained in the technical basics (see 2.2), the programmer is only involved in programming the basic features of the AI. It therefore can be argued that the human involvement in the creation process of the AI code is to be distinguished from the human involvement in creation of the output. The fact that the programmer is involved in the beginning of the process does not mean that the programmer gets protection over the AI’s output (see 3.4.2).<sup>259</sup> For instance, in the case of folkRNN (see 2.3.1), the programmers would not be sufficiently involved in the output process.

(4) Some authors classified computer-generated works generally as impossible and as science fiction. NEFF and ARN for instance argue in 1998 that output of art created entirely by computers can at best be found in the science fiction genre.<sup>260</sup> Also VON BÜREN and MEER still state in 2014 with reference to computer graphics that at least today there needs to be a human involved in creating them.<sup>261</sup> They argue, that no computer is active on its own, but a human being must develop a program, load it into some computer, enter additional data and, finally, start the program.<sup>262</sup> According to these authors, this small human contribution should be sufficient for crossing the creator’s threshold.<sup>263</sup> However, this reasoning cannot be upheld any more. In light of the above-mentioned technological developments (2.2), it does not seem sensible to claim that computer-generated works are still science fiction.<sup>264</sup> Referring to the small human input does not seem convincing. The examples from above (2.3) show well to what extent AI is already capable of generating output today with little or no human input. The qualification as science fiction also seems to misjudge how advanced AI is today and that AI differs fundamentally from “ordinary” computer programs (see above, 2.2). Furthermore, the current rapid technological development will further reduce the human involvement.<sup>265</sup>

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<sup>258</sup> RAGOT ET AL., pp. 575 et seq.

<sup>259</sup> ROHNER, p. 52.

<sup>260</sup> NEFF/ARN, p. 184; see also ROHNER, p. 42.

<sup>261</sup> VON BÜREN/MEER, Werkbegriff, N 168, 298; arguing in the same direction: BARRELET/EGLOFF, p. 35.

<sup>262</sup> VON BÜREN/MEER, Werkbegriff, N 298; see also US jurisdiction: BRIDY, coding, N 23 et seqq.; GRIMMELMANN, No Such Thing, p. 408 et seqq., still with the statement that there is enough human input.

<sup>263</sup> VON BÜREN/MEER, Werkbegriff, N 168.

<sup>264</sup> See RAGOT ET AL., p. 575; ROHNER, p. 45; see also GE jurisdiction: ORY/SORGE, p. 711; SPINDLER, p. 1051; AU jurisdiction: DEVARAPALLI, pp. 4 et seq.; US jurisdiction: HRISTOV, p. 451.

<sup>265</sup> RAGOT ET AL., p. 575; see also GE jurisdiction: PFEIFER, p. 227; US jurisdiction GRUBOW, p. 410, who rejects the argument already with the following statement: “[... the] argument is misplaced because even human intelligence requires other humans ‘in the loop.’”.

(5) A comparison with similar cases is useful. Photographs are only protected if they are based on human action.<sup>266</sup> The Federal Court stated that the human will is reflected in particular in the choice of the image detail and the time of the triggering during a certain motion sequence.<sup>267</sup> Thus, it is particularly important here how a photo is taken.<sup>268</sup> Photographs taken by an automatic process such as radar photos or photos from surveillance cameras are therefore not protected.<sup>269</sup>

(6) Also, in the already mentioned monkey selfie case, the question arose whether the photographer's actions, namely setting up the camera equipment, and selecting the image from a large number of images counted as sufficient human involvement.<sup>270</sup> Although this case has not been finally dealt with by the courts, it seems clear that there is not enough human involvement.<sup>271</sup> Even if this case was not judged under Swiss law, the granting of copyright for such constellations is also rejected in Switzerland.<sup>272</sup>

(7) It can also be argued that because so many different humans are involved in the process of creating an output, none of them crosses the threshold, since it would not have been possible for a single human to achieve this output.

(8) The circumstance that the classification of AI as a tool is somewhat outdated today also becomes clear by the fact that various authors assume in only a few remarks in their definitions of terms that the output is generated directly by AI.<sup>273</sup>

In conclusion, it seems like (at least some) AI output does not show the sufficient human involvement required by Swiss copyright law and must therefore be classified as a computer-generated work. Hence, the intellectuality requirement of as part of the work concept is not fulfilled for the output of AI (see for the interim conclusion 3.2.1).

### 3.2.3 Individual Character

The requirement of the individual character is hard to define.<sup>274</sup> According to the 1992 dispatch on copyright the point is to judge whether a creation is sufficient to stand out from the existing pool of

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<sup>266</sup> Dispatch CopA 2018, p. 620; It is crucial to understand that both the requirement of intellectual creation and that of individuality (see below, 3.2.3) can fail in photographs.

<sup>267</sup> BGE 130 III 168 "Bob Marley", E. 5.2.; see also BGE 130 III 714 "Meili", E. 2.2.; CHERPILLOD, in: SHK-CopA, art. 2, N 9.

<sup>268</sup> SENN, p. 254.

<sup>269</sup> Dispatch CopA 2018, p. 620; RAGOT ET AL., pp. 574 et seq.

<sup>270</sup> See GE jurisdiction LAUBER-RÖNSBERG/HETMANK, p. 573.

<sup>271</sup> Ibid.

<sup>272</sup> THOUVENIN/BIRCHER/FISCHER, p. 93.

<sup>273</sup> See, e.g. US jurisdiction: BRIDY, coding, N 4; BROWN, pp. 8 et seq.; DENICOLA, p. 269; YU, p. 1247.

<sup>274</sup> See CHERPILLOD, in: SHK-CopA, art. 2, N 32 et seq.; GORDON, N 4.2 et seq.; REHBINDER, N 73; ROHNER, p. 54; THOUVENIN/BIRCHER/FISCHER, p. 93; WILD, N 245.

works.<sup>275</sup> Also, different terms are used. The Swiss federal court has used the terms “individuality” and “originality” synonymously.<sup>276</sup> Despite these inconsistencies, there are some principles that have to be considered when assessing individuality.<sup>277</sup>

(1) The individual character is determined by the overall impression of the work.<sup>278</sup>

(2) Individuality needs to be expressed in the work itself and the circumstances of its creation are not relevant.<sup>279</sup> This reflects an objective understanding of individuality.<sup>280</sup> The decisive factor is always the individuality of the work and not the individuality of the author.<sup>281</sup> Some authors, however, associate individuality with a human being. For instance, RAGOT ET AL. write that individuality is normally viewed as “[...] an attribute of an intellectual creation of a human being.”<sup>282</sup> However, this view no longer seems up-to-date since the 1992 revision of the CopA.<sup>283</sup>

(3) Individuality exists at least when a work has unmistakable characteristic traits.<sup>284</sup> Thus, creations that would have been created in the same way by any other creator have no individual character.<sup>285</sup> Although the statistical uniqueness, as claimed in particular by KUMMER, is an indication of the character of the work, it does not alone constitute individuality.<sup>286</sup> The theory of statistical uniqueness is, to a certain extent, an attempt to bring objectivity into the examination of individuality.<sup>287</sup>

(4) No particular level of individuality is required.<sup>288</sup> Individuality is already achieved when the work goes a sufficiently creative step beyond mere otherness.<sup>289</sup>

(5) According to the Federal Supreme Court, the required individual character depends on the creative freedom of the creator.<sup>290</sup> The less freedom there is for individuality, the lower the benchmark should

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<sup>275</sup> Dispatch CopA 1989, p. 521; HILTY, Urheberrecht, N 91.

<sup>276</sup> BGE 113 II 190 “Le Corbusier”, E. I.2. a); DESSEMONTET, N 56; DESSEMONTET, in: CR PI-CopA, art. 2, N 17; HILTY, Urheberrecht, N 91; RAGOT ET AL., pp. 576 et seq.; ROHNER, p. 54, with remarks that the use of “originality” is outdated.

<sup>277</sup> See BGE 113 II 190 “Le Corbusier”, E. II.1; THOUVENIN/BIRCHER/FISCHER, p. 93; SENN, pp. 254 et seq., with a summary of the criteria.; VON BÜREN/MEER, Werkbegriff, N 178

<sup>278</sup> THOUVENIN/BIRCHER/FISCHER, p. 93; REHBINDER, N 73.

<sup>279</sup> BGE 130 III 714 “Meili”, E. 2.2.; BGE 130 III 168 “Bob Marley”, E. 4.4.; THOUVENIN/BIRCHER/FISCHER, p. 93; VON BÜREN/MEER, Werkbegriff, N 183.

<sup>280</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 18, 21.

<sup>281</sup> BGE 143 III 373 “Barhocker”, E. 2.1.; BGE 130 III 168 “Bob Marley”, E. 4.4.; CHERPILLOD, in: SHK-CopA, art. 2, N 18; THOUVENIN/BIRCHER/FISCHER, p. 93; ZÜLLIG, p. 105.

<sup>282</sup> RAGOT ET AL., pp. 576 et seq.

<sup>283</sup> DESSEMONTET, N 56; see also BARRELET/EGLOFF, p. 14; VON BÜREN/MEER, Werkbegriff, N 183.

<sup>284</sup> THOUVENIN/BIRCHER/FISCHER, p. 94; see also BARRELET/EGLOFF, p. 14.

<sup>285</sup> THOUVENIN/BIRCHER/FISCHER, p. 94; VON BÜREN/MEER, Werkbegriff, N 281.

<sup>286</sup> BGE 134 III 166 “Arzneimittelkompendium”, E. 2.3.1.; CHERPILLOD, in: SHK-CopA, art. 2, N 20; THOUVENIN/BIRCHER/FISCHER, p. 94; VON BÜREN/MEER, Werkbegriff, N 179 et seq.; see also KUMMER, pp. 30 et seq., 80.

<sup>287</sup> DESSEMONTET, N 58 et seq.; VON BÜREN/MEER, Werkbegriff, N 179 et seq.; see also ZÜLLIG, pp. 106 et seq.

<sup>288</sup> THOUVENIN/BIRCHER/FISCHER, p. 94.

<sup>289</sup> Ibid.

be (which is the case, for instance, with works of architecture or applied art).<sup>291</sup> This attitude is often criticized in the doctrine, because in the case of works for which there is insufficient creative freedom, no such protection should be granted.<sup>292</sup>

(6) At this point, the concept of creativity could also be dealt with in greater depth. However, in Swiss copyright literature the concept of creativity is basically not used (in contrast to the discussion at the international level (see 4.4)).<sup>293</sup> If one would equate the concept of creativity with individuality, the question would be, what creativity is and when it exists.<sup>294</sup> However, it does not seem right to focus here on the question of creativity, as this is not a priority under Swiss law.

(7) With regard to photography, for instance, there is a lack of individual character, if the photography does not stand out from the usual, because there is a high probability that the same or essentially the same photograph will result from the same action.<sup>295</sup> The Federal Supreme Court has based its assessment of individuality for photographs on the following factors: selection of the subject, the image section and the time of the shutter release, the use of a specific lens, filter or film, the adjustment of sharpness and exposure and the processing of the negative.<sup>296</sup> However, as a result of the current revision of Swiss copyright law, the requirement of individuality for photographs will no longer be necessary (see 2.1).<sup>297</sup>

With regard to AI, the following must be considered. As with the requirement of intellectual creation, a case-by-case evaluation is necessary for the aspect of individuality of the AI output.<sup>298</sup> Because individuality is to be found in the work and not in the author, it is possible to speak of individuality in AI output. The requirement of unmistakable characteristic traits and the non-particular level of individuality, especially in view of the fact that AI output cannot be distinguished from human works, leads to the conclusion that individuality can also be regarded as fulfilled from these aspects. If one considers, for example, the painting “Edmond De Belamy” (see 2.3.3), individuality would undoubtedly exist in such a painting if it had been painted by a human being. As far as creativity is concerned, it has al-

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<sup>290</sup> BGE 143 III 373 “Barhocker”, E. 2.1.; BGE 136 III 225 “Guide Orange”, E. 4.2.; BGE 125 III 328 “Hobby Kalender”, E. 4.b); BGE 113 II 190 “Le Corbusier”, E. I.2.a); see also CHERPILLOD, in: SHK-CopA, art. 2, N 19.

<sup>291</sup> BARRELET/EGLOFF, p. 14; VON BÜREN/MEER, *Werkbegriff*, N 182.

<sup>292</sup> See, e.g., DESSEMONTET, N 62 et seqq.; HILTY, *sic!* 2003, pp. 30 et seqq.; THOUVENIN/BIRCHER/FISCHER, p. 94.

<sup>293</sup> See, e.g., ROHNER, p. 57, with comments on that.

<sup>294</sup> ROHNER, pp. 57 et seqq.; see GE jurisdiction PFEIFER, p. 223, with comments on creativity and the conclusion that creativity is often based only on what already exists.; EU jurisdiction: DE COCK BUNING, pp. 315 et seqq.

<sup>295</sup> BGE 134 III 166 “Arzneimittelkompendium”, E. 2.3.1.; see also BGE 130 III 714 “Meili”, E. 2.1.; Dispatch CopA 2018, pp. 619 et seqq.; DESSEMONTET, in: CR PI-CopA, art. 2, N 50, with further comments.

<sup>296</sup> BGE 130 III 168 “Bob Marley”, E. 4.5.; SENN, p. 251; THOUVENIN/BIRCHER/FISCHER, p. 94; see also BGE 130 III 714 “Meili”, E. 2.1., 2.3.

<sup>297</sup> Dispatch CopA 2018, pp. 619 et seqq., however, the requirement of the intellectual creation (see above) remains necessary.; see also SALVADÉ, N 28.

<sup>298</sup> RAGOT ET AL., pp. 576 et seqq.

ready been mentioned that this concept is not important under Swiss law (see for other jurisdictions: 4.4).<sup>299</sup> In sum, the requirement of individuality is achieved for AI output.

### 3.2.4 Area of Literature and Art

According to art. 2 para. 1 CopA only intellectual creations in the field of literature and art are protected. However, this restriction is rather difficult to define. The definition of “literature” is in principle possible, but there is no useful definition of “art”.<sup>300</sup> It follows from these very broad terms that many areas are included.<sup>301</sup> In this definition, in particular, the literary work (any written text), the musical area (acoustic occurrences), the visual arts, and the performing arts (including language and gestures) are included.<sup>302</sup> In the doctrine many attempts to define these terms have been made.<sup>303</sup>

In art. 2 para 2 CopA there is a list of what can be regarded as a work. The following are named there: literary, scientific and other linguistic works; musical works and other acoustic works; works of art, in particular paintings, sculptures and graphic works; works with scientific or technical content such as drawings, plans, maps or three-dimensional representations; works of architecture; works of applied art; photographic, cinematographic and other visual or audio-visual works; choreographic works and works of mime. The wording in this article (“They include, in particular”) makes clear, that this list is not exhaustive.<sup>304</sup> The distinction between different categories of works is relevant, though, since the legal consequences may vary from category to category.<sup>305</sup> Finally, para. 3 mentions that computer works are also protected. This aspect will be discussed below (see 3.4.2).

With regard to AI output, the question arises whether it falls within the scope of literature and art. As mentioned above (see 2.3), the output of AI consists for instance of music, texts or images which, are certainly covered by the corresponding definition. Thus, the requirement of the area of literature and art is fulfilled by AI output.

## 3.3 Authorship (Art. 6 CopA)

As explained above (see 3.2.1), it follows from art. 2 CopA that the author can only be a natural person. Art. 6 CopA explicitly states this requirement again.<sup>306</sup> This article assigns to whom the copyright

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<sup>299</sup> See ROHNER, p. 62 et seqq., who examines the creativity of AI output under Swiss law under various aspects.

<sup>300</sup> VON BÜREN/MEER, *Werkbegriff*, N 188.

<sup>301</sup> BARRELET/EGLOFF, p. 13; CHERPILLOD, in: SHK-CopA, art. 2, N 10-11; DESSEMONTET, N 10 et seqq.; ROHNER, p. 53; VON BÜREN/MEER, *Werkbegriff*, N 189;

<sup>302</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 10-11.

<sup>303</sup> See e.g., CHERPILLOD, in: SHK-CopA, art. 2, N 12 et seqq.; SALVADÉ, N 18 et seq.

<sup>304</sup> CHERPILLOD, in: SHK-CopA, art. 2, N 41; REHBINDER/VIGANÒ, p. 35; THOUVENIN/BIRCHER/FISCHER, pp. 89 et seq.

<sup>305</sup> VON BÜREN/MEER, *Werkbegriff*, N 198.

<sup>306</sup> HUG, in: SHK-CopA, art. 6, N 3; RAGOT ET AL., pp. 574 et seq.; VON BÜREN/MEER, *Urheber*, N 410.

should belong. The author is defined there as “the natural person who created the work” (“Urheber oder Urheberin ist die natürliche Person, die das Werk geschaffen hat”).

Under this aspect, Swiss copyright law also deals with the creative principle (“Schöpferprinzip”).<sup>307</sup> This basically means that copyright always originates in the person of the creator.<sup>308</sup> An original acquisition by a legal persons is therefore excluded, the copyright can only be transferred subsequently by legal transaction.<sup>309</sup> In principle, however, the creator does not necessarily have to be identical with the author as it is the case in Switzerland.<sup>310</sup> The position of the creator is only a factual one, whereas that of the author is a legal one.<sup>311</sup> This is why Swiss copyright law does not have a “work for hire doctrine”, such as for instance, US copyright law (see 6.3).<sup>312</sup>

For the present analysis, the aspect of authorship does not result in any other farreaching results than the above-mentioned requirement of the natural person, which already results from the requirement of intellectual creation. It follows from this that no authorship according to art. 6 CopA exists for AI output. At the same time this also shows that the AI *de lege lata* cannot be an author itself.

### 3.4 Other Classifications

This chapter examines whether there are other possibilities in Swiss copyright law under which protection for AI output may exist.

#### 3.4.1 Derivative Work

Since AI output is maybe based on pre-existing works, the question arises whether the authors of these works may have a right over the AI output. Swiss copyright law distinguishes between three categories in this context. First, the adaption, which is so close to the original that it does not enjoy independent protection (see art. 11 para. 1 lit. a and b CopA).<sup>313</sup> Second, the redesign, which is protected by copyright alone and independently.<sup>314</sup> However, the consent of the author of the pre-existing work is required for a redesign (see art. 11 para. 1 lit. a and b CopA).<sup>315</sup> Third, there is the category of new arrangement, for which the pre-existing work merely served as a source of inspiration, which is not a

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<sup>307</sup> BGE 116 II 351 “Verein G”, E. 2.b.; DESSEMONTET, N 65; HUG, in: SHK-CopA, art. 6, N 1; THOUVENIN/BIRCHER/FISCHER, p. 97; VON BÜREN/MEER, Urheber, N 405 et seqq.

<sup>308</sup> DESSEMONTET, N 65; HUG, in: SHK-CopA, art. 6, N 1; THOUVENIN/BIRCHER/FISCHER, p. 97.

<sup>309</sup> THOUVENIN/BIRCHER/FISCHER, p. 97; VON BÜREN/MEER, Urheber, N 412.

<sup>310</sup> VON BÜREN/MEER, Urheber, N 407.

<sup>311</sup> Ibid.

<sup>312</sup> HUG, in: SHK-CopA, art. 6, N 8; see also BARRELET/EGLOFF, p. 35.

<sup>313</sup> THOUVENIN/BIRCHER/FISCHER, p. 91; VON BÜREN/MEER, Werkbegriff, N 392.

<sup>314</sup> Ibid.

<sup>315</sup> Ibid.

derivative work in the true sense.<sup>316</sup> Accordingly, the consent of the author of the pre-existing work is not required.<sup>317</sup>

In principle, the output of AI could fall into all three categories. However, the existing author of the pre-existing work never has a right to the new work, neither in the case of an adaptation nor in the case of a redesign.<sup>318</sup> The question is rather, to what extent the AI output violates the copyright of pre-existing works, which is not examined in this thesis.<sup>319</sup> In conclusion, it can be stated that the concept of the use of pre-existing works does not provide an answer to the assignment of protection to AI output. With regard to the folkRNN example (see 2.3.1), this means that the authors of the folk music pieces with which the AI was loaded, are not authors of the new AI outputs created with the website.

### 3.4.2 Protectability of the Software

The AI output and the underlying software code must be distinguished. Nevertheless, the question arises whether appropriate protection of AI output can be obtained through the protection of the software code. Art. 2 para. 3 CopA states, that computer programs are also works (“Als Werke gelten auch Computerprogramme.”, see above, 2.1, for historical background). Computer programs do not meet the requirements of a work; however, their work character is fictitious.<sup>320</sup> The question of the extent to which the AI itself, i.e. its codes, can be protected through copyright is not the subject of this thesis.<sup>321</sup>

In principle, there is no general rule under Swiss copyright law whether the author of the software code is also the author of the creations resulting from it.<sup>322</sup> However, the fact that AI software code may be protected by copyright does not automatically imply that its author is also the author of the creations created by AI (AI output), rather, this must be assessed separately.<sup>323</sup> With other technologies, such as computer graphics or digital audio workstations, the programmer is also not considered the author of the works created with the software.<sup>324</sup> For instance, if the user creates an image with “Adobe Photoshop”, the author of the image is not the “Adobe Photoshop” programmer, but the “Adobe Photoshop” user.

The relationship of the programmer to the AI output and its participation has already been discussed above (see 3.2.1). The conclusion was that there are cases in which there is not sufficient participation

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<sup>316</sup> THOUVENIN/BIRCHER/FISCHER, p. 92.

<sup>317</sup> Ibid.

<sup>318</sup> See THOUVENIN/BIRCHER/FISCHER, pp. 91 et seq.

<sup>319</sup> See GE jurisdiction: PFEIFER, pp. 228 et seq., who deals with this question.

<sup>320</sup> DESSEMONTET, in: CR PI-CopA, art. 2, N 57.

<sup>321</sup> See for this question: Berger, cited in: MINDER, p. 49; GE jurisdiction: HARTMANN/PRINZ.

<sup>322</sup> RAGOT ET AL., pp. 575 et seq.

<sup>323</sup> RAGOT ET AL., pp. 575 et seq.; REHBINDER, N 92; ROHNER, p. 52; see GE jurisdiction: ORY/SORGE, p. 711.

<sup>324</sup> RAGOT ET AL., pp. 575 et seq.

of the programmer in the output and therefore, according to art. 2 CopA, no work is present. It can therefore be stated that the protection of the code of the AI does not lead to the protection of its outputs. In the example of folkRNN (see 2.3.1) this means, that the programmers of folkRNN don't have copyright on the output just because they might have protection on the software code.

### 3.4.3 Work on a Project Originated by the Publisher

A certain systemic deviation from the principle that legal persons cannot obtain copyright can be found in art. 393 para. 2 of the code of obligation<sup>325</sup> (“CO”).<sup>326</sup> According to this article, copyright lies with the publisher (who may also be a legal person) if an author has edited the work according to a plan submitted by the publisher (“Das Urheberrecht am Werke steht dem Verleger zu.”). However, the provision is interpreted with such restraint that this only applies if the publisher has provided all the details.<sup>327</sup> In such a case, it can be argued that the author was in fact merely an assistant in the execution of a third party's idea. Thus, the principle that only a natural person can acquire copyrights is not violated, since the publisher himself must have the creative idea and thus be a natural person.<sup>328</sup>

With regard to AI output, the question arises whether this article can be used to derive protection for the output. For example, it could be argued that the AI is regarded as author, implementing the ideas of a third party (e.g. programmer or user), who is eligible for copyright. However, this argument fails because in this case, too, the author would have to be a natural person, a criterion that the AI does not fulfil. Therefore, from this provision *de lege lata* no copyright results for AI output.

### 3.4.4 Related Rights

It can also be examined whether AI output is possibly protected under a related right according to art. 33 et seqq. CopA. In particular, it should be examined whether the issue could fall under the rights of performers under Art. 33 CopA.<sup>329</sup> The requirement of art. 33 et seqq. CopA is that an act by a performing artist is present (“Ausübende Künstler und Künstlerinnen sind natürliche Personen, die ein Werk oder eine Ausdrucksform der Volkskunst darbieten oder an einer solchen Darbietung künstlerisch mitwirken.“). Such a performing artist is by definition a human being.<sup>330</sup> A technical process involving a pre-existing work is therefore not qualified as a performing artist.<sup>331</sup> Art. 33 CopA

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<sup>325</sup> SR 220

<sup>326</sup> HUG, in: SHK-CopA, art. 6, N 3; VON BÜREN/MEER, Urheber, N 413, 464 et seqq.; see also BARRELET/EGLOFF, p. 35; HILTY, in: BSK-CO art. 393, with further comments on this controversy; THOUVENIN/BIRCHER/FISCHER, p. 97.

<sup>327</sup> HILTY, in: BSK-CO, art. 393, N 2; HUG, in: SHK-CopA, art. 6, N 3; VON BÜREN/MEER, Urheber, N 413.

<sup>328</sup> HUG, in: SHK-CopA, art. 6, N 3; VON BÜREN/MEER, Urheber, N 413.

<sup>329</sup> THOUVENIN/BIRCHER/FISCHER, pp. 112 et seqq.

<sup>330</sup> DESSEMONTET, N 153; MOSIMANN, N 1066; RAGOT ET AL., p. 578; THOUVENIN/BIRCHER/FISCHER, p. 113.

<sup>331</sup> RAGOT ET AL., p. 578.



also requires that the performed act is a work, the definition of which is based on art. 2 CopA.<sup>332</sup> With regard to AI output it is imaginable that the AI writes a piece of music and then performs it itself. However, the AI is not a human and therefore does not qualify as a performing artist. Hence, a protection of AI output by related rights is not possible.

### 3.5 Conclusion

Given the applicable Swiss law, the question whether *de lege lata* copyright for AI output exists must be examined with regard to whether the requirements for a work pursuant to art. 2 CopA are met and whether an author pursuant to art. 6 CopA is present.

According to art. 2 para. 1 CopA a work must be a literary and artistic intellectual creation with an individual character. The first condition, literary and artistic, is fulfilled by AI. The second requirement, intellectual creation, requires that a natural person has participated and that a work is therefore based on a human will and is the expression of a thought. With AI output this threshold is not reached. The third requirement, the individual character, requires that a creation stands out of the existing pool of works. This requirement is met by AI output (unlike by certain photographs). Given that one of three requirements is not met, the requirements of art 2 para. 1 CopA are not fulfilled and AI output is not a work according to art. 2 para. 1 CopA. From art. 6 CopA it follows that the author can only be a human being and thus no new requirements arise. In any case, it is evident that AI output does not fulfil this requirement either.

Furthermore, the examination of whether other protection institutions under Swiss copyright law can be applied shows that no protection for AI output can be derived from derivative work, from the protectability of the software, from works on a project originated by the publisher or from related rights.

In conclusion, *de lege lata* AI output is not protected under Swiss copyright law. However, since AI output does not meet the requirements of a work, it cannot be said that the output falls into the public domain since there is no work that could fall into the public domain.<sup>333</sup>

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<sup>332</sup> See MOSIMANN, N 1081 et seqq.

<sup>333</sup> Stating that it falls into the public domain: Berger, cited in: MINDER, p. 49; see also DELTRON/MACREZ, p. 10, with further explanations of what generally happens when a work is not protected by copyright.

## 4 Protectability in Other Jurisdictions de Lege Lata

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In this part, the legal situation in selected other jurisdictions is presented.<sup>334</sup> First, the legal situation in Germany is dealt with, as it is close to that of Switzerland. Second the European Union (“EU”) perspective will then be briefly discussed. Third, the legal situation in the United Kingdom (“UK”) is to some extent presented as a contrast to the Swiss system. Finally, given that a large part of the literature on the subject is based on the American jurisdiction, this section will conclude with a brief look at the latter. In all jurisdictions, several points of discussion are similar to those in Switzerland; these will not be taken up again.

### 4.1 Example of German Copyright Law

As explained above (see 3.2), for the situation under German law, to a large extent reference can be made to the explanations under Swiss law, and vice versa, in the above explanations, references to German law have already been made. For this reason, only a very brief overview is given in the following:

Under German law, personal intellectual creation requires a human-creative activity of the author.<sup>335</sup> Accordingly, animal or purely mechanical creations are not considered protectable.<sup>336</sup> Also § 7 of the German Copyright Act requires a human as author.<sup>337</sup> Furthermore, individuality is central to the definition of the work under German copyright law.<sup>338</sup> It is controversial how exactly this criterion must be interpreted. According to LAUBER-RÖNSBERG, it is most convincing to focus on whether there was room for creativity and whether this was used by the author.<sup>339</sup> Individuality must also be attributable to the human author.<sup>340</sup> Thus, creations can be regarded as eligible for protection if, firstly, they were created independently by an author, and, secondly, there was scope for creativity and, thus, the creations are not simply technical or functional, and thirdly, they stand out from solely technical or routine

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<sup>334</sup> See AIPPI, Resolution, p. 4, with summaries and extensive comparisons about different countries.; LAMBERT, p. 11, with the statement that an international comparison would be important.; ROHNER, pp. 67 et seq., with short comparisons to other countries.

<sup>335</sup> LAUBER-RÖNSBERG, p. 245; SCHÖNBERGER, p. 157; SCHULZE, N 8.

<sup>336</sup> LAUBER-RÖNSBERG, p. 245.

<sup>337</sup> LAUBER-RÖNSBERG, p. 245; ORY/SORGE, p. 711.

<sup>338</sup> LAUBER-RÖNSBERG, p. 245; SCHULZE, N 18 et seqq.; SÖBBING, p. 36.

<sup>339</sup> LAUBER-RÖNSBERG, p. 246.

<sup>340</sup> SÖBBING, p. 36.

creations.<sup>341</sup> Thus, not all creations of humans are protected, but only those that are not commonplace.<sup>342</sup>

With regard to the above-mentioned aspects, the question is whether AI output is a personal intellectual creation and whether it is individual. With reference to personal intellectual creation, the discussion revolves around the classification of AI output as computer-aided or computer-generated works.<sup>343</sup> The question arises whether AI output can still be regarded as personal intellectual creations.<sup>344</sup> Thus, in principle, reference can be made to what has already been said for Swiss law, with the conclusion that there is no personal intellectual creation since the human input is not high enough. With regard to individuality, some requirements are probably fulfilled, however it can be stated that individuality does not exist because in the case of an AI output there is no individuality attributable to any human author.<sup>345</sup> It follows, therefore, that *de lege lata* AI output which cannot be attributed to a human is not copyrightable under German law.<sup>346</sup>

The following aspect are also worth mentioning. Under German law, other intellectual property rights could be examined.<sup>347</sup> The question arises whether the protection of the code of the AI under § 69 of the German Copyright Act also gives rise to protection of the AI output.<sup>348</sup> However, there is no rule that allocates the output directly to the programmer.<sup>349</sup> Here, too, reference can be made to the explanations under Swiss law. The relevant question is what effects the programmer's decisions have on the end product, whereby the above-mentioned criteria are again relevant.<sup>350</sup> It can also be examined whether an ancillary copyright according to § 72 of the German Copyright Act is applicable.<sup>351</sup> This does not require any personal creation, but only a minimum of technical performance.<sup>352</sup> However, there has not been enough debate about which requirements must be met regarding human involvements.<sup>353</sup> Thus, this cannot be answered conclusively here. Finally, protection within the framework of database manufacturer rights can also be examined. The question is whether the AI output can be understood as a database and, thus, according to § 87a et seqq. of the German Copyright Act the database manufacturer who made the investments is entitled to the corresponding exclusive rights.<sup>354</sup> However,

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<sup>341</sup> LAUBER-RÖNSBERG, p. 246.

<sup>342</sup> LAUBER-RÖNSBERG, p. 245.

<sup>343</sup> See, e.g., LAUBER-RÖNSBERG, p. 247; LAUBER-RÖNSBERG/HETMANK, pp. 273 et seq.; ORY/SORGE, p. 711.

<sup>344</sup> SPINDLER, pp. 1049 et seq.

<sup>345</sup> SÖBBING, p. 36.

<sup>346</sup> LAUBER-RÖNSBERG, p. 249; ORY/SORGE, p. 711; SÖBBING, pp. 36 et seq.

<sup>347</sup> See LAUBER-RÖNSBERG, p. 248; SÖBBING, p. 37.

<sup>348</sup> SÖBBING, p. 12; see also ORY/SORGE, p. 712.

<sup>349</sup> LAUBER-RÖNSBERG, p. 248; ORY/SORGE, p. 712.

<sup>350</sup> LAUBER-RÖNSBERG, p. 248.

<sup>351</sup> *Ibid.*

<sup>352</sup> *Ibid.*

<sup>353</sup> See LAUBER-RÖNSBERG/HETMANK, p. 574.

<sup>354</sup> ORY/SORGE, p. 712; see also PFEIFER, pp. 222 et seqq.

in the case of AI output a corresponding allocation is to be denied because an intellectual creation is required.<sup>355</sup>

## 4.2 Example of European Union Copyright Law<sup>356</sup>

At the EU level, large parts of copyright law are harmonized.<sup>357</sup> However, the European Copyright Directive<sup>358</sup> contains neither a general definition of the concept of work nor an explicit provision on the person of the author.<sup>359</sup> Also other European directives such as the Software Directive or the Database Directive do not provide a direct answer in this respect.<sup>360</sup>

On the basis of previous decisions, there is much to suggest that the Court of Justice of the European Union (“CJEU”) only regards human creations as eligible for protection.<sup>361</sup> In the *Infopac* decision, the CJEU decided that a work is protected only if it expresses “the author’s own intellectual creation”.<sup>362</sup> The CJEU also clarified the condition of originality by stating that “an intellectual creation is an author’s own if it reflects the author’s personality”.<sup>363</sup> This is now interpreted in such a way that a requirement for the protection of a work is that a human being stands behind it.<sup>364</sup> It also follows from this that the author must be able to make subjective choices during the creation and thereby give the work its “personal touch”.<sup>365</sup> However, the extent to which these conditions apply to all types of works is controversial.<sup>366</sup> Further, it is controversial to what extent the requirement of own personal creation also encompasses the requirement of individuality.<sup>367</sup> Despite the fact that the CJEU has not yet dealt

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<sup>355</sup> ORY/SORGE, p. 712; SCHULZE, N 130.

<sup>356</sup> See for an overview and further explanations also: DE COCK BUNING, pp. 314 et seqq.; GUADAMUZ, Quarterly, pp. 10 et seqq.; RAMALHO, pp. 7 et seqq.

<sup>357</sup> LAUBER-RÖNSBERG/HETMANK, p. 572; see also ZIBNER, p. 6.

<sup>358</sup> Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights.

<sup>359</sup> DE COCK BUNING, p. 314; DELTRON/MACREZ, p. 8; LAUBER-RÖNSBERG, p. 246; LAUBER-RÖNSBERG/HETMANK, p. 572; SCHÖNBERGER, p. 255.

<sup>360</sup> See LAUBER-RÖNSBERG/HETMANK, p. 572; RAMALHO, pp. 7 et seqq., with further explanations, also on what was captured in the materials.

<sup>361</sup> IHALAINEN, p. 727; LAUBER-RÖNSBERG, p. 246; see also RAMALHO, pp. 8 et seq., with an overview of relevant decisions.; STURM ET AL., p. 4.

<sup>362</sup> *Infopaq International A/S v Danske Dagblades Forening* (C-5/08) EU:C:2009:465 (2012); see also DELTRON/MACREZ, p. 9; DEVARAPALLI, p. 10; LAUBER-RÖNSBERG, p. 246; ORY/SORGE, p. 711.

<sup>363</sup> *Infopaq International A/S v Danske Dagblades Forening* (C-5/08) EU:C:2009:465 (2012); see also DELTRON/MACREZ, p. 9; DEVARAPALLI, p. 10; GUADAMUZ, Quarterly, pp. 10 et seq.; IHALAINEN, p. 727.

<sup>364</sup> DELTRON/MACREZ, p. 9; DEVARAPALLI, p. 10; see also. DE COCK BUNING, p. 318, with explanations on the historical background.

<sup>365</sup> DE COCK BUNING, p. 314.

<sup>366</sup> See, e.g., GUADAMUZ, Quarterly, p. 12; SCHULZE, N 22.

<sup>367</sup> See SCHULZE, N 23.

with AI outputs, it seems likely that they are not eligible for protection, because there no own intellectual creation of a human being is involved.<sup>368</sup>

Furthermore, under EU law it can also be examined whether an AI output can be protected under certain circumstances by databases right.<sup>369</sup> However, as under German law, such protection would probably not apply to AI output. In conclusion, *de lege lata* under European copyright law there is no protection for AI output.<sup>370</sup>

### 4.3 Example of United Kingdom Copyright Law

The UK Copyright, Design and Patents Act 1988 provides in section 9 (3), 178 explicit protection for computer-generated literary, dramatic, musical or artistic (“LDMA”) works if they were created solely by a computer and it is not possible to attribute them to a human author.<sup>371</sup> In this case, the copyright should be assigned to the person who is responsible for the arrangements necessary for the creation of the work (“[...] the person by whom the arrangements necessary for the creation are undertaken”).<sup>372</sup> This provision was inserted with the aim to ensure protection for automated creations, such as satellite photographs.<sup>373</sup> In this context, the previously mentioned example of the monkey selfies enjoys copyright protection in the UK.<sup>374</sup> However, in the last 30 years since the introduction of this article, it has only been cited once in court.<sup>375</sup> Another requirement in UK copyright law is that LDMA works are original.<sup>376</sup> This criterion must be viewed independently of the classification as computer-generated work.<sup>377</sup>

It is questionable whether UK copyright law is compatible with the above-mentioned conditions in the EU, demanding a human creation.<sup>378</sup> At least as far as photography which is not the “authors own intellectual creation” is concerned, it can be argued that the UK regulations are valid, as art. 6 of Directive 2006/116/EC leaves it to the member states how they are protected.<sup>379</sup> However, in view of the

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<sup>368</sup> DE COCK BUNING, pp. 314 et seq., 321 et seq.; IHALAINEN, p. 727; LAUBER-RÖNSBERG, pp. 246 et seq.; LAUBER-RÖNSBERG/HETMANK, p. 573; STURM ET AL., p. 4.

<sup>369</sup> LAUBER-RÖNSBERG/HETMANK, p. 575; see also RAMALHO, p. 7; VON BÜREN/MEER, *Werkbegriff*, N 257 et seqq.

<sup>370</sup> See STURM ET AL., p. 4.

<sup>371</sup> <<http://www.legislation.gov.uk/ukpga/1988/48/section/9>> (last accessed December 18, 2019); see also BOND/BLAIR, p. 423.

<sup>372</sup> *Ibid.*

<sup>373</sup> DE COCK BUNING, p. 315; LAUBER-RÖNSBERG/HETMANK, p. 574.

<sup>374</sup> YANISKY-RAVID, pp. 695 et seq.

<sup>375</sup> BOND/BLAIR, p. 423; IHALAINEN, p. 725, with further explanations on corresponding decisions.

<sup>376</sup> BOND/BLAIR, p. 423.

<sup>377</sup> *Ibid.*

<sup>378</sup> LAUBER-RÖNSBERG, p. 249; see also DE COCK BUNING, p. 315.

<sup>379</sup> LAUBER-RÖNSBERG/HETMANK, p. 574.

above-mentioned decision of the CJEU, there will probably not be another EU country that follows this approach.<sup>380</sup>

With regard to the classification of AI output as computer-generated works, two questions arise. On the one hand, there is a question arises to when a computer-generated work occurs, i.e. where the boundary between a computer-assisted and a computer-generated work lies.<sup>381</sup> In principle, reference can be made to what is set out under Swiss law (see 3.2.2). At the same time the question arises as to whether there are also cases in which no corresponding human being who has made the necessary arrangements can be identified, or example if the AI has developed itself further.<sup>382</sup>

On the other hand, despite these explicit regulations in UK copyright law about computer-generated works, the question remains as to who can be assigned to an AI output.<sup>383</sup> Who in the case of AI output has made the necessary arrangements is controversial.<sup>384</sup> It could be the programmer or the person who uses the AI or controls it, or the person who provides the AI with the necessary data.<sup>385</sup> For example, it is argued that the person who provides instructions such as “the type of color to be used” and “how the final painting should look” to a machine for a painting should be regarded as the author.<sup>386</sup>

With regard to the requirement original, it should be noted that, so far, no UK court has dealt with the relationship of this requirement to computer-generated works.<sup>387</sup> The following views can be found in the literature. First, it is argued that it is about the creative efforts of the person making the arrangements.<sup>388</sup> Secondly there is the opinion that no originality should be demanded for computer-generated works and, thirdly, there is the view that originality should be looked at objectively, i.e. in the sense of a comparison, whether a human being would have fulfilled the requirement.<sup>389</sup>

In summary, according to UK copyright, protection for AI output is in principle possible, but several questions remain unanswered.

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<sup>380</sup> DE COCK BUNING, p. 315, 320.

<sup>381</sup> See, e.g., BOND/BLAIR, p. 423.

<sup>382</sup> LAMBERT, p. 8; SCHÖNBERGER, p. 157.

<sup>383</sup> LAUBER-RÖNSBERG, p. 249; MONTAL/REICH, p. 833; RAMALHO, pp. 10 et seqq.

<sup>384</sup> DELTRON/MACREZ, p. 12; LAUBER-RÖNSBERG/HETMANK, p. 574; SCHÖNBERGER, p. 157; see also GUADAMUZ, Quarterly, p. 9, with the contrary opinion that this allocation is not difficult.

<sup>385</sup> LAUBER-RÖNSBERG, p. 249; MONTAL/REICH, p. 833; see also DELTRON/MACREZ, p. 13, listing further possibilities. GUADAMUZ, WIPO states that the programmer has the copyright.

<sup>386</sup> DEVARAPALLI, p. 6.

<sup>387</sup> BOND/BLAIR, p. 423.

<sup>388</sup> Ibid.

<sup>389</sup> Ibid.

#### 4.4 Example of United States Copyright Law

According to 17 U.S.C. § 102(a) of the United States Copyright Law, copyright is automatically guaranteed for “original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”<sup>390</sup> For a valid copyright, the following three conditions are required: fixation, originality and authorship.<sup>391</sup>

The requirement fixation means that a work is kept in such a way that it can be communicated for a longer period of time.<sup>392</sup> The requirement of originality was defined by the Supreme Court as “independently created by the author” and “possess[es] at least some minimal degree of creativity”.<sup>393</sup> Independency means that the author has created the work himself without copying from other works.<sup>394</sup> However, an author may have been inspired by other works.<sup>395</sup> There is no standard definition for the minimum degree of creativity.<sup>396</sup> The courts usually define it negatively, meaning that a work cannot be “mechanical” or “entirely typical”.<sup>397</sup> The requirement authorship does not result explicitly from the Copyright Act but rather follows from the interpretation of the Constitution.<sup>398</sup> The supreme court defined “author” as “the party who actually creates the work, that is, the person who translates an idea into a fixed tangible expression to copyright protection”.<sup>399</sup> However, the Constitution does not define authors as humans.<sup>400</sup> The Congress did not define authors as humans either in the Copyright Act.<sup>401</sup> This non-existent human specification distinguishes US copyright law from other jurisdictions.<sup>402</sup> Nevertheless, the US Copyright Office recently argued that to “qualify as a work of ‘authorship’ a work must be created by a human being” and stated as well, that “works that do not satisfy this requirement are not copyrightable”.<sup>403</sup> The US Copyright Office mentions various examples that are

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<sup>390</sup> <<https://www.copyright.gov/title17/title17.pdf>> (last accessed December 18, 2019); see also BROWN, p. 17.

<sup>391</sup> BROWN, p. 17; see also YANISKY-RAVID, p. 721.

<sup>392</sup> BROWN, p. 17.

<sup>393</sup> *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340 (1991); see also BRIDY, evolution, p. 398; BRIDY, coding, N 21 et seqq., with comments on the criticism of this decision.; BROWN, p. 18; YANISKY-RAVID, p. 720.

<sup>394</sup> DENICOLA, p. 271.

<sup>395</sup> BROWN, p. 18.

<sup>396</sup> BROWN, p. 19.

<sup>397</sup> *Ibid.*

<sup>398</sup> BROWN, p. 19; IHALAINEN, p. 726.

<sup>399</sup> BROWN, p. 20; see also DENICOLA, p. 272; BRIDY, evolution, p. 398.

<sup>400</sup> BROWN, p. 20.

<sup>401</sup> BROWN, p. 20; BRIDY, evolution, p. 399; YANISKY-RAVID, p. 718, commenting that it is unclear whether the Copyright Act requires a human as author.

<sup>402</sup> DENICOLA, p. 281.

<sup>403</sup> US COPYRIGHT OFFICE, Compendium, Section 313.2; see also BRIDY, evolution, p. 396, with further explanations on the historical development of this question.; BROWN, p. 20; DENICOLA, p. 265; DEVARAPALLI, p. 6; SCHÖNBERGER, p. 155 et seq.;

excluded from protection.<sup>404</sup> These are among others a photograph taken by a monkey, a mural painted by an elephant, an application for a song naming the Holy Spirit as the author of the work.<sup>405</sup>

The report from the Commission on New Technological Uses of Copyrighted (“CONTU”) of 1978 should also be mentioned in this context.<sup>406</sup> This CONTU report was created to advise the Congress on how new technologies make a change in copyright necessary.<sup>407</sup> The conclusion of this report was that computers should only be considered as tools for humans.<sup>408</sup> In a report of the Office of Technology Assessment, the question was taken up again in 1986 and the opinion of the CONTU report was to some extent rejected.<sup>409</sup> It stated, for instance: “It is misleading [...] to think of programs as inert tools of creation, in the sense that cameras, typewriters, or any other tools of creation are inert.”<sup>410</sup> However, the issue with all its questions was classified as not requiring immediate action by the Congress.<sup>411</sup> At this point reference can again be made to the above discussion on computer-generated and computer-assisted works (see 3.2.2).

Despite these developments and reports, it is necessary to make a subsumption for AI output. The prerequisite of fixation appears to be met with AI output.<sup>412</sup> AI output can be embodied in exactly the same way as a work made by a human.<sup>413</sup>

The requirement of originality must be divided into the two sub-requirements.<sup>414</sup> The requirement independency is fulfilled by AI output.<sup>415</sup> The AI generates a new work without copying directly from other works.<sup>416</sup> The fact that AI works rely on existing works is not an obstacle to this argumentation, since this is exactly the same for artists, as even they are inspired by other artists and their works.<sup>417</sup> The second requirement of creativity is more controversial.<sup>418</sup> There are several authors arguing that the requirement of creativity is met since AI makes decisions independently.<sup>419</sup> Since the output of AI

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<sup>404</sup> US COPYRIGHT OFFICE, Compendium, Section 313.2.

<sup>405</sup> Ibid.

<sup>406</sup> NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, Final Report; BOYDEN, p. 378; YANISKY-RAVID, pp. 690 et seq.

<sup>407</sup> BRIDY, coding, N 54; YANISKY-RAVID, p. 690.

<sup>408</sup> BRIDY, coding, N 54; HRISTOV, p. 451, with the remark that a reassessment of this report is long overdue today.; YANISKY-RAVID, p. 690.

<sup>409</sup> US CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, Intellectual, see also BRIDY, coding, N 56 et seqq.

<sup>410</sup> US CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, Intellectual, p. 72; see also BRIDY, coding, N 57 et seq.

<sup>411</sup> US CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, Intellectual, p. 13; see also BOYDEN, p. 378; BRIDY, coding, N 58.

<sup>412</sup> BROWN, p. 24; DENICOLA, p. 271; YANISKY-RAVID, p. 722.

<sup>413</sup> BROWN, p. 24; DENICOLA, p. 271.

<sup>414</sup> See YANISKY-RAVID, p. 724, with criticism to this distinction.

<sup>415</sup> BROWN, p. 24; YANISKY-RAVID, p. 721.

<sup>416</sup> BROWN, pp. 24 et seq.; DENICOLA, p. 271; YANISKY-RAVID, p. 721.

<sup>417</sup> BROWN, pp. 24 et seqq.

<sup>418</sup> See e.e., BRIDY, coding, N 22 et seq.; BRIDY, evolution, p. 398; GRUBOW, pp. 407 et seqq.; YANISKY-RAVID, pp. 722 et seq.

<sup>419</sup> BROWN, p. 26.



is the result of a complex series of weights and calculations, which a human programmer can neither create nor understand, there is a strong case for creativity.<sup>420</sup> BRIDY is on the same page arguing that basically all creativity is algorithmic and therefore the difference between human works and AI output is not so big.<sup>421</sup> Furthermore, the fact that the AI output cannot be distinguished from human works is also mentioned as an argument for the existence of creativity.<sup>422</sup>

However, many authors criticize this position and argue that an AI can never be creative.<sup>423</sup> One can come to this conclusion if one argues that creativity also means that the author has to understand what the issue is, what is probably not given in an AI.<sup>424</sup> BRIDY sums up the decisive distinction as follows: “If we define creativity as a quintessentially human faculty, then computers can never be authors, and we can basically stop there. But if we define creativity alternatively as a set of traits or behaviors, then maybe creativity can be coded.”<sup>425</sup> This opens up for a very important and interesting philosophical discussion, but that clearly exceeds the scope of this thesis.

Finally there is the requirement of authorship which might be the most difficult for AI output.<sup>426</sup> Until now, the Supreme Court has not had to deal with the question of whether a computer or AI could fulfil the requirements of an author or whether it had to be a human being.<sup>427</sup> However, it is likely that AI output would not fulfil the requirements of authorship because there is no human being.<sup>428</sup> Even if the US Copyright Office does not explicitly address AI output in its report, it can be assumed that AI output is not protected.<sup>429</sup> At the same time, there are several authors arguing that the restriction to a human being is not necessary, also because it cannot be derived from the copyright act.<sup>430</sup>

Also, under US copyright further possible intellectual property rights can be examined. The software of the AI might also be protected under US law.<sup>431</sup> However, also under this jurisdiction a protection of the software does not automatically include the protection of its output.<sup>432</sup>

In summary, it can be said that AI output is currently not protected under US copyright law and falls accordingly into the public domain.<sup>433</sup>

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<sup>420</sup> YANISKY-RAVID, p. 724.

<sup>421</sup> BRIDY, coding, N 2.

<sup>422</sup> BROWN, p. 27.

<sup>423</sup> See, e.g., SCHÖNBERGER.

<sup>424</sup> See YANISKY-RAVID, p. 724.

<sup>425</sup> BRIDY, evolution, p. 398.

<sup>426</sup> See BROWN, p. 27; YANISKY-RAVID, pp. 718 et seqq.

<sup>427</sup> BROWN, p. 20; see also BRIDY, evolution, p. 400.

<sup>428</sup> See DENICOLA, pp. 265 et seq., with explanations on the historical development.

<sup>429</sup> SCHÖNBERGER, p. 156.

<sup>430</sup> See, e.g., BROWN, pp. 28 et seqq.; DENICOLA, p. 251.

<sup>431</sup> YANISKY-RAVID, p. 693.

<sup>432</sup> YANISKY-RAVID, pp. 693 et seqq.

## 4.5 Conclusion

A protection for AI output is not possible in the majority of the investigated jurisdictions. Even in the UK, the jurisdiction that is most open to computer-generated works, there are certain legal uncertainties. The analysis of the copyrights of the different jurisdictions can be summarized as follows.

	Switzerland	Germany	European Union	United Kingdom	United States
Requirements	<ul style="list-style-type: none"> <li>- Intellectual creation (enough human input)</li> <li>- Individual character</li> <li>- Human author</li> </ul>	<ul style="list-style-type: none"> <li>- Personal intellectual creation</li> <li>- Individuality (attributed to human)</li> <li>- Human author</li> </ul>	<ul style="list-style-type: none"> <li>- Own individual creation</li> </ul>	<ul style="list-style-type: none"> <li>- Explicit provision for computer-generated works</li> <li>- Original</li> </ul>	<ul style="list-style-type: none"> <li>- Fixation</li> <li>- Originality (independency and creativity)</li> <li>- Authorship (human)</li> </ul>
Subsumption	<ul style="list-style-type: none"> <li>- No intellectual creation: not enough human input</li> <li>- No human author</li> </ul>	<ul style="list-style-type: none"> <li>- No personal intellectual creation: not enough human input</li> <li>- No individuality attributed to a human</li> <li>- No human author</li> </ul>	<ul style="list-style-type: none"> <li>- No own intellectual creation: not enough human input</li> </ul>	<ul style="list-style-type: none"> <li>- Attributability of AI output unclear.</li> </ul>	<ul style="list-style-type: none"> <li>- Discussion about aspect of creativity</li> <li>- No fulfilment of the requirement of authorship</li> </ul>
	<b>- Conclusion: not protected</b>	<b>- Conclusion: not protected</b>	<b>- Conclusion: not protected</b>	<b>- Conclusion: probably protected</b>	<b>- Conclusion: not protected</b>

Figure 6: Overview of the different jurisdictions regarding copyright for AI output

It is noticeable that the requirements in the different jurisdictions vary and thus the focus of the examination of a corresponding copyright law lies on different areas. While under Swiss, German and European copyright law, the examination focuses in particular on whether there is sufficient human participation, in the US, the question is to what extent AI is creative.

Certainly, such differences are to some extent related to the justifications of copyright. While in civil law countries the author is in the foreground, the justifications in common law are more based on providing incentives for creativity. An explanation purely focusing on these distinctions, however, seems to be short-sighted. Especially so, because protection is not granted by either law system. Rather, copyright law throughout all jurisdictions does not really seem up-to-date to handle questions that have arisen in the last decades and will continue to arise due to technological progress.

<sup>433</sup> See BOYDEN, pp. 389 et seq., identifying different types of possible outcomes.; BRIDY, coding, N 51, 61; BROWN, p. 38; DENICOLA, p. 251; GINSBURG/BUDIARDJO, pp. 439 et seq., 453 et seqq.; GUADAMUZ, Quarterly, pp. 13 et seq.; HRISTOV, p. 436; SCHÖNBERGER, p. 156.

## 5 Necessity of Copyright for AI Generated Output?

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The previous chapters have shown that currently in Switzerland as well as in other jurisdictions a protection of AI output is not possible. Thus, the question arises to what extent such a lack of copyright protection is adequate from a policy point of view and to what extent it would be appropriate to grant protection. This chapter attempts to answer this question from different angles.<sup>434</sup> The main focus is on justification theories of copyright. However, it is clear that the answer to this complex question requires a profound analysis, which in this chapter can only be done up to a limited extent (see 1.2).

### 5.1 Dogmatic Arguments

Dogmatic argumentation is understood here as that which results from the applicable law *de lege lata*. In principle, therefore, reference can be made to the previous chapter. Since Swiss copyright law does not provide any protection for AI output, a dogmatic argumentation from a Swiss perspective speaks against such protection. It is also argued that the existing (Swiss) copyright is designed to be technology-neutral and can therefore deal well with technological developments and that therefore there is no need for protection.<sup>435</sup> However, the legislator did not consider the possibility of AI output at the time of writing the law. This argument can therefore not be considered to have the highest relevance.

### 5.2 Justification of Copyright Law Arguments

One possible approach to determine whether a copyright protection for AI output is necessary, is by looking at the justification theories of copyright law.<sup>436</sup> This approach also helps to understand why there is no protection under current law and to what extent protection could be justified from the point of view of these theories.

#### 5.2.1 Basics and Distinctions

There are various justification theories for copyright law.<sup>437</sup> It is not the purpose of this thesis to examine all of them in detail. It primarily makes sense to look at the basic justification theories. A basic distinction can be made between an individualistic justification theory and collectivist justification

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<sup>434</sup> See DELTRON/MACREZ, p. 24, who demand that the topic should be divided into two questions: firstly, how such a copyright protection relates to the existing rational and objectives of copyright, and secondly, to what extent it makes sense to extend the granting of protection.

<sup>435</sup> RAGOT ET AL., pp. 578 et seq.; see also THOUVENIN/BIRCHER/FISCHER, p. 88.

<sup>436</sup> See YU, p. 1248, with the remark that this question would be taken up much too little in the literature.; RAMALHO, p. 14; ROHNER, pp. 70 et seqq.

<sup>437</sup> See, e.g., HANSEN, 83; cf. VON GUNTEN, who for instance completely opposes intellectual property rights.

theory.<sup>438</sup> Individualistic approaches are used to describe the justification in the continental European copyright system, often also under the term “droit d’auteur”.<sup>439</sup> These approaches are based in particular on the argument that the author’s work belongs to his or her sphere of personality and that copyright thus protects the author’s personal interests.<sup>440</sup> The collectivist justification theories, which are also named “utilitarian” due to their philosophical basis, are often associated with the justification in the anglo-american copyright systems and put emphasis on incentives.<sup>441</sup>

Before specifically looking at the two theories, the following aspects should be kept in mind:

(1) A clear distinction between the individualistic and the collectivistic theories is no longer possible or appropriate today.<sup>442</sup> HILTY even writes that the justification of the “droit d’auteur” only lives on in theory but is ignored in practice.<sup>443</sup> For instance, incentive aspects also influence the justification of droit d’auteur systems.<sup>444</sup>

(2) Because both justification approaches cannot conclusively assess all aspects of copyright, the justifications are combined.<sup>445</sup> For that, the term integrative justification model is also used.<sup>446</sup>

(3) The distinction, however, becomes visible especially in the origin of copyright. Since a collective justification does not at all focus on the creator personality, a copyright according to the “work made for hire” doctrine can also be awarded to a legal person, which is not possible in an individualistic system (see 6.3).<sup>447</sup>

In Switzerland, a contemporary justification of copyright is probably only possible with a combination of both justification approaches.<sup>448</sup> Today, however, more and more collectivist justification approaches are integrated into Swiss copyright law.<sup>449</sup> For instance, the justifications for the current revision of Swiss copyright law also encompasses incentives.<sup>450</sup>

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<sup>438</sup> HANSEN, 83, with critical remarks on these terminologies.; see also GINSBURG, p. 134; HILTY, Urheberrecht, N 33; VON GUNTEN, pp. 8 et seqq. dividing it at the highest level into “justification by natural law”, “utilitarian justification” and “justification by personality rights”.; YANISKY-RAVID, p. 699.

<sup>439</sup> GINSBURG, p. 134; HANSEN, 84; LAUBER-RÖNSBERG, p. 250; LAUBER-RÖNSBERG/HETMANK, p. 573.

<sup>440</sup> HANSEN, p. 93; see also GINSBURG, p. 134; HILTY, Urheberrecht, N 28; STURM ET AL., p. 4.

<sup>441</sup> BROWN, p. 15; HANSEN, 84, 110; HILTY, Urheberrecht, N 33; LAUBER-RÖNSBERG, p. 251.

<sup>442</sup> HILTY, Urheberrecht, N 34; LAUBER-RÖNSBERG, pp. 250 et seq.; see also VON GUNTEN.

<sup>443</sup> HILTY, Urheberrecht, N 34.

<sup>444</sup> See DELTRON/MACREZ, p. 24.

<sup>445</sup> See LAUBER-RÖNSBERG, p. 250.

<sup>446</sup> LAUBER-RÖNSBERG, p. 251.

<sup>447</sup> HILTY, Urheberrecht, N 34.

<sup>448</sup> See THOUVENIN/BIRCHER/FISCHER, p. 28.

<sup>449</sup> See HILTY, Urheberrecht, N 3, 52; REHBINDER, N 19; ROHNER, p. 74.

<sup>450</sup> See Dispatch CopA 2018, pp. 678 et seq.; THOUVENIN; see also already in Dispatch CopA 1989, p. 610, with critical remarks to the effect that the term “intellectual property” (geistiges Eigentum) leads to the feeling that one always has to argue with incentives.

### 5.2.2 Arguments with Individualistic Justification Theories

As already mentioned, individualistic approaches focus on the human being and his or her personal touch.<sup>451</sup> These approaches can be further subdivided into nature-theoretical justifications, work-theoretical thoughts, but also personalistic and liberalistic foundations.<sup>452</sup> The argumentation of natural law justification approaches is based on the idea that individual creators are entitled to a natural unlimited right to the result of their creative work.<sup>453</sup> This theory is used, in particular, to grant moral rights to authors.<sup>454</sup> Labor theory aspects go back to John Locke in the Age of Enlightenment.<sup>455</sup> The basic idea is that every human being has a right to the fruits of their labor.<sup>456</sup> The protection should exist because of the hard work and dedication of the author.<sup>457</sup> Personalistic justification approaches justify copyright on the grounds that the work is assigned to the author's sphere of personality.<sup>458</sup> In this way the accomplishments of the author should be recognized and appreciated.<sup>459</sup> Closely related to this theory are the liberalist justification approaches, which argue that in order to secure personal freedom, autonomy and dignity of authors, it is necessary for authors to be able to dispose of their property.<sup>460</sup>

These justification approaches are criticized because they cannot conclusively explain all aspects of copyright (see 5.2.1).<sup>461</sup> The theories are afflicted with various weaknesses, which today do not let explain many aspects of copyright anymore and do not seem appropriate.<sup>462</sup> Especially today, looking at works of a technical nature such as software, these individualistic justification theories are increasingly reaching their limits.<sup>463</sup> The labor theory in particular is criticized for the fact that Locke created this term primarily for physical and not immaterial goods.<sup>464</sup>

With regard to the justification of the AI output, the following main line of argumentation can be found. A protection for AI output does not seem justifiable from the perspective of an individualistic justification theory.<sup>465</sup> Because AI systems do not have the need for recognition of their works, nature, work, personalistic and liberalistic theories cannot be used as justification.<sup>466</sup> Furthermore, these indi-

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<sup>451</sup> DE COCK BUNING, p. 319.

<sup>452</sup> See RAMALHO, p. 14; YANISKY-RAVID, p. 699; for an overview: HANSEN, p. 86.

<sup>453</sup> HANSEN, p. 88; VON GUNTEN, pp. 8 et seq.

<sup>454</sup> LAUBER-RÖNSBERG, p. 250.

<sup>455</sup> HANSEN, p. 89; YANISKY-RAVID, p. 706.

<sup>456</sup> HANSEN, p. 89; LAUBER-RÖNSBERG, p. 252; RAMALHO, p. 14; YANISKY-RAVID, p. 699.

<sup>457</sup> YANISKY-RAVID, p. 706.

<sup>458</sup> HANSEN, p. 91; YANISKY-RAVID, p. 699; see also VON GUNTEN, pp. 13 et et seqq.

<sup>459</sup> RAMALHO, p. 14; YANISKY-RAVID, p. 706.

<sup>460</sup> HANSEN, p. 92.

<sup>461</sup> HANSEN, pp. 103 et seq.; LAUBER-RÖNSBERG, p. 250.

<sup>462</sup> See, e.g., HANSEN, p. 105.

<sup>463</sup> LAUBER-RÖNSBERG/HETMANK, p. 573.

<sup>464</sup> See ROHNER, p. 71.

<sup>465</sup> See, e.g., YANISKY-RAVID, pp. 706 et seq.; RAMALHO, p. 15, with more detailed explanations on the subcategories.

<sup>466</sup> See YANISKY-RAVID, p. 707.

vidualistic approaches are generally completely tailored to humans. In conclusion, individualistic justification approaches only grant copyright protection for human works, but not for AI output.<sup>467</sup> An extension of copyright protection to AI output is therefore not justified on the basis of this justification theory.<sup>468</sup>

### 5.2.3 Arguments with Collectivist Justification Theories

In general, the aim of collectivist justification theories is the creation of incentives in order to encourage the creation of something new in terms of technology, science and culture for the benefit of the general public.<sup>469</sup> The theories justify copyright with the achievement or preservation of certain concepts of society that have been found to be good, and the role of the author is not in the foreground.<sup>470</sup>

For example, art. I section 8, clause 8 of the US Constitution contains the clause: “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Investors the exclusive Right to their respective Writings and Discoveries”.<sup>471</sup> Also the aim of British law was the “encouragement of learned men to compose and write useful books”.<sup>472</sup>

Within the framework of collective justification theories there are various sub-theories.<sup>473</sup> In particular, there are economic theories, cultural and socio-political theories, as well as democratic theories.<sup>474</sup> The economic theories at the forefront can be further subdivided into a multi-level approach, a traditional approach of incentive and benefit optimization, a neoclassical property rights approach that aims to increase allocation efficiency purely on the basis of the market, and, finally, the new institute economics with transaction cost economics and information economics.<sup>475</sup>

These justification approaches are criticized, among other things, for the fact that, on the one hand, it is difficult to quantify the benefits of art for society, and, on the other hand, that too little account is taken of concepts of fairness since it is only a question of maximizing benefits.<sup>476</sup> Furthermore, there are doubts whether the assumed incentive effect of copyright actually exists to this extent, or whether

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<sup>467</sup> LAUBER-RÖNSBERG, p. 252; DELTRON/MACREZ, p. 24.

<sup>468</sup> DELTRON/MACREZ, p. 24; see also CRAIG/KERR, p. 42, with the conclusion, that “[...] it is to say that human communication is the very point of authorship as a social practice; indeed, as a condition of life. As such, we do not think we are being at all romantic when we say: authorship is properly the preserve of the human.”; GINSBURG/BUDIARDJO, pp. 454 et seq.; ROHNER, p. 79.

<sup>469</sup> BROWN, p. 15; DE COCK BUNING, p. 320; HILTY, Urheberrecht, N 33; VON GUNTEN, pp. 11 et seq.; YANISKY-RAVID, p. 700.

<sup>470</sup> HANSEN, p. 86; see ROHNER, p. 72.

<sup>471</sup> <[https://www.senate.gov/civics/constitution\\_item/constitution.htm](https://www.senate.gov/civics/constitution_item/constitution.htm)> (last accessed December 18, 2019); see also DENICOLA, p. 270; HANSEN, p. 84.

<sup>472</sup> <<http://www.copyrighthistory.com/anne.html>> (last accessed December 18, 2019); see also HANSEN, p. 84.

<sup>473</sup> See, e.g., HANSEN, p. 86.

<sup>474</sup> HANSEN, pp. 87 et seq.

<sup>475</sup> HANSEN, pp. 107 et seq.

<sup>476</sup> HANSEN, p. 114; see also VON GUNTEN, p. 65, who states that there is generally no evidence for this incentive argument.

other incentive effects might lead to more efficient solutions.<sup>477</sup> There are various other incentives that could be considered.<sup>478</sup> It is for instance known from psychological research that humans have an urge for self-development and personal satisfaction, which can be another incentive for creating art.<sup>479</sup> However, it seems wrong to refrain from further elaboration just because there may be further incentives.

With regard to the protection of AI output, the following lines of argumentation can be found in the literature.

(1) There is the general argumentation that it is necessary to ensure appropriate protection, because otherwise there is the danger that too little innovation is made in AI research and thus too little AI output is created.<sup>480</sup> With regard to innovation, it is argued that not giving protection to AI output could lead to a decline in various sectors. Without appropriate copyright, investments would decrease because there wouldn't be a safe return.<sup>481</sup> This argumentation can be further developed by arguing that less AI output also means less material for teaching, scholarship and research.<sup>482</sup> On the other hand, it can be argued that it is not necessarily the task of copyright to promote innovation in AI, but rather to create incentives for creativity in general.<sup>483</sup> Furthermore, it is argued that the AI market has developed enormously in recent years even though there is no copyright for the AI output.<sup>484</sup> However, this reasoning seems to be misleading to some extent because a comparison of the quantity of works to a situation with copyright is not possible. It can be argued, for example, that a newspaper, is also interested in using an AI for the creation of texts even if there is no copyright to the output, since the AI's work is so efficient that it compensates for the inexistence of copyright on the output.<sup>485</sup>

(2) It is argued that incentive effects only play a role for humans and that AI as a machine cannot be incentivized.<sup>486</sup> It is sufficient to provide the AI with electricity and sufficient computing power for it to create output.<sup>487</sup> Against this, it is argued that if the output of the AI is assigned to a human being, the incentive effects will certainly apply to this human.<sup>488</sup> Copyright would be an incentive for humans

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<sup>477</sup> HILTY, Urheberrecht, N 57 et seqq.; LAUBER-RÖNSBERG, p. 251; SPRIGMAN, p. 451, concluding that "[...] the link between copyright and creative incentives appears to be considerably less robust than theory may have led us to expect."

<sup>478</sup> BROWN, pp. 16 et seqq.

<sup>479</sup> BROWN, pp. 16 et seq.

<sup>480</sup> GUADAMUZ, WIPO.; BROWN, p. 22; HRISTOV, p. 438, 444.

<sup>481</sup> See GUADAMUZ, WIPO.

<sup>482</sup> HRISTOV, p. 439.

<sup>483</sup> See SCHÖNBERGER, p. 159.

<sup>484</sup> See ROHNER, p. 77; YU, p. 1270.

<sup>485</sup> YU, p. 1270.

<sup>486</sup> LAUBER-RÖNSBERG, p. 251; LAUBER-RÖNSBERG/HETMANK, pp. 575 et seq.; see also BROWN, p. 22; DENICOLA, p. 273; ROHNER, p. 77; SCHÖNBERGER, p. 159.

<sup>487</sup> YANISKY-RAVID, p. 702.

<sup>488</sup> LAUBER-RÖNSBERG, p. 251; LAUBER-RÖNSBERG/HETMANK, p. 576; YU, p. 1249.

behind the machine, be it the programmer or the user or someone else.<sup>489</sup> They would have a “fair return” for their effort.<sup>490</sup> An AI output is only produced when a user is motivated to “engage the machinery of its creation.”<sup>491</sup> This might be true, at least as long as AI cannot start producing output on its own, and as long as people are still involved in the development of AI.

(3) The question arises whether the existing possible protection for the AI software already offers sufficient incentives.<sup>492</sup> It can be argued that with the copyright on the code of the AI, or even with certain patent rights on it, there already exist enough incentives to develop AI that creates art.<sup>493</sup> In contrast, it is stated that this argument is based on the assumptions that programmers have a copyright to the AI output since they have a copyright to the code, which, however, often isn’t the case (see 3.4.2).<sup>494</sup> Also, it is argued, that even if the code of the AI can be protected, this is not necessarily enough incentive.<sup>495</sup> Furthermore, investments can be worthwhile far more if also the corresponding AI output can be protected.<sup>496</sup>

(4) It is also argued that the protectability of AI output can have negative effects on human effort.<sup>497</sup> It could be seen as a devaluation of human efforts if AI output is rewarded in the same way.<sup>498</sup> For instance, SCHÖNBERGER asks “why should anyone still care to create and undergo all the pains and existential insecurities a creative process entails, if a machine – that naturally cannot know similar troubles – was treated the same?”<sup>499</sup> If AI so accurately imitates human art, all incentives for humans to produce art could disappear and ultimately no more works would be created by humans.<sup>500</sup> This could create a kind of monopoly position for AI.<sup>501</sup> An imbalance could arise because thousands of works could be produced by AI and subsequently copyright violations by people could arise because they violate the copyright of AI works.<sup>502</sup> However, this argumentation is to be rejected to a certain extent, as it misjudges the fact that copyright not only stands for a labor compensation for humans but rather for the achievement of good art outputs in general.

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<sup>489</sup> BROWN, p. 22; YANISKY-RAVID, p. 701.

<sup>490</sup> BROWN, p. 22.

<sup>491</sup> DENICOLA, p. 282.

<sup>492</sup> BROWN, pp. 22 et seq.; GINSBURG, pp. 134 et seq.; ZECH, p. 1147; with the demand that it is absolutely necessary to clarify this in more detail before a country introduces appropriate protection for AI output in a *droit d’auteur* system.

<sup>493</sup> BROWN, p. 23; GINSBURG, p. 134.

<sup>494</sup> BROWN, p. 23.

<sup>495</sup> LAUBER-RÖNSBERG/HETMANK, p. 576.

<sup>496</sup> *Ibid.*

<sup>497</sup> LAUBER-RÖNSBERG/HETMANK, p. 576; SCHÖNBERGER, p. 159; YANISKY-RAVID, pp. 702 et seqq.; see also ROHNER, pp. 78 et seqq.

<sup>498</sup> LAUBER-RÖNSBERG/HETMANK, p. 576.

<sup>499</sup> SCHÖNBERGER, pp. 159 et seq.

<sup>500</sup> YANISKY-RAVID, p. 703.

<sup>501</sup> IHALAINEN, p. 725; see also ROHNER, p. 78.

<sup>502</sup> IHALAINEN, p. 725; YU, pp. 1249 et seqq.



In conclusion, on the basis of collectivist theories and in connection with appropriate incentives an extension of the copyright law to AI output can be justified.<sup>503</sup> Although other incentives may exist or copyright for AI output may not be as effective as expected (or even have negative effects), it is in the core interest of this justification theory to provide protection for AI output.

#### 5.2.4 Excursus: Law & Economics Arguments

A law and economics justification approach can basically be classified as part of the economic justification approaches within the collectivist justification theories (it was therefore already mentioned, see 5.2.3).<sup>504</sup> As these lines of argumentation appear to be particularly important, because they're attempting to quantify the incentives, they are dealt with in detail here.

The background to the economic analysis of the law can be found particularly in Coase and Posner in the 1960s.<sup>505</sup> The basic argumentation is, that from an economic point of view, coming from the collectivist justification theories, the justification of copyright lies in creating incentives for the development of intellectual property.<sup>506</sup> Intellectual property rights, including copyright law, are, without a legal protection public goods that have the characteristic that their use is not rivaling and cannot be excluded.<sup>507</sup> Therefore, copyright creates conditions that prevent market failure, since it creates incentives for production.<sup>508</sup> The basic criticism, i.e. the question of the extent to which these incentives really exist, has already been explained above (see 5.2.3). As a further criticism of this method, it should be added that while it may be possible to find more efficient solutions in this way, this does not mean that they are fair.<sup>509</sup>

The assumption is that when a person acts rationally, based on a cost-benefit analysis, he or she makes the choice where the expected net benefit is greatest for him or her.<sup>510</sup> This applies to the author of a work as well as to the consumer of a work.<sup>511</sup> For an author, the benefits of a work lie, for instance, in royalties or prestige.<sup>512</sup> The costs of the work can be subdivided into disposal costs and costs of manufacturing further work pieces.<sup>513</sup> They are, for example, labor and time expenditure, monetary expendi-

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<sup>503</sup> See DELTRON/MACREZ, p. 24; cf. ROHNER, pp. 77 et seq., who comes with reference to the increasing development of AI to the opposite conclusion.

<sup>504</sup> See HANSEN, 107.

<sup>505</sup> See BISGES, p. 99; see also LANDES/POSNER; POSNER, in general for law and economics approach to intellectual property.

<sup>506</sup> See e.g., SCHÄFER/OTT, pp. 667 et seq., 671.

<sup>507</sup> BISGES, p. 133; THOUVENIN/BIRCHER/FISCHER, p. 27.

<sup>508</sup> THOUVENIN/BIRCHER/FISCHER, p. 28; see ROHNER, p. 73, with further comments on the efficiencies created by this.

<sup>509</sup> BISGES, p. 101; see also HILTY, Urheberrecht, N 53.

<sup>510</sup> BISGES, p. 131; whereby in particular this assumption is criticised., see also HILTY, Urheberrecht, N 53, with critical remarks on the concept of the homo oeconomicus in copyright law.; SPRIGMAN, p. 451.

<sup>511</sup> BISGES, p. 131.

<sup>512</sup> Ibid.

<sup>513</sup> BISGES, p. 131; LANDES/POSNER, pp. 326 et seq., with more detailed subdivisions; see also SOON, p. 39; STOJKOV/NAUMOVSKI/NAUMOVSKI, p. 133.

ture and mental strain and effort.<sup>514</sup> The copyrights allow authors to retain control over their work even after it has been published.<sup>515</sup> It ensures that authors can charge a price for the work that is above the marginal cost.<sup>516</sup> Only with such protection rational authors will produce a work.<sup>517</sup>

In a situation without copyright, it would be difficult for authors to get something for their creation of the work that is above the marginal cost.<sup>518</sup> This is because once a work has been made available to the public, the author can no longer control it.<sup>519</sup> Therefore, if there would be no copyright, no rational consumer of a work would pay for an already published work, because their net benefit is greater if they can make this saving and still enjoy the work.<sup>520</sup> The consequence would be that rational authors would have much less incentives to produce works and therefore the quantity of works produced would decrease considerably.<sup>521</sup> This, in turn, would lead to a considerable reduction in the common good and material welfare losses, since works of art serve the purpose of intellectual edification and enjoyment and a lack of diversity of works could reduce this effect.<sup>522</sup> In principle, such an argumentation seems to be transferable to the production of output by the AI, at least as long as a human being is still connected with the production in some (smallest) way and certain costs incur.

Concluding, from a Law and Economics perspective it is justifiable to grant copyright to AI output. This further supports the above (see 5.2.3) conclusion of the collectivist justifications. However, it must be added that an in-depth analysis of the economic impacts is necessary for a detailed and comprehensive answer.<sup>523</sup> In particular, it must be examined in more detail what influence an increased production of AI output has on human generated works (see 5.2.3).

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<sup>514</sup> Ibid.

<sup>515</sup> HILTY, Urheberrecht, N 3; see also SCHÄFER/OTT, p. 668.

<sup>516</sup> BIGES, p. 135; SOON, p. 40.

<sup>517</sup> BIGES, p. 131; SOON, p. 40.

<sup>518</sup> BIGES, p. 133; see also SCHÄFER/OTT, p. 671.

<sup>519</sup> BIGES, p. 133; see also HILTY, Urheberrecht, N 55.

<sup>520</sup> BIGES, p. 137; see also SOON, p. 40.

<sup>521</sup> BIGES, p. 138; SOON, p. 40; see also HILTY, Urheberrecht, N 56.

<sup>522</sup> BIGES, p. 138; see also SOON, p. 40 et seq.; cf. LANDES/POSNER, pp. 339 et seq., with comments on what happens when the marginal costs of a further production fall.

<sup>523</sup> See, e.g., GINSBURG/BUDIARDJO, p. 456, with the statement that “[...] without empirical evidence, it would be imprudent (and premature) to seek to design a regime to cover authorless outputs.” SPRIGMAN, p. 478, with remarks on the connection to creativity.; YU, pp. 1248 et seq.; ZECH, p. 1145, who describes the issue as follows: “Another question will be, whether AI related investments at least potentially lead to innovations and ultimately to positive welfare effects.”

## 5.3 Other Arguments

In addition to the justifications set out above, the following arguments may also be considered.

### 5.3.1 Practicability Arguments

Since it is difficult or even impossible to distinguish AI output from human works, it would be impracticable to make a distinction between these different production methods.<sup>524</sup> As already explained above (see 2.3), AI systems are able to simulate creativity so well that the difference between human creativity and AI output is often no longer perceptible. As long as AI output is perceived as equal to or better than human art but enjoys worse protection than the latter, the use of AI will probably remain obscured.<sup>525</sup> However, there are arguments to the effect that this can be solved by introducing a reversal of the burden of proof, but this solution is not really convincing.<sup>526</sup>

Also, the extremely difficult question of the demarcation between computer-assisted works and computer-generated works (see 3.2.2) may be considered as an argument.<sup>527</sup> From this perspective, it seems sensible to find a solution that no longer makes such a distinction necessary. The importance of legal certainty and the undesirability of distinctions is also shown, for example, by the fact that after the current revision of the Swiss copyright law no differentiation will be made in Switzerland between protected and unprotected press photographs.<sup>528</sup>

### 5.3.2 Legal System Arguments

As mentioned above (see 5.2.3), the question arises to what extent the AI output issue is not already covered by other areas of law.<sup>529</sup> This argumentation can be taken further. Competition law, for instance, can also be considered as a kind of counter pool to copyright law, and possibly grant some protection.<sup>530</sup> AI output may also be subject to trade legislation.<sup>531</sup> The existence of other possible legal institutions implies that it is not necessary to react directly with copyright regimes to AI output. However, this argument is not especially relevant since an overlap with other areas of law does not automatically relieve the main area of responsibility.

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<sup>524</sup> See LAUBER-RÖNSBERG/HETMANK, p. 578; VON BÜREN MEER, *Werkbegriff*, N 168.

<sup>525</sup> See LAUBER-RÖNSBERG, p. 249; LAUBER-RÖNSBERG/HETMANK, p. 577; PEARLMAN, p. 37; SAMUELSON, p. 1226; see also MONTAL/REICH, pp. 840 et seq., with investigations into the extent to which newspapers disclosed whether AI was used in text production. The results showed that more than half of the companies investigated did not provide any information at all.

<sup>526</sup> See, e.g., LAUBER-RÖNSBERG/HETMANK, p. 577.

<sup>527</sup> DENICOLA, pp. 284 et seq.

<sup>528</sup> See *Dispatch CopA 2018*, p. 676.

<sup>529</sup> See for a general overview of the interfaces of copyright to other rights: HILTY, *Urheberrecht*, N 4 et seqq.

<sup>530</sup> GINSBURG/BUDIARDJO, p. 455; YANISKY-RAVID, p. 702; see also AIPPI, *Resolution*, p. 3.

<sup>531</sup> See GINSBURG/BUDIARDJO, p. 455; SPINDLER, pp. 1050 et seqq.

## 5.4 Conclusion

The analysis has shown that different lines of reasoning exist regarding the need for a copyright for AI output. From a dogmatic perspective, starting from the law *de lege lata*, no need for the protection of AI output can be deduced. This argument seems to be relatively relevant, not least against the background that the Swiss copyright is technology-neutral and should therefore also apply to new technologies. From an individualistic justification perspective, there is also no need for the protection of AI output. However, this argument does not seem to be particularly relevant because today, since especially in Switzerland, the reasoning approaches for copyright are increasingly mixed and individualistic justifications are losing ground.

From the perspective of a collectivist argumentation, a necessity for the protection of AI output can be deduced. This is especially the case on the grounds that it is the task of copyright to work with appropriate incentives for the creation of works and, thus, among other things, to prevent market failure (however, the above-mentioned (see 5.2.3) criticism regarding this argumentation must be kept in mind). This argumentation is to be classified as rather relevant, as collectivist justifications are increasingly gaining ground in Swiss copyright law. Finally, the practicability argumentation also argues for the necessity of protection and is to be classified as rather relevant. The legal system argumentation speaks more against the necessity, but at the same time it does not seem relevant. The above arguments can be summarized in the following matrix.

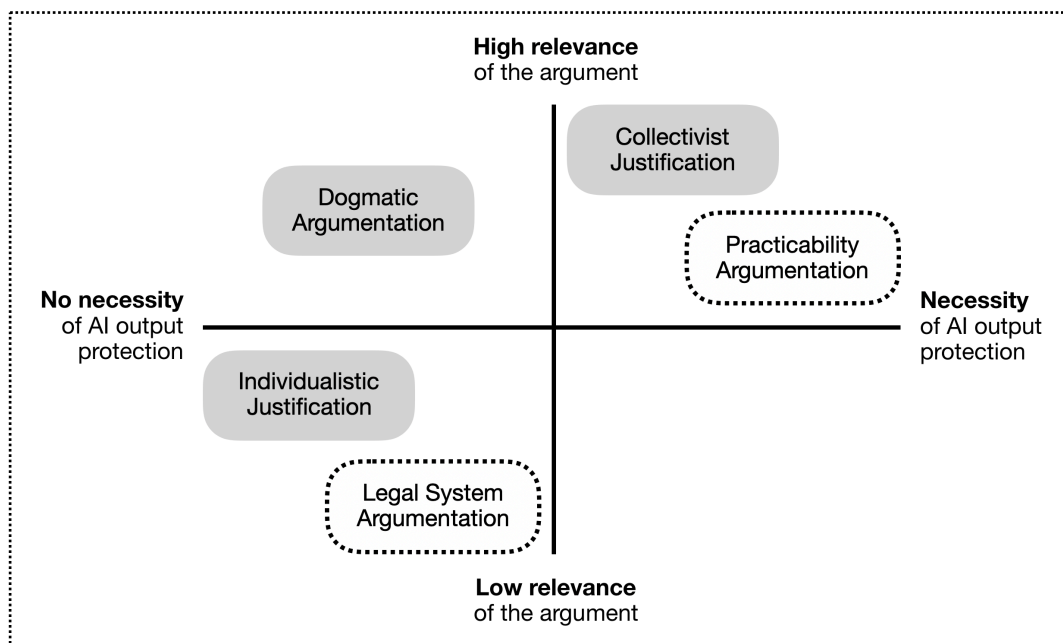


Figure 7: Classification of different arguments in terms of necessity and relevance

In summary, under Swiss copyright law it is possible to argue for the necessity of protection of AI output, since both, collectivist and practicability arguments support a protection.

## 6 Different Approaches de Lege Ferenda

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This chapter outlines different possibilities what the granting of a copyright protection for AI output could look like.<sup>532</sup> Each different approach is evaluated as follows: First it is assessed how a solution approach stands to the arguments explained in the previous chapter. Then, specific arguments for and against a corresponding approach are brought up (even if they cannot always be distinguished from the general arguments). Finally, the implications for Swiss law are discussed. What exactly an optimal legal framework for the copyright protection of AI output should look like can only be answered on the basis of detailed empirical and economic studies, which go beyond the scope of this thesis.

There are currently no concrete proposals (from the official side) in Switzerland as to what type of copyright protection should be granted for AI output.<sup>533</sup> This stands in contrast to the EU where the legal affairs committee of the EU Parliament had originally recommended in its report on civil law regulations in the field of robotics that the EU Commission should draw up criteria under which conditions works produced by computers or robots should be regarded as intellectual creations of its own are capable of being protected by copyright.<sup>534</sup>

### 6.1 Assignment to the Human Behind the Machine

One approach is to assign the AI generated output directly to a human being.<sup>535</sup> There are different possibilities to whom “behind a machine” the copyright can be assigned to.<sup>536</sup> Possibly, this can also be decided on a case-to-case basis.<sup>537</sup> Furthermore, this could either be explicitly defined or, as in UK law, assigned to the person who made the necessary arrangements.<sup>538</sup> In principle, however, it seems clear that such an approach would require lowering the thresholds or requirements for human involvement in the work. Three possible concrete allocations are discussed.

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<sup>532</sup> See for an overview also: BOYDEN, pp. 383 et seq.; DEVARAPALLI, pp. 10-13; ROHNER, pp. 74 et seqq.

<sup>533</sup> See RAGOT ET AL., pp. 578 et seq.; see also STAATSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION, Herausforderungen, p. 98, with the statement that there is currently no need for action in Switzerland.

<sup>534</sup> EUROPEAN PARLIAMENT, POLICY DEPARTMENT, Robotics; see also IHALAINEN, p. 727; LAUBER-RÖNSBERG, p. 252; however, this recommendation was not included in the final version.

<sup>535</sup> See PEARLMAN, pp. 27 et seqq., with an overview of these approaches.; YANISKY-RAVID, p. 690, with comments on the fact that this is probably the strongest supported approach.

<sup>536</sup> BROWN, p. 33; GUADAMUZ, WIPO; LAUBER-RÖNSBERG/HETMANK, p. 477; YANISKY-RAVID, pp. 691-693, showing eight different possibilities to which human being behind machine the copyright can be assigned.; Another possibility would be to identify individual humans on the basis of the process described in 2.3.1. It would then be possible to identify the programmer, the data supplier and the user. In the following, however, for reasons of priority, only the programmer and the user will be focused on. The data supplier can be subsumed under the same conditions.

<sup>537</sup> GUADAMUZ, WIPO.

<sup>538</sup> LAUBER-RÖNSBERG/HETMANK, p. 577.

A dogmatic argumentation speaks against such an approach, since appropriate human involvement is currently required in the investigated jurisdictions. An individualistic argumentation also tends to speak against such a solution, since the connection between human beings as authors and their work would probably not be strong enough from this point of view. From a collectivist perspective, such a solution is to be encouraged, since incentives can be applied accordingly.

One first possibility is to assign the copyright rights to the programmer of the code. The following arguments are given for such a solution. Firstly, the programmers are the actual “masterminds” behind the AI output.<sup>539</sup> The programmers lay the foundation for the AI output and have to be creative in their process.<sup>540</sup> Secondly, such a solution leads to a flexible system.<sup>541</sup> If programmers are not interested in using and controlling the rights of the potential output they can sell or license their rights this way.<sup>542</sup> At the same time, the following arguments speak against such a solution. Firstly, the fact that programmers may already have a copyright on the code itself (see 5.2.3).<sup>543</sup> Thus, programmers already have a way to control distribution and usage of their software (however, the existence of this right is unclear).<sup>544</sup> If programmers were also given the copyright to the output, they might have too much power in this relationship.<sup>545</sup> Secondly, assigning the copyright to programmers can also lead to insufficient incentives for users to create works.<sup>546</sup> Thirdly, another practical argument is that a programmers often will not know if and when outputs have been created with their software.<sup>547</sup> In the case of folkRNN (see 2.3.1) the copyright would lie directly with the programmers of the code. This example shows the argument of practicability, because it is difficult for the programmer to know who produced the music.

A second possibility would be to give the copyright to the user of the AI.<sup>548</sup> The following arguments support such an approach. Firstly, the fact that users are incentivized to run a program and create new works speaks in favor of this solution.<sup>549</sup> Secondly, assigning the copyright to users would have the advantage that the AI software has a value for them, since they can rely on the fact that they will get the rights to the output.<sup>550</sup> After all, such a solution would also put programmers in a better economic

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<sup>539</sup> BROWN, p. 35; see also PEARLMAN, p. 28.

<sup>540</sup> BROWN, p. 35.

<sup>541</sup> BROWN, p. 36.

<sup>542</sup> BROWN, p. 36; DENICOLA, pp. 283 et seq.; HRISTOV, p. 445.

<sup>543</sup> BROWN, p. 37; see DELTRON/MACREZ, p. 11; DENICOLA, p. 283.

<sup>544</sup> BROWN, p. 37.

<sup>545</sup> BROWN, p. 37; see also PEARLMAN, p. 29.

<sup>546</sup> DENICOLA, p. 283.

<sup>547</sup> DENICOLA, p. 284.

<sup>548</sup> Supporters of such a solution are, e.g., BROWN; DENICOLA; SAMUELSON, although the remarks are accordingly old, and the technical conditions were different.; cf. GINSBURG/BUDIARDJO, p. 450 et seqq.

<sup>549</sup> BROWN, p. 38, see also SAMUELSON, p. 1227, with the statement that “If someone must be given incentives to bring the work forward, it is the user who is best situated to respond to the motivation.”

<sup>550</sup> BROWN, p. 37.

position, because they could sell or license their code, since it could generate value.<sup>551</sup> Thirdly, it is also argued that assigning rights to users makes the distinction between computer-assisted works and computer-generated works obsolete, since in both cases the copyright would lie with the user.<sup>552</sup> The following arguments are put forward against such an approach. Firstly, since users make the smallest contribution to the AI output development process, they have the least right to the copyright output.<sup>553</sup> Secondly, granting rights to the user can result in programmers being more reluctant to share AI codes, and ultimately in fewer works being produced.<sup>554</sup> Thirdly, it can also be argued that such a solution only works as long as a user can be identified at all. In the case of folkRNN (see 2.3.1), the copyright would therefore belong to the person who uses the website and clicks on “compose”.

A third option is to introduce joint ownership between several humans.<sup>555</sup> This could be justified by the fact that often several humans can be regarded as involved in an AI output (for example the programmer, the data contributor and the user).<sup>556</sup> However, the fact that not both contributed in the same way to the end output speaks against this.<sup>557</sup> Moreover, such a system can lead to an undesirable and complicated fragmentation of ownership rights.<sup>558</sup> Also, there seem to be practical reasons against such a solution. In the example of folkRNN (see 2.3.1) a joint copyright between the programmer and the user would be created.

From a Swiss copyright perspective, human behind the machine approaches would imply a turning away from individualistic reasoning theories towards collectivist justifications. With such a solution, the requirement of intellectual creation would basically be dropped or at least lowered and only the requirement of individuality would be emphasized. However, the fact that a change in the requirements of Swiss copyright law is in principle possible is also shown in the current revision of copyright with regard to the protection of photographs (see 2.1).

## 6.2 Machine as Author

Another possibility is to assign the copyright directly to the machines themselves.<sup>559</sup> Such an approach is more or less the opposite to the human behind machine approaches since here it is not tried to assign

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<sup>551</sup> BROWN, p. 39.

<sup>552</sup> DENICOLA, p. 284.

<sup>553</sup> HRISTOV, p. 444; see also GUADAMUZ, WIPO.

<sup>554</sup> HRISTOV, pp. 444 et seq.

<sup>555</sup> BROWN, p. 34.

<sup>556</sup> BOYDEN, pp. 383 et seq., with comments on various possible participations.; BROWN, p. 34.

<sup>557</sup> BROWN, p. 35.

<sup>558</sup> Ibid.

<sup>559</sup> Supporters of such a solution are, e.g., DAVIES; ABBOTT, regarding patent law, however.; see also GRUBOW, p. 417, who argues in the direction that the AI should be regarded as a joint author.; PEARLMAN, pp. 29 et seq., who seems to be basically in favour of such an approach.; ZECH, p. 1147, with further considerations: “Whether and under which conditions

the copyright to a human, but the copyright would be given to where output is created. Such a solution would require the introduction of appropriate rights for AI or machines in general. In the case of folkRNN (see 2.3.1), this solution would assign the copyright directly to the code itself.

A dogmatic argumentation speaks against such a solution, since the granting of rights to machines is not included in various jurisdictions. From an individualistic justification perspective, the granting of rights to the machine must also be denied, since human beings are in the center of this justification. Finally, from a collectivist perspective, the granting of copyright rights can certainly be argued for. The allocation of rights would create incentives to a certain extent (e.g., for the innovation of AI) and prevent market failure.<sup>560</sup>

The following arguments in particular support such an approach. Firstly, it is argued, that the defining features of an AI, such as intelligence, rationality, independency, are very similar to those of a human being, and therefore they should also be given the corresponding rights.<sup>561</sup> Secondly, AI can also be seen as analogous to firms which are also separate, non-human legal entities capable of possessing legal rights, benefits and responsibilities.<sup>562</sup> However, such an approach does not seem desirable, for a very general argumentation: BROWN for instance argues, that the computer cannot be the owner because it is “as a piece of chattel, rendering it incapable of owing anything, including intellectual property”.<sup>563</sup> This reasoning is based on the attitude that our legal system is not adapted for electronic persons and is therefore not nearly ready for that.<sup>564</sup> Many questions would not be solved, such as who would grant the corresponding licenses or who could and would sue for a copyright infringement.<sup>565</sup> More questions would probably arise with such a solution than would be solved.<sup>566</sup> For example, since the copyright is tailored to human beings as authors it includes aspects such as a term of protection starting after death.<sup>567</sup>

Under Swiss copyright law, this solution would tend to be a rejection of individualistic justification and it would open up a completely new field of legal issues. However, the tendency also seems to apply to Switzerland, which has already been explained in general above: the Swiss legal system is

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AI should be treated as a person, is – like the parallel debate about animals – a fundamental question of legal philosophy.”.

<sup>560</sup> See ROHNER, pp. 80 et seq.

<sup>561</sup> See, e.g., YANISKY-RAVID, pp. 685 et seqq.

<sup>562</sup> DAVIES, p. 617; YANISKY-RAVID, pp. 685, 687 et seqq.; see also RAMALHO, p. 17, with the opinion that this comparison is wrong, because with firms there is still a human being behind it.; ROHNER, pp. 79 et seq.

<sup>563</sup> BROWN, p. 34.

<sup>564</sup> BRIDY, evolution, p. 400; DENICOLA, p. 274; see also PFEIFER, p. 226, with the statement that the corresponding granting of rights would be a cultural-political revolution and a cultural-historical loss.

<sup>565</sup> LAUBER-RÖNSBERG/HETMANK, p. 577; SCHÖNBERGER, p. 159.

<sup>566</sup> See SCHÖNBERGER, p. 159.

<sup>567</sup> YANISKY-RAVID, p. 689.



currently not prepared to treat machines as independent legal entities. Also, it would appear somewhat disproportionate to move forward in copyright law with such a bold solution.

### 6.3 Different Legal Regime for AI Output

Another approach would be to introduce a specific legal regime for AI output.<sup>568</sup> This could for example be a specific *sui generis* right or a variation of the US “Work Made for Hire” (“WMFH”) doctrine.<sup>569</sup> Here too, however, the question arises as to who would be assigned such a right.<sup>570</sup>

A first possibility is to create a right *sui generis*.<sup>571</sup> Such a solution would in principle create a new type of right. In the case of folkRNN (see 2.3.1) a specific new type of copyright would be created for these outputs. An analysis in relation to the basic arguments is accordingly difficult. However, dogmatic and individualistic justifications would probably tend to oppose, and collectivist justifications would tend to support such an approach. The following concrete arguments support this kind of approach: In such a case, the allocation of rights could be done entirely according to the will of the legislative, without the principles of copyright law having to be thrown overboard.<sup>572</sup> The solution of a right *sui generis* has already been used successfully applied other instances, such as at a European level with the Database and Semiconductor Directive.<sup>573</sup> Arguments against such a solution must be made on the basis of a concrete proposal.<sup>574</sup>

From a Swiss copyright perspective, such a solution is conceivable in principle. However, it must be kept in mind that such a solution should not be presented as a miracle weapon until the concrete aspects have been worked out.

A second possibility is to treat the machine as a kind of employee, based on the US concept of WMFH.<sup>575</sup> With the WMFH concept, the employer, or the person for whom a work was created, is regarded as the author of a work created by his or her (human) employee.<sup>576</sup> Thus, a person who commissioned the work but basically played no role in the creation process can be regarded as the author and owner, which is an exception to the general principle in most copyright systems.<sup>577</sup> The AI would

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<sup>568</sup> LAUBER-RÖNSBERG/HETMANK, p. 577; RAMALHO, p. 16, with further explanations.

<sup>569</sup> See LAUBER-RÖNSBERG/HETMANK, p. 577; RAMALHO, p. 16; ROHNER, pp. 81 et seq.

<sup>570</sup> See LAUBER-RÖNSBERG/HETMANK, p. 277.

<sup>571</sup> Supporter of this approach are, e.g., DE COCK BUNING.

<sup>572</sup> DE COCK BUNING, p. 321; ROHNER, p. 82.

<sup>573</sup> DE COCK BUNING, p. 322.

<sup>574</sup> See RAMALHO, p. 16, with the argument that for example in the EU the economic advantages of the newly introduced database law cannot be conclusively proven.; ROHNER, p. 82.

<sup>575</sup> Supporters of this theory are, e.g., BRIDY; HRISTOV; PEARLMAN; YANISKY-RAVID; cf. ROHNER, pp. 75 et seq., who classifies this approach also as a human behind the machine approach.

<sup>576</sup> DENICOLA, p. 275; BRIDY, evolution, p. 400; YANISKY-RAVID, p. 705.

<sup>577</sup> DENICOLA, p. 276; HRISTOV, p. 447; YANISKY-RAVID, p. 708.

therefore be regarded as an employee working for a person or a company.<sup>578</sup> However, who is regarded as an employer in this solution is a second question.<sup>579</sup> This approach differs from the Human Behind the Machine approaches mentioned above (see 6.1) in that it explicitly works in tandem with the employee-employer relationship. In the case of folkRNN (see 2.3.1) either the programmer, the user or someone else would be the author. This, however, not directly as with the humans behind the machine approaches, but through the fiction that the machine is employed by, for example, by the user or the programmer.

From a dogmatic point of view, such a solution must be evaluated differently, depending on whether a similar framework to WMFH already exists in the applicable jurisdiction. Individualistic argumentations clearly contradict such a framework, since the creator and the author would get separated. From a collectivistic argumentation such a framework is to be welcomed, because so appropriate incentives for the employers for the creation of AI output are created.

The following arguments are used to argue for such a solution.<sup>580</sup> Firstly, it is based on a legal concept that already exists, at least in principle, in various (common-law) jurisdictions.<sup>581</sup> Thus an adaptation for AI output would not be associated with too great a change.<sup>582</sup> Secondly, the rationale behind the WMFH theory is, that the employer maintains the commercial purpose and bears the risk.<sup>583</sup> It is argued that this justification fits well to the needs apparent in the case of AI output, because there, too, a corresponding person or company bears the investment and risks etc.<sup>584</sup> The following arguments are raised against such a solution.<sup>585</sup> Firstly, it seems wrong to classify computers as employees, but at the same time deny them the personhood for copyright.<sup>586</sup> Secondly, with the introduction of a WMFH framework for AI output many questions remain unanswered and new ones arise.<sup>587</sup> For instance, the question arises what happens when the AI produces works that are outside scope of “employment”.<sup>588</sup>

From the perspective of the Swiss copyright law, such a solution would mean a shift away from individualistic centering and would instead stress collectivist aspects. However, to some extent, it can be argued that such a solution is already provided for in Swiss copyright law within the concept of a work

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<sup>578</sup> HRISTOV, pp. 443, 446; YANISKY-RAVID, pp. 705, 709, 713.

<sup>579</sup> See HRISTOV, pp. 443 et seqq.

<sup>580</sup> See for an overview: YANISKY-RAVID, pp. 716 et seqq.

<sup>581</sup> BRIDY, coding, N 66, who cites the jurisdiction in the UK as an example; BRIDY, evolution, pp. 400 et seq.; HRISTOV, p. 442.

<sup>582</sup> BRIDY, coding, N 63, 66; see also HRISTOV, p. 449, with the remark that, for example, the problem of the Term of Copyright Protection does not arise.

<sup>583</sup> YANISKY-RAVID, p. 711.

<sup>584</sup> See YANISKY-RAVID, pp. 711 et seq.

<sup>585</sup> See for an overview: YANISKY-RAVID, pp. 714 et seqq.

<sup>586</sup> DENICOLA, p. 283.

<sup>587</sup> See IHALAINEN, p. 728.

<sup>588</sup> YANISKY-RAVID, p. 715.

on a project originated by the publisher (see 3.4.3). But this is rather seen as an erroneous exception and reinterpreted in the doctrine as explained above. The introduction of such a solution in Switzerland would therefore involve the introduction of a completely new concept, which is for reasons of uniformity probably not desirable.

## 6.4 Do nothing – No Author

Finally, a possibility is to change nothing which would result in AI output not being protected (according to the above explanations (see 3.5)).<sup>589</sup> In the case of folkRNN (see 2.3.1) there would be no copyright on the pieces of music for which the user simply clicked on “compose”. The general argumentation for this approach is basically identical to the explanations on the necessity of the protection of AI output. Thus, dogmatic and individualistic justification argumentations speak in favor of this approach. From a collectivist justification argumentation, however, such an approach should be rejected.

The following arguments favor such an approach. Firstly, it can be seen as an opportunity to create completely new artistic fields and furthermore to make AI output available to human authors for creation of new works.<sup>590</sup> Secondly, it can be argued that the (Swiss) copyright law is technology-neutral and has been able to keep pace with technological developments.<sup>591</sup> Thirdly, it can also be argued that the fact that AI output is already produced under the current regime speaks for no protection.<sup>592</sup> That the argument that output is already being produced is only of limited relevance has already been explained above (see 5.2.3). Against such an approach speaks that at a more abstract level, there is a risk that control over AI (output) will be lost if there are no rules.<sup>593</sup>

From a Swiss copyright law perspective, such a solution means that there is no need to change the legal basis. However, looking back to the relevance of individual arguments (see 5.4) and the collectivist and practicability arguments (see 5.2.3, 5.3.1) this approach is not to be favored in Switzerland.

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<sup>589</sup> Supporters of this solution are, e.g., PFEIFER SCHÖNBERGER; SPINDLER; RAGOT ET AL.; RAMALHO, with certain modifications; ROHNER.

<sup>590</sup> SCHÖNBERGER, p. 160; see also DE COCK BUNING, p. 322; RAMALHO, p. 20.

<sup>591</sup> RAGOT ET AL., p. 578.

<sup>592</sup> See ROHNER, p. 85.

<sup>593</sup> See YANISKY-RAVID, pp. 712, 717.

## 7 Conclusion

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The use of technology to create works is nothing new. The discussion about how copyright should be dealing with its use is correspondingly old. Comparisons can and should be made, for example to the use of computers as a tool or the use of photographs. Developments in the field of AI in recent years have, however, lent the subject a new explosive force. Based on the analysis of huge amounts of data on existing works, AI can now generate new output that can no longer be distinguished from the output of a human being.

The Swiss copyright law requires for the granting of protection according to the CopA, among other aspects, that a work is an intellectual creation and has an individual character. While the second is often fulfilled by AI output, intellectual creation requires that a work is based on a human will expressing a thought. However, this criterion is not given which means that AI output cannot be qualified as a work and therefore does not receive protection. The first part of the research question (*To what extent is the output of AI de lege lata protectable under Swiss copyright law?*) can thus be answered as: there is no protection for AI output. The analysis of the protectability of AI output in other jurisdictions has shown that it is not only in Switzerland that there is no protection for AI output. Also in Germany, the European Union and in the United States, protection of AI output fails due to a lack of human participation. At the same time, the discussions in these jurisdictions do not always revolve around the same questions. While in Switzerland and Germany the question of intellectual creation is stressed, in the US the question is discussed whether AI output is creativity at all. The United Kingdom, lastly, has a copyright law for computer-generated works, but even under this jurisdiction, relevant questions remain unanswered.

For the second part of the research question (*to what extent should it be protectable de lege ferenda?*) several possible arguments were examined in a first step. This has shown that a dogmatic and an individualistic perspective fundamentally speak against an extension of protection for AI output. From a collectivist, utilitarian perspective, on the other hand, there are arguments for extending copyright to AI output and there is a corresponding necessity. In a second step, different concrete possibilities were examined regarding the allocation of such copyright. Possible options include assigning the right to some human being behind the machine, granting the right to the machine itself, working with a new type of right or deliberately deciding against protection.

Concerning Switzerland, the following overall answer emerges. With regard to the individualistic origin and thus also current dogmatic outflows of the Swiss copyright law, it seems obvious to deny protection for AI output. This view, however, overlooks collectivist arguments as well as arguments of practicability. Especially today, Swiss copyright is more and more justified with collectivistic, incentive justifications. Consequently, protection for AI output should be granted in Switzerland. This would certainly be connected to a system change and lead in particular to a renunciation of the human factor in the creation process. As a concrete solution, it seems best for Switzerland, in accordance with the above-mentioned advantages, to choose an approach based on the human being behind the machine, specifically the user. For that, however, the concrete economic effects must be examined more closely in order to be able to provide a reliable answer. Moreover, due to the harmonization of copyrights, it seems appropriate to consider the question from an international perspective.

To conclude, even if it is a characteristic of the law to lag behind technological developments, it remains to be hoped that in this case technological developments will be confronted with open eyes. It also seems particularly important that Switzerland follows international developments in this field.