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ARTIFICIAL INTELLIGENCE PROGRAMS AND THEIR RELATIONSHIP WITH COPYRIGHT.

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Introduction. -

Through history, humans have used their cognitive capabilities in order to generate knowledge and apply it in a practical way to create tools that facilitate their daily lives. Usually, such tools help them to carry out tasks with an important reduction of effort or, in some cases, even without their intervention. This process, namely, "*the application of scientific knowledge for practical purposes*"[1] is what we call "*technology*".

As long society evolves, the human creates more complex technologies in order to facilitate the accomplishment of emerging tasks or the solution of new social, economic or political problems. Nowadays, the completion of most of the human tasks, such as professional activities, personal communications, financial transactions, transportation services, information searches, etc. depend on the use of technological tools such as: Internet, electronic devices (*i.e. laptops, smartphones and electronic tablets*) and radioelectric spectrums. These tools' functionality depends on the existence of a second tool, namely, a "*computer program*", which Timothy L. Butler defines as "*a representation of an algorithm prepared initially as a flow chart or step-wise procedure written in standard English to solve a particular problem or to perform a specific task*"[2].

By combining the above-mentioned technologies, humans can use the "*physical and electronic parts of a computer*"[3] (known as, the "*hardware*"), in order to store a list of instructions that control the behavior of the device (known as the "*software*"[4]), which as an automated response to the binary code or instruction provided using a certain part of the hardware (e.g. the keyboard), will complete a specific task or solve a determined problem, by using a preestablished "*algorithm*"[5].

Due to the efficiency, effectiveness and functionality of computer programs to solve problems, today's corporations invest large amounts of human and material resources to enlarge their functions, so that they can introduce

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[1] English Oxford Living Dictionaries. Definition of the word "*technology*". Consulted on February 5th, 2019. Available in: https://en.oxforddictionaries.com/definition/technology.

[2] Butler, Timothy L. Can a Computer be an Author? Copyright Aspects of Artificial Intelligence. HeinOnline. PDF Version. Page 13.

[3] Cambridge Dictionary. Definition of the word "*hardware*". Consulted on February 5th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/hardware.

[4] "*Software*". - The instructions that control what a computer does". Cambridge Dictionary. Consulted on May 31st, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/software.

[5] "*Algorithm*". - A set of mathematical instructions or rules that, especially, if given to a computer, will help to calculate an answer to a problem". Cambridge Dictionary. Consulted on February 5th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/algorithm.

technical improvements or new technologies into the market to facilitate the provision of services, the offer of products or the automated completion of some tasks in which the human intervention is still necessary. As a result of the strong competition in the globalized market, computer programs with "*new*" or "*improved*" functionalities are released every day, which is generating a less need for the human intervention (-physical and intellectual-) to solve problems and carrying out daily tasks.

This speed-up development has also caused that companies lose their interest in creating computer programs that only provide pre-programmed responses and focus their resources in the develop of programs that: 1) consult external sources of information (*as electronic databases*), and 2) simulate or imitate human behavior.

As consequence of the above-mentioned emergent business model, technology companies are developing "*artificial intelligence*" ("A.I."), term that refers to "the part of computer science concerned with designing intelligent computer systems, that is, systems that exhibit characteristics we associate with intelligence in human behavior"[6]. A.I.'s programs are playing an important role in the modern society, since they are being used by large and small corporations to decrease their operating expenses by replacing human labor. The reason of this is that, some of them, by analyzing internal and external sources of information, the client's background and preferences, combined with the imitation of the human behavior and its decision-making processes, can create patterns to be used on an automated way to solve industrial or commercial problems and tasks.

Although the topic of A.I.'s programs sounds distant for a lot of people, who tend to relate such technology with advanced robots that surpass the human capacity, it is a real and contemporary subject, due to the fact that, nowadays, most of the people in the world are using such programs, through their electronic devices, to resolve simple tasks (*e.g. searching information, add events to calendars, send messages, etc.*) or to cover some necessities as the purchase of products (*e.g. clothes, books, groceries, etc.*) or the acquisition of services (*e.g. movies platforms, house cleaning, pet care, etc.*). Some examples of the most A.I.'s programs used in our daily lives are the following:

- **Siri**. - A personal assistant that helps iPhone's owners to find information, give directions, add events to the electronic calendars, write and send messages, make calls, etc. This program uses a machine-learning program to predict and understand human language, as well as the questions and requests made to it (R.L. Adams, 2017)[7];

- **Amazon.com**. - A website program that uses algorithms to predict the interest of the consumers in further products purchases based on their previous online behavior (R.L. Adams, 2017)[8]; and

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[6] E.C. Jr. Lashbrooke. Legal Reasoning and Artificial Intelligence. Vol 34. 1988. HeinOnline. PDF Version. Page 10 (295).
[7] R.L. Adams. 10 Powerful Examples Of Artificial Intelligence In Use Today. Forbes. January 10, 2017. Consulted on February 10, 2019. Available in: https://www.forbes.com/sites/robertadams/2017/01/10/10-powerful-examples-of-artificial-intelligence-in-use-today/#70df0b78420d.
[8] Ibid.

- **Netflix**. - An internet platform of movies that analyze customer's reactions to films and compare them with millions of records to suggest films that could be of interest for the user (R.L. Adams, 2017)[9].

The examples mentioned above are A.I.'s programs that use "*machine-learning systems*" to obtain and analyze data in order to reach conclusions. For a better understanding of the subject, it is important to explain what the machine-learning term implies and the different categories of machine-learning that exist.

According to Jason Bell, machine-learning is a system "that can learn from data in a manner of being trained"[10]. Those type of systems, "might learn and improve with experience, and with time, refine a model that can be used to predict outcomes of questions based on the previous learning"[11]. In other words, machine-learning is a computer program that collects data, analyzes it with or without the guidance of human-programmed rules, considers its previous experiences with similar data and finds patterns that can be used to solve a determined problem.

Furthermore, there are two categories of machine-learning programs, namely, "*supervised learning*" and "*unsupervised learning*". The first, according to Sobel, is a predictive technology that carry out the two following tasks: 1) classification: associating input data with labels (e.g. identifying written or printed characters as letters of the alphabet), and 2) regression: attempting to predict a continuous variable given a set of data that may influence that variable[12]. The second is quite similar to the first, however, it does not need the "*labeled data*", which is data programmed by a human to show the system how to answer a target question or solve a determined problem.

In view of the above, we can state that "*supervised learning*" comprises human intervention for programming "*labeled data*" in the A.I.'s program that allows it to predict specific outcomes, while "*unsupervised learning*" does not need any information provided by humans, it does gather related data from external sources that could have a direct or indirect relation with the target question or problem[13].

The aforementioned A.I.'s programs are increasingly being used by corporations in order to improve their products and services, circumstance that is causing the replacement of the human intervention in several stages of the business and industrial processes. However, it is important to point out that the use of A.I.'s programs have transcended to other fields beyond the industry which are not related with the solution of daily problems and the carry out of tasks, as it is the "*artistic expression*".

As it sounds, some A.I.'s programs can gather "artistic" or "expressive" data such as literature works (*books*), songs and paintings, in order to analyze it,

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[9] Ibid.
[10] Bell, Jason. Machine Learning: Hands-On for Developers and Technical Professionals. John Wiley & Sons, Inc. 2015. Page 2.
[11] Ibid.
[12] L.W. Sobel, Benjamin. Artificial Intelligence's Fair Use Crisis. 41 Columbia Journal of Law & the Arts. 2017. HeinOnline. PDF Version. Page 15 (58).
[13] Ibid. Page 16 (59).

compare it, find patterns within it and, later on, "create and produce works independently, unexpectedly, and creatively, with self-determination and an independent choice of what to create and how to create it"[14]. Nowadays, we can find several artworks created by A.I.'s programs independently, as the ones listed below:

- *Paintings.* **The Next Rembrandt Project**. - The companies ING Groep, N.V. and Microsoft, in collaboration with the Delft University of Technology and the Mauritshuis Museum, gathered a team to analyze 346 artworks of the famous painter Rembrandt Harmenszoon van Rijn, using an A.I.'s program in order to create, after 347 years of his dead, a new painting that would accurately imitate his painting technique. The A.I. program, in order to create the new "Rembrandt's" painting followed the next steps: 1) gathering the data of all the author's paintings, 2) determining the subject to be painted by finding a pattern through the comparison of all the people reproduced in the paintings of the author, 3) generating the features of the subject to be painted, by analyzing the special characteristics of the people reproduced in Rembrandt's paintings in order to determine the technique to paint noses, eyes, mouths, hair, etc., and 4) bringing the new painting to live, by printing the result using a 3D printer that imitates the brushstrokes, the layers of paint, the surface texture, the composition and the kinds of pigments used by Rembrandt in all of his original paintings (Haanstra, Augustus and Dik, 2016) [15]. The A.I.'s program used by the corporations mentioned above in order to create a new "Rembrandt's" painting used a supervised machine-learning program, due to the fact that, the engineers had to programmed "*labeled data*", such as the scanned images of the 346 Rembrandt's master pieces so that, the program could analyze them and, by using special algorithms, determine the angles, the layers of paint, the texture, the shapes, and the subject to be used in the painting.

  In the particular case, Rembrandt's paintings belong to the public domain, as he died more than 70 years ago, thus, his master pieces are no longer matter of copyright protection, however, such event created new concerns related with copyright, which will be mentioned later on in the present chapter.

- *Literature/poetry.* **RACTER**. - Is an A.I.'s program designed by William Chamberlain and Thomas Etter in 1980 that, by "using a vocabulary stored in its memory, applies grammatical rules to construct semi-coherent stories in English"[16]. This program pick nouns, verbs, adjectives and adverbs and apply grammatical rules to them in order to construct coherent sentences. The outcome, according to its author, is not foreseeable or predetermined, which means that the story created by the program is completely independent of human creativity (L. Butler, 1981).

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[14] Shlomit Yanisky-Ravid. Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era: The Human-like Authors Are Already Here: A New Model. Michigan State Law Review. 2017. HeinOnline. PDF Version. Page 13 (670).
[15] Haanstra, Ben, Augustus, Ron and Dik, Joris. The Next Rembrandt. Can The Great Master Be Brought Back To Create One More Painting? Consulted on February 10, 2019. Available in: https://www.nextrembrandt.com/.
[16] L. Butler, Timothy. Can a Computer be an Author?- Copyright Aspects of Artificial Intelligence. Vol. 4. Comm/Ent L.S. 1981. HeinOnline. PDF Version. Page 10 (715).

Although this kind of programs need some starter labeled data such as the alphabet and the grammatical rules of a certain human language (*i.e. English*), they use an unsupervised machine-learning program to: 1) gather general information from external sources, such as names, places, dates, actions, objects, historical facts, etc., and 2) compare such data with different pre-existing stories, in order to create an original story with a different outcome.

RACTER is considered as the first A.I.'s program to create a book, namely, a poetry anthology called '*The Policeman's Beard if Half Constructed*', which is based on randomly chosen words from a hand-crafted lexicon to fill the gaps provided in a template-based grammar structure (Niebla, 2017)[17].

- *Music*. **Artificial Intelligence Virtual Artist ("AIVA")**. - Is an A.I.'s program "capable of composing emotional soundtracks for films, video games, commercials and any type of entertainment content"[18]. According to the author, such program "has been learning the art of music composition by reading through a large collection of music partitions, written by the greatest Composers (Mozart, Beethoven, Bach…) to create a mathematical model representation of what music is"[19]. By analyzing and comparing the music partitions contained in its database, such program finds rhythm patterns and combine them to elaborate original songs.

  According to the French Society of Authors, Composers and Publishers of Music's ("SACEM") database, AIVA has around 200 melodies registered as a composer[20].

  This A.I.'s program uses a supervised machine-learning program, due to the fact that, the engineers had to programmed some starter "*labeled data*", such as the Mozart, Beethoven and Bach music partitions so that, the program could analyze them and, by using special algorithms, find rhythm patterns which combined can create new soundtracks. Notwithstanding the foregoing, AIVA's program could be turned into an unsupervised machine-learning program to search for data in external sources such as the Internet, with the purpose of analyzing all existing music online, including copyrighted protected songs.

By analyzing the examples provided above, we can realize that, A.I.'s programs are infiltrating the "creativity" field, which not much time ago we had the believe that it was a terrain that only could be develop by humans using their artistic

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[17] Niebla Zatarain, Jesus Manuel. The Role of Automated Technology in the Creation of Copyright Works: The Challenges of Artificial Intelligence. International Review of Law, Computers & Technology. February 22, 2017. Consulted on February 10, 2019. Available in: https://www.tandfonline.com/doi/full/10.1080/13600869.2017.1275273.

[18] Unknown author. Rights reserved to Aiva Technologies, S.A.R.L. Consulted on February 10, 2019. Available in: https://www.aiva.ai/about.

[19] Ibid.

[20] The search for AIVA`s register melodies can be made in the following link: https://www.sacem.fr/en.

skills, creativity and emotional expression. This phenomenon is not only changing the concept of "*art*" and "*expression*", but also constitutes a new challenge for the legal framework, which is in charge of protecting artistic creations, namely, copyright, due to the fact that new questions arises, as the ones detailed below:

a) How does A.I.'s programs create artworks?
b) Are the artworks created by A.I.'s programs protectable under the European Union ("EU") copyright legal framework?
c) Which exclusive rights are involved in the creation process of artworks carried out by A.I.'s programs?
d) Is there any limitation or exemption to prevent copyright infringement by the use/analysis of protected artworks carried out by A.I.'s programs in the process of creation of new artworks?

Chapter I.

A. How does A.I.'s programs create artworks?

As explained in the introduction, A.I.'s programs use machine-learning in order to collect data, which will be properly classified according to human-programmed rules in specific groups (*such as activities, animals, names, objects, etc.*), to further carry out a deep analysis of the same (*with or without human intervention*), that involves the comparison of such data with other previously collected, to find patterns that could be used for solving a determined problem, by applying a special algorithm. In this sense, the functioning of the A.I.'s programs that involve machine-learning could be illustrated as follows:

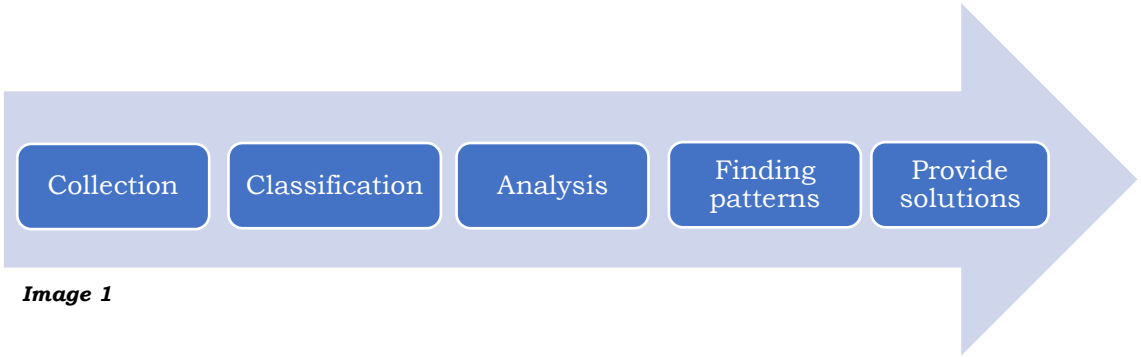

Image 1

A.I.'s programs improve their performance with every process carried out (*since they gain "experience"*) and evolve by gathering new data, which is the source for the discovery of unknown patterns.

Although there are several types of A.I.'s programs, the World Intellectual Property Organization's ("WIPO") Program's Notes provide descriptions of three categories that are relevant for intellectual property, which are detailed as follows:

- ***Expert systems***. – "Programs for solving problems in specialized fields of knowledge"[21]. This kind of programs have two main components: 1) a knowledge base, and 2) an inference engine. The former contain the expertise of specialists in a determined field, which is expressed through rules in the form of "if-then" statements, while the latter stores specific problem-solving knowledge that allows the program to apply the specialized rules to the facts the user supplies, in order to solve a determined problem (WIPO's Notes, 1991)[22].

  **The operation of this kind of programs is illustrated in the image below:*

[21] WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence. Stanford University. March 25th to 27th, 1991. Page 56. Consulted on March 11, 2019. Available in: ftp://ftp.wipo.int/pub/library/ebooks/wipopublications/wipo_pub_698e.pdf.
[22] Ibid.

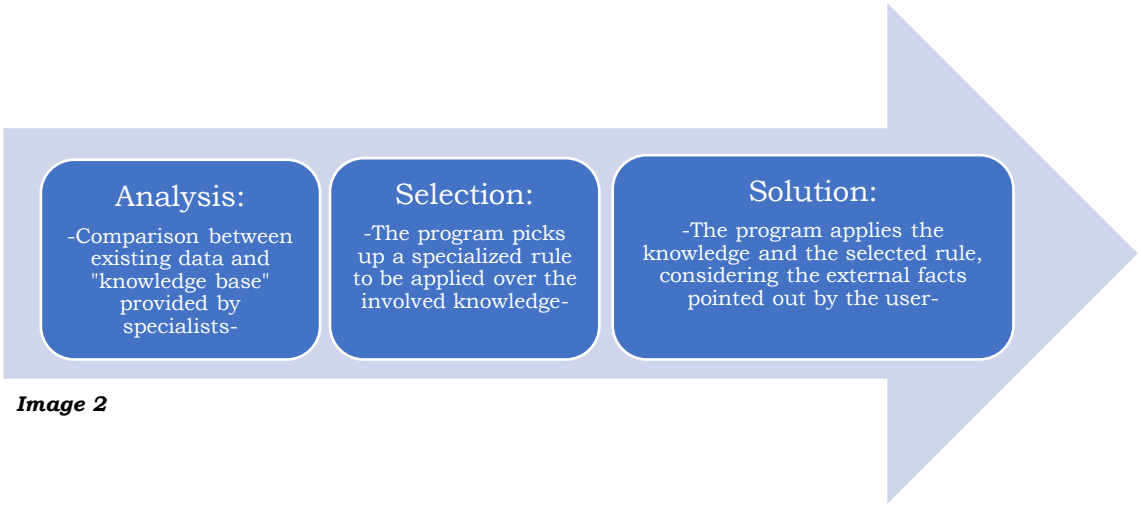

Image 2

- ***Perception systems***. – "Systems that permit a computer to "perceive" the world, typically by providing the computer with a "sense" of "sight" or "hearing"[23]. This type of programs, by using a determined hardware can gather information of the real world such as images (*by means of cameras*), sounds (*by means of recording devices*), temperatures (*by means of thermometers*), texts (*by means of scanners*), etc., and transform the same into analyzable data. This process is achieved through the comparison of the objects, shapes, sounds' frequencies, colors, letters, grammar rules, and other model data that the A.I.'s program stores in its "knowledge base" with the "perceived" real world information.

  **The operation of this kind of programs is illustrated in the image below:*

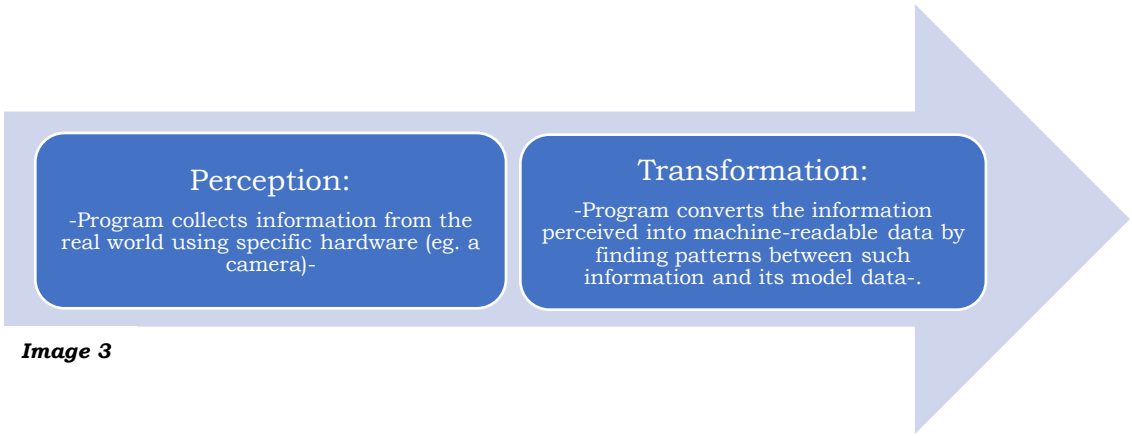

Image 3

- ***Natural-Language Systems***. – Types of perception systems that understand the meanings of words by using a dictionary database (*in machine-readable form*), that apply the semantic analysis and rules of syntax in order to give the words perceived from the real world a specific use in a certain context (*e.g. Speech recognition systems*) (WIPO's Notes, 1991)[24].

The aforementioned A.I.'s programs gather information from images, sounds, texts, videos, etc. of the real world (*by using perception systems*) or collect data

[23] Ibid.
[24] Ibid, Page 57.

already available in a machine-readable form (*contained in databases*), that could be protected by copyright. Moreover, they analyze the collected data through their supervised or unsupervised machine-learning programs, identify patterns, and use the results obtained to solve a specific problem outlined by the user which, for the purpose of the present thesis, is the creation of new and creative artworks, such as songs, lyrics, paintings, photographs, sculptures, novels, etc., which could be copyright-protectable matter if it fulfills with the corresponding legal requirements.

Some A.I.'s programs such as The Next Rembrandt Project, RACTER and AIVA (*used as examples in the introduction*), which are being used in order to create artworks without the human's intervention or with its minimal intervention, belong to some of the three categories provided by the WIPO or, at least, they opened a window for the development of other similar programs that fall under such categories, as explained below:

1) ***The Next Rembrandt Project***. – The program involved the scanning of 346 artworks of the famous painter Rembrandt. Thus, the A.I.'s program used was a type of "*perception system*", which used scanners as a "*sense of sight*" in order to perceive the information contained in the Rembrandt's paintings (*brushstrokes, the layers of paint, the surface texture, the composition, the kinds of pigments, the subjects represented, etc.*) to compare such information of the real world with the human-programmed data contained in its database and so create new data. Then, such program analyzed the data in order to find patterns and, finally, proceeded with the creation of a new "Rembrandt's" painting, which could be considered as an artwork.

2) ***RACTER***. – This is a basic A.I.'s program that cannot be classified under any of the categories provided by the WIPO, since it collects data from external sources already available in a machine-readable form and compare it to create coherent stories different to the previous analyzed ones, but it does not involve the expertise of specialists (to be considered expert system) or the "*perception*" of the real world (to be considered perception/natural-language system). Notwithstanding the foregoing, such program is relevant because its creation opened a window for the develop of other similar A.I.'s programs which not only collect information from external sources (*such as literary works available in machine-readable form*), but also from the real world (*by analyzing photographs*), and use that data to create original literary works (*i.e. poems*).

   An example of such new programs is the one called **XiaoIce**. This program is a conversational chatbot developed by Microsoft in China, which "studied all the modern poems of about 519 poets dating as far back as the 1920's"[25] and, after analyzing and compare them, "wrote more than 10, 000 poems in 2,760 hours"[26], of which "139 were selected for the collection, titled "Sunshine Misses Windows""[27]. Also, this A.I.'s program gathers information from the real life by detecting and analyzing

[25] Jiang Jie, Bianji. First AI-authored collection of poems published in China. People's Daily Online. May 31st, 2017. Consulted on March 11, 2019. Available in: http://en.people.cn/n3/2017/0531/c90000-9222463.html.
[26] Ibid.
[27] Ibid.

patterns in photographs and then, it compares such data with "a group of 2,027 modern Chinese poems it has read"[28] to create new coherent and original poems.

By the above, we can state that XiaoIce's program uses a type of "*perception system*", in order to gather information from the real world (*i.e. photographs*), which later compares with pre-existing copyright works (*i.e. poems*) in order to create independent, autonomous, creative and original poems.

3) **AIVA**. – As **RACTER**, this program cannot be classified under any of the categories provided by the WIPO, since it collects data from external sources already available in a machine-readable form (i.e. Mozart, Beethoven, Bach's music) and compare it to find patterns and create new songs, but it does not involve neither "*expert*" or "*perception*" systems. However, its creation also opened a window for the develop of other similar A.I.'s programs like the one called **AI-powered Doodle**, which was made by Google in order to homage the birthday of the great music composer Johann Sebastian Bach. This A.I., by using a "*perception*" system, allows the user to draw some musical notes in the Google website in order to create a musical sheet, which is processed using a machine learning program that compares the musical information logged in by the user with the 306 choral Bach's harmonizations previously analyzed and collected, to create a new and original two measure melody bearing Bach's musical style (Google, 2019)[29].

   In this sense, we can state that AI-powered Doodle uses a type of "*perception system*", in order to gather information from the real world (i.e. the musical notes logged by the user), which later on compares with pre-existing works (*i.e. Bach's music*) in order to create independent, autonomous, creative and original songs bearing the musical style of Bach.

By analyzing the examples detailed above, we can point out that the A.I.'s programs can be related to copyright in two ways: 1) they can collect, store and analyze copyright-protected works (*with or without authors' consent*) in order to solve a determined problem, that does not involves the creation of an artwork, such as the creation of a database of artistic patterns, or 2) they can use the results obtained from analyzing copyright-protected works (*with or without the authors' consent*) to create autonomous, independent and creative artworks.

In view of the analysis carried out, the question of whether or not the creations of A.I.'s programs could be copyright-protectable under the current legal European Union framework arises.

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[28] Gershgorn, Dave. A Microsoft chatbot composes poetry by looking at photographs. August 13th, 2018. Consulted on March 11, 2019. Available in: https://qz.com/1354736/a-microsoft-chatbot-composes-poetry-by-looking-at-photographs/.

[29] Unknown Author. Google. 2019. Consulted on March 22, 2019. Available in: https://www.google.com/doodles/celebrating-johann-sebastian-bach.

Chapter II.-

B. Are the artworks created by A.I.'s programs protectable under the European Union ("EU") copyright legal framework?

As it is known, there are no provisions contained in any Regulation or Directive, at an EU level, that define the term "*copyright*", however, such task has been taken by each EU Member States through their domestic laws. Considering the elements that the term "copyright" comprises in the different provisions contained in the EU Member States' domestic legislations, some authors have taken the task to construct a general definition that could apply within the Union, such as Justine Pila and Paul Torremans, who define copyrights and related rights as "limited-term exclusionary rights that subsist automatically in authorial works such as poems, paintings, musical tunes, and dance compositions, in addition to certain other categories of expressive subject-matter such as phonograms (sound recordings), films, non-authorial databases, broadcasts, and performances"[30].

In order to determine if an artwork created by an A.I.'s program can be copyright-protectable, we need to analyze, on a case-to-case basis, if the result thrown by the program fulfills with the requirement of being an "authorial work". This term has been defined by the Court of Justice of the European Union ("CJEU") through a preliminary ruling in the *Case C-5-708 Infopaq International A/S v Danske Dagblades Forening [2009] ECR I-6569 (Infopaq)*, as follows: "…for a subject-matter to satisfy this description it must be a bounded expressive object (a work) that can be said to have resulted from an author's free and creative choices and to bear her personal mark"[31]. Thus, for determining if a subject-matter is copyright-protectable it is necessary to carry out a two-stage test process that, according to Justine Pila and Paul Torremans, involves deciding:

a) "Whether it leaves scope for free and creative choices; and

b) The extent if any to which that scope has been exploited by the alleged author of the course of creating it such that the work bears her personal mark"[32].

However, it is important to point out that the two-stage test detailed above was created on a copyright infringement case which involved: 1) traditional authors, namely, natural persons (journalists) that assigned the economic rights over their works' copyrights in favor of legal persons (Danish daily newspapers), by means of an employee-employer relationship, and 2) traditional works, namely, literary works (newspaper articles). Thus, in order to apply such test for works generated by A.I.'s programs, first we need to determine if the EU framework allows such programs to be recognized as "authors".

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[30] Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 243.
[31] Ibid, page 271.
[32] Ibid.

B.1) Does the EU copyright legal framework allow A.I.'s programs to be considered as "authors" of their creations?

For answering this question, first, we need to analyze the provisions that apply to all the EU Member States, in particular, to the Berne Convention, which Articles 2 (6), 6 bis (1) and (2) and 7 (1), provides que following:

> *"Article 2*
> *Protected Works*
> *(6) The works mentioned in this Article shall enjoy protection in all countries of the Union. This protection shall operate for the benefit of the author and his successors in title.*
> *Article 6bis*
> *Moral Rights*
> *(1) Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.*
> *(2) The rights granted to the author in accordance with the preceding paragraph shall, after his death, be maintained, at least until the expiry of the economic rights, and shall be exercisable by the persons or institutions authorized by the legislation of the country where protection is claimed.*
> *Article 7*
> *Term of Protection*
> *(1) The term of protection granted by this Convention shall be the life of the author and fifty years after his death"*[33].

The Articles transcribed above, link the term of protection of copyrights to the "life of the authors", their "death" and their "successors in line", thus, such provisions assume that the creators of artworks must be humans or other creatures capable of living, dying and inherit their rights to third parties, logic that excludes A.I.'s programs, which are creations of the former that cannot sustain life (unknown, 2017)[34]. Furthermore, such provisions link the moral rights granted by copyright to the "honor" and "reputation" of the creator of the work, which are terms intrinsically related to morality, philosophy that only applies to beings that are aware of their own existence and behavior.

However, the analyzed provisions were drafted before A.I.'s programs were on the map and had impact the industry and the expressive fields, as they have done in the last years. For this reason, we can assert that the EU copyright international framework do not address this innovative topic immersed in the modern society, thus, it cannot be considered suitable to solve recent law-

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[33] Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention"). December, 1887. World Intellectual Property Organization ("WIPO"). Consulted on April 8th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.

[34] Unknown. EU copyright protection of works created by artificial intelligence systems. University of Bergen. June 1st, 2017. Consulted on April 19th, 2019. Available in: http://bora.uib.no/bitstream/handle/1956/16479/JUS399_V17_183.pdf?sequence=1&isAllowed=y.

technological problems, such as the question of whether or not artworks generated by A.I.'s programs are suitable for copyright protection.

As the international framework do not provide suitable provisions to solve if A.I.'s programs can or cannot be considered as "authors", we need to analyze if the domestic laws of each EU Member State provide a solution for this problem. Because of that, we can take as starting point the German, Dutch and United Kingdom ("UK") domestic jurisdictions, which provide the following definitions of "author":

1) ***Netherlands***. *Copyright Act (Auteurswet)*:

> *"Section 1*
> *The nature of copyright*
> *Article 1*
> *Copyright is the exclusive right of the maker of a literary, scientific or artistic work or his successors in title to make the work public and to reproduce it, subject to the limitations laid down by law"*[35].

2) ***Germany***. *Copyright Act of September 1965*:

> *"Section 7*
> *Author*
> *The author is the creator of the work"*[36].

3) ***United Kingdom***. *Copyright, Designs and Patents Act 1988*:

> *"Authorship and ownership of copyright*
> *9 Authorship of work*
> *(1) In this Part "author", in relation to a work, means the person who creates it.*
> *[…]*
> *(3) In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.*[37].

By analyzing the provisions transcribed above, we can observe that:

a) The Dutch jurisdiction, limit the term "author" to humans, when referring to "the maker of the work or his successors", so A.I.'s programs cannot be considered as expressive and intellectual authors of a work;

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[35] Eechoud, Mireille Van. Copyright Act- Auteurswet Unofficial Translation. Consulted on April 19th, 2019. Available in: https://www.ivir.nl/syscontent/pdfs/119.pdf.
[36] Copyright Act of 9 September 1965 (Federal Law Gazette I p. 1273), as last amended by Article 1 of the Act of 1 September 2017 (Federal Law Gazette I p. 33). Consulted on April 19th, 2019. Available in: https://www.gesetze-im-internet.de/englisch_urhg/englisch_urhg.pdf
[37] Copyright, Designs and Patents Act 1988. Consulted on April 19th, 2019. Available in: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/772818/copyright-designs-and-patents-act-1988.pdf.

b) On the other hand, the German jurisdiction provides a more general definition of author which, at first glance, could include A.I.'s programs, since it only refers to "the creator of the work". However, when analyzing such disposition altogether with the remaining provisions of the German Copyright Act, this possibility is discarded, as the law restrict the moral and economic rights and the presumptions of authorship to the word "person", which exclusively encompasses human beings, in particular, "a man, a woman or a child"[38]; and

c) Finally, the UK domestic jurisdiction has an Article which is expressly applicable to cases in which an artistic work is computer-generated, description that covers all the artworks created by A.I.'s programs. This provision, states that the author of artworks generated by A.I.'s programs "*shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken*"[39]. In this sense, the author of an artwork generated by an A.I.'s program, will be deemed to be the programmer who created the program. This because, such programmer is the one that is giving the A.I.'s program the mechanical tools needed to achieve its final purpose, namely, the creation of an expressive work.

In view of the above, we can state that, either EU international framework and EU Member States domestic laws do not allow A.I.'s programs to be recognized as the "authors" of their artistic creations, since such privilege can only be claimed by humans, who are the only living creatures susceptible of being subject to rights and obligations. This idea is also supported by the UK Copyright, Designs and Patents Act 1988 since, although such legislation provides for the protection of computer-generated artworks under the copyright legal framework, it does not recognizes such programs as the "authors" of the created subject matter, as the ownership over such rights will fall over the programmers.

Following the above line of argumentation, the question of whether an artwork must be created by a human to be eligible for copyright protection and, if affirmative, into what extent it needs to participate in the creation process when it uses an A.I.'s program for executing a work for it to be considered as a result of his own creation arises.

B.2) Must an artwork be created by a human in order to be eligible for copyright protection?

For answering this question, we need to analyze the requirements that each domestic copyright legislation of the EU Member States and their case-law impose for the subsistence of copyright over a work. In order to see if the EU Member States' domestic legislations and their case-law provide the aforementioned requirements and, if the same are clear enough to clarify this matter, we can analyze once again the German, Dutch and United Kingdom ("UK") domestic jurisdictions which, according to a comparative research conducted by the European Parliamentary, state the following:

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[38] Cambridge Dictionary. Definition of the word "*person*". Consulted on April 22nd, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/person.
[39] Id. 37.

1) ***Netherlands***. *Copyright Act (Auteurswet)*:

> *"The Copyright Act lacks a definition of the concept 'protected work'. According to established case law and doctrine, to be eligible for copyright protection, a work should:*
> *1) have an individual, original character and have the personal mark of the creator;*
> *2) be perceptible by the senses; and*
> *3) not be mostly aimed at technical effect (in order to distinguish from patent right)"*[40].

2) ***Germany***. *Copyright Act of September 1965*:

> *"While the Copyright Act does not contain a definition of copyright, it describes the content of the protection granted. Copyright protects the author in his intellectual and personal relationships to the work and in respect of the use of the work. It shall also serve to ensure equitable remuneration for the use of the work"*[41].

3) ***United Kingdom***. *Copyright, Designs and Patents Act 1988*:

> *"For copyright to subsist:*
> *– literary, dramatic, musical and artistic works must comply with the criterion of originality, i.e. the work must originate from its author and must not be copied from another work. This does not mean that the work must be the expression of original or inventive thought; the originality required relates to the expression of the thought and is not a subjective test regarding the 'artistic' originality or novelty. The standard of originality is low and depends on the author having created the work through his own skill, judgment and individual effort, and not having copied from other works"*[42]

By analyzing the above, we can state that, the policymakers that drafted the legislations mentioned above, and the courts that have interpreted their provisions, support that, for copyright to subsist over a work at a EU level, it needs to incorporate "*the expression of the thought*", "*the personal mark*" and/or "*the intellectual contribution*" of a human creator.

This idea is supported by one of the most important legal instruments for the protection of the minimal rights that society must recognize in the benefit of humans as consequence of their mere existence, namely, the Universal Declaration of Humans Rights, which conceive as an inalienable entitlement for

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[40] Copyright in the EU. Salient features of copyright law across the EU Member States. European Parliament. EPRS- European Parliamentary Research Service Comparative Law Library Unit. June, 2018. PE 625.16. Consulted on June 4th, 2019. Available in: http://www.europarl.europa.eu/RegData/etudes/STUD/2018/625126/EPRS_STU(2018)625126_EN.pdf. Page 262.
[41] Ibid, Page 69.
[42] Ibid, Page 382.

all the people, the protection of their creations, within its Article 27 (2), disposition that provides the following:

> *"Article 27*
> *[…]*
> *(2) Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author"*[43].

According to Gervais, Daniel J., the conception of the protection provided in the article mentioned above has a historical background, that leads us to the early 16th century, before the Statue of Anne, period of time in which, the English law, protected publishers, not authors. As consequence of such protection, the author states that publishers achieved *erga omnes* protection, since the importation of foreign books was banned, and the Queen Mary gave the publishers a Charter that allowed them to search and destroy any book printed in contravention of the Statue of proclamation. For this reason, important figures as John Milton and John Locke started a movement to put into an end the publisher's regime, which was considered as a form of censorship, which came to an end with the issuing of the Statue of Anne, which recognized the effort of the authors by granting them rights over their productions (Gervais, 2019)[44].

In this sense, we can reach the conclusion that, for an artwork to be suitable for obtaining copyright protection, it needs to be created by a human, due to the fact that, the conception of an artwork contained in the domestic legislations of the EU Member States, which follows an historical background, is intrinsically related with its human creator, who put his intellectual effort in order to stamp his expression thoughts within the content generated. However, this statement leads us to another fundamental matter that is: when using a computer program to execute an artwork, until what extend the human intervention is needed in order to consider the outcome as the creation of the author (programmer), so that it can attract copyright protection?

B.3) Until what extent does artworks generated by computer programs need to involve human intervention to attract copyright protection?

In order to answer this question, first we need to distinguish the types of works created by computer programs that exist, depending on the degree of human intervention needed to create the output data. According to Jani Mccutcheon, we can find the three following types of works:

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[43] Universal Declarations of Humans Rights. United Nations, 2015. Consulted on June 4th, 2019. Available in: https://www.un.org/en/udhrbook/pdf/udhr_booklet_en_web.pdf. Page 56.

[44] Gervais, Daniel J. The Machine As Author (March 25, 2019). Iowa Law Review, Vol. 105, 2019. Consulted on June 4th, 2019. Available at SSRN: https://ssrn.com/abstract=3359524. Pages 26-27.

- **Computer-assisted works**. – Those which creation process involves a software that is used merely as a tool. "The software does the user's bidding and the user is largely responsible for the form of the work" [45].
- **Autonomously computer-generated works**. – Those which creation process involves a software that will determine the particular form of the output data. "The significance of these methods of production is that while the programmer sets the rules and parameters in which the software operates, the actual form of the output is unpredictable"[46].
- **Partly computer-generated works**. – Those which creation process involves a software that will determine the particular form of some substantial part of the output data, but that at the same time also involves the intellectual contribution of a human. In this works, the program is not a mere tool, since it "significantly fashions the material form of the output"[47] data, however, the program is not autonomous, as some part of the output data will not be completely unpredictable for the programmer (Mccutcheon, 2013).

By analyzing the definitions of the above-mentioned classifications of works created by computer programs, we can state that:

1. Computer-assisted works are suitable for obtaining copyright protection, due to the fact that, the computer software is used as a mere tool, such as a paintbrush, a musical instrument, a pencil or a chisel, that allows the author the fixation of his intellectual creation into a material form, however, such tool does not interferes in any way with the decision making process of the author during the execution of the work. Thus, the outcome would be completely predictable by the user of the program.

   Some examples of this kind of computer programs are Microsoft Word (for literary works), Microsoft Paint (for graphic works), AutoCAD (for architectural plans), Notion 6 (for musical works), etc.

2. Autonomously computer-generated works are not suitable for obtaining copyright protection since, although the programmer may order the computer program to use specific "*data*", "*algorithms*" or "*code*" to execute an artwork, he will not be able to: a) predict the outcome or, b) make free and creative choices to stamp his personal mark or style within the work, during the creation process. Thus, the program will determine, by using all the information collected and analyzed, the patterns found by comparing such data, and the algorithms available within its pre-programmed rules, the specific form of the output data (in this case the artwork), without the need of human intervention.

   This classification of works covers all the A.I. that use advanced "*machine-learning*" programs, that do not let the programmer or user to participate during the creation process of a work. This is because, the

[45] Mccutcheon, Jani. (2013). The vanishing author in computer-generated works: A critical analysis of recent Australian case law. Melbourne University Law Review. 36. 915-969. Consulted on June 4th, 2019. Available in: https://www.researchgate.net/publication/289409001_The_vanishing_author_in_computer-generated_works_A_critical_analysis_of_recent_Australian_case_law. Page 929.
[46] Ibid, page 929-930.
[47] Ibid, page 932.

programmer or the user will never be able to: 1) predict or anticipate the outcome reached by the program, as he does not have any idea of which data, patterns or algorithms would be used and how they are going to be used by the software, and 2) take free and creative choices during the creation process, as the program does not allow the human participation.

In this sense, it is important to mention that, although the users or programmers insert some starter "*labeled data*", "*algorithms*", "*code*" or "*instructions*", the programs will apply the experience gained autonomously from: a) previously resolved tasks, and b) the comparison of the data analyzed (which is not known by the user/programmer), regardless his will, in order to reach a final result. However, such result would be achieved without letting the programmer or the user to be part of the problem-solution process.

Some examples of this kind of A.I.'s programs are the ones used as example throughout this work, namely, The Next Rembrandt Project, RACTER, AIVA, XiaoIce and AI-powered Doodle since, although they required of some initial effort from the programmers in order to collect, analyze and insert some starter data as pre-programmed code, the information would be processed by the A.I. without the need of human intervention, which will cause that the outcome reached is completely unpredictable for the programmers.

3. Partly computer-generated works' suitability for obtaining copyright protection will lay on the degree of human contribution in obtaining the final result, since this will allow the programmer or the user to predict, at a certain degree, the final outcome reached by the program.

   This human contribution, according to Mccutcheon, can be detected by referring to the source (or input data) used by the computer program since, if it uses an incomplete artwork of a human author in order to "finish" or "polish" it, the intellectual effort of the author would be detectable within the ultimate result. An example of this kind of programs, provided by Mccutcheon, is "**Band-in-a-box**", which let the user "type the chords for any song using standard chord symbols…, choose the style" [48], and then, "it automatically generates a complete professional-quality arrangement"[49]. Thus, the result achieved by using this program would be predictable by the user, who chose the musical notes and the style to be applied by the program to produce the song, although he does not participate within the "modification process" of the work.

   These A.I's programs would use their machine-learning programs in order to produce new data, that could be applied to the unfinished artworks logged by the users, so that they can improve on the work by adding or eliminating small details that are not in "harmony" with the general composition or structure of the artwork. This would be determined by analyzing the patterns found in previous works, which

[48] Unknown. PG music. Band-in-a-box. Consulted on June 4th, 2019. Available in: https://www.pgmusic.com/.
[49] Ibid.

have a similar composition or style than the artworks that need to be improved.

On the other hand, there are others A.I.' programs, which allow the user participation within the "creation" or "modification" process of a work, such as the one called "**Amper**". This program allows the user to make music "that fits the exact style, length, and structure"[50] he wants. In other words, such A.I. does not composes the music automatically and autonomously or fixes it without the users intervention, since it allows them to have "full control to shape the output"[51] data, which means that they participate within every stage of the "creation" or "modification" process of the song.

These kind of A.I.'s programs will use, during the creation process of a work, its machine-learning process to produce new data, such as combinations of rhythms, musical compasses, tones, styles, techniques, etc. This in order to provide the user with several alternatives, so that he can choose the options he considers more suitable, within the creation or modification process, in an attempt to combine them, and thus, create an artwork that bears his personal mark.

However, in order to assess if the artworks generated by this kind of programs can obtain copyright protection, the court would need to determine, by conducting a case-by-case analysis, the degree of human intervention for the execution of the work. This could be measured either by using a quantitatively or qualitatively method. According to Mccutcheon, the former would measure the number of expressive features related to the final form of the work that were determined by the software and the ones that were determined by the user, while the latter, would measure into what extent the program and the user were "controlling the nature of the material form produced"[52] and the percentage of participation that can be attributed to each.

By carrying out such test, with the evidence available, the court would be able to analyze if, the number of expressive features provided by the user (quantity) and/or the percentage of control that he exercised over the material produced (quality) are sufficient enough for considering that the work bears his personal mark, at a certain degree.

In view of the above, we can conclude that: 1) autonomously computer-generated works will not be able to be considered for obtaining copyright protection in any case, 2) computer-assisted works will be able to be considered for obtaining copyright protection in all the cases, and 3) partly computer-generated works will be able to be considered for obtaining copyright protection

[50] Unknown. Amper. Consulted on June 4th, 2019. Available in: https://www.ampermusic.com/?ref=Welcome.AI.
[51] Unknown. Amper. Consulted on June 4th, 2019. Available in: https://www.ampermusic.com/music/.
[52] Mccutcheon, Jani. (2013). The vanishing author in computer-generated works: A critical analysis of recent Australian case law. Melbourne University Law Review. 36. 915-969. Consulted on June 4th, 2019. Available in: https://www.researchgate.net/publication/289409001_The_vanishing_author_in_computer-generated_works_A_critical_analysis_of_recent_Australian_case_law. Page 933.

if the program: a) is used only for polishing an unfinished authorial work, although it does not allows the user to participate within the modification process, or b) lets the user to control the output data to be created, by allowing him to participate during the creation or modification process, and if it can be demonstrated that the participation degree of the user was such that the artwork could be deemed as his creation instead that as a creation of the software. Thus, we can state that, the artworks executed by A.I.'s programs are able to be consider for obtaining copyright protection, as long as they are partly computer-generated.

Coming back to the topic...

Returning to the main question of the present chapter, namely, if the artworks created by A.I.'s programs are protectable under the EU copyright framework. It is crucial to point out that, once the authorship issue is solved, by considering the users or programmers of A.I.'s programs (that create partly computer-generated works) as authors of the creations executed by such. We can now apply the CJEU's two-stage test in order to determine if the artworks produced can or cannot be considered as "authorial works". By applying these criteria, we can reach the conclusion that, partly computer-generated artworks executed by A.I.'s programs, that already passed the test of "certain human intervention degree" mentioned above, could be able to obtain copyright-protection, for the following reasons:

1. The partly computer-generated works that are created by a software that only "adjust", "modify", "polish" or "finish" a work created by a human, could fulfil with the requirements of the test, for the following reasons:

   -*Free choices*

   - The sources (or input data), namely, the unfinished works that pretend to be "improved", "finished" or "adjusted", which could be songs, novels, paintings, architectural plans, etc., will allow their human authors to take free, i.e. "not limited or controlled"[53] choices, when "deciding what they want from two or more things or possibilities"[54]. This because, such unfinished works, are going to be created either by: a) applying traditional techniques for writing, painting, composing, drawing, etc. (*and, after their creation, they would be introduced into a software in a "machine-readable form" or by using a "perception system", so that software can process that data in order to "improve", "polish" or "finish" the work*), or b) using computer programs as mere tools (computer-assisted works). Thus, such creation processes are just constrained to the scope of musical notes, painting techniques, words, shapes, colors, etc. that exist, and that can be reproduced by the tools used, therefore, the authors can take any free and possible decision within such margin.

[53] Cambridge Dictionary. Definition of the word "*free*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/free.
[54] Cambridge Dictionary. Definition of the word "*choose*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/choose.

The perfect examples for these two situations would be: i) typing the musical chords of the created song into a program, such as Band-in-a-box (*machine-readable form*), or ii) recording the sound generated while playing a musical instrument by using a software that can transcribe the sounds into an electronic musical sheet, such as **ScoreCloud**[55] (*perception system*).

- Furthermore, the conclusion reached throughout the present thesis, namely, that computer-generated works need the intervention at a certain degree of humans, so that they can incorporate "*the expression of the thought*", "*the personal mark*" and/or "*the intellectual contribution*" of a human and, thus, be eligible for obtaining copyright-protection, is not contradictory with the fact that, such programs, can take free choices.

  This is because, as it was explained in the introduction, the aim of A.I. programs is to imitate human behavior. Thus, they are going to use the "*labeled data*" or the "*data obtain from external sources*", which show the systems how to solve a determined problem, to imitate human reasoning. Then, they will choose from thousands (*maybe millions*) of options, in a logical way, what elements of the provided work they will "remove", "adjust", "polish" or "eliminate", and what elements they will "add", by using the data obtained by running their machine-learning systems, when comparing such work with others of the same genre.

  In this sense, the programs will be able to choose, within the thousands of variables found when running their machine-learning process, the best logical option available to "fix" or "finish" the work. Therefore, the decision-making process will be constrained to the available data in the internal and external sources analyzed, however, the existence of such restriction does not mean that a free choice cannot be taken within such margin.

-*Creative choices*

- The sources (or input data), namely, the unfinished works that pretend to be "improved", "finished" or "adjusted", which could be songs, novels, paintings, architectural plans, etc., will allow their human authors to take creative choices. This because, if they create such works by either using traditional means or computer-assisted programs, they will have the opportunity "to make something new or imaginative" [56], as the number of alternatives available will only be constrained by the musical notes, painting techniques, words, tones, compasses, shapes, colors, etc. that exist in the real world, or that can be reproduced by the tools used for its execution (*e.g. musical instrument*).

[55] ScoreCloud. Consulted on June 5th, 2019. Available in: https://scorecloud.com/.
[56] Cambridge Dictionary. Definition of the word "*creativity*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/creativity.

However, a case-by-case analysis must be conducted in order to asses if, the executed work (*output data*), is different to other previously executed works (*in case of copyright infringement procedures*).

- Moreover, the "amendments" that the programs make to the works logged by the users could be considered as creative choices. This because, they are the result obtained from combining the information and patterns found when running their machine-learning processes over the works logged by the users with other works of the same genre. Thus, such changes or amendments could be deemed as "new", namely, "recently created"[57] and "imaginative", i.e. "new original and clever"[58] subject-matter, if there are no other of the same kind or, even if they already exist, if they were applied on a different way or over an unexpected style of song, paint, novel, etc.

  Furthermore, it is highly probable that, the amendments to be created by the program are original in a teleological way, that is to say, that they are "the first one made and not a copy"[59], since: a) by analyzing and comparing the data collected they will determine what already exist and what does not in the external and internal sources of data used, and b) the final material will be created by using the elements found in the analyzed data on a different way, so that the result when applying them to the work to be improved is not the same or similar to the pre-existing subject-matter.

- *Degree of exploitation of the free and creative choices to stamp the author's personal mark.*

  - The unfinished works that pretend to be "improved", "finished" or "adjusted", would allow the author to exploit the free and creative choices, as they would be executed by using traditional methods or computer-assisted programs, which are not restrained by any rules that could prevent the author for taking free and creative decisions. In order to determine the extent in which the scope of free choices was exploited by the author, a case-by-case analysis must be conducted, so that the court can assess the expressive contributions made by the author.

  - A.I.'s programs that are used to "finish", "polish" or "improve" artworks would not allow the user to take any free or creative choice, due to the fact that, the ones that exist until now, like Band-in-a-box, do not allow the intervention of the user within the "modification" process, thus, the results would only depend

[57] Cambridge Dictionary. Definition of the word "*new*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/new.
[58] Cambridge Dictionary. Definition of the word "*imaginative*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/imaginative.
[59] Cambridge Dictionary. Definition of the word "*original*". Consulted on June 8th, 2019. Available in: https://dictionary.cambridge.org/us/dictionary/english/original.

on the information selected by the machine-learning process of the A.I. Notwithstanding the foregoing, this does not mean that the artworks resulting from the use of such programs are not suitable for obtaining copyright protection, as the "free and creative choices" could have been taken by the authors, before using such programs, so that the results will bear their personal mark.

2. The partly computer-generated works created by a software that allow the users' participation within the "creation" or "modification" process of a work, could also fulfil with the requirements of the test, for the following reasons:

-*Free choices*

- If the users use this type of programs to "modify", "finish" or "polish" a previous artwork, which was executed by traditional means, they would not find any transcendent restrain. This because, as the programs analyzed in the previous number, they would only be used for "polishing" or "finishing" a work that already allowed to take free choices, which are only restrained to by the musical notes, painting techniques, words, tones, compasses, shapes, colors, etc. that exist in the real world, or that can be reproduced by the tools used for its execution. The only difference is that, this kind of programs, would also allow the user to participate within the modification or creation process, so that, the "amendments" carried out or the artwork executed would be also considered as a result of the free decisions taken by the author, who is choosing, within thousands of options provided by the software, the elements to be implemented, eliminated, polished or created.

- On the other hand, the programs will also be able to choose, within the thousands of variables found when running their machine-learning process, the best logical options available for fixing or finishing the work. In this sense, it is important to mention that, although the program is not making the final decision of what to fix or finish, and how to do it, in an autonomous and automatically way, it is choosing from thousands of options available in order provide the user with the most suitable elements for polishing, finishing or creating the work. Therefore, the decision-making process will be constrained to the available data in the internal and external sources analyzed, however, the existence of such restriction does not mean that a free choice cannot be taken within such margin.

-*Creative choices*

- If the program is just used for modifying or finishing a previously artwork created by a human, the same arguments that were provided for the first kind of software's would apply, with the only difference that the authors would be able to take creative choices, by selecting, arranging and, later on, applying the information provided by the software to their artworks. This

small difference is of grand importance, due to the fact that, according to the intellectual conception that the author has of the work that he wants to create, he will choose from all the options provided by the software, so he can stamp his personal mark or style.

Furthermore, it is important to point out that, although the software provides all the users with some starter options for the creation of a work, depending on the style that wants to be reproduce (e.g. jazz rhythms), that would be the same for all users, if they start from cero. It will be hard that two independent users achieve the same result, as they will take creative choices during the creation process of the work, that would exclusively depend on their conception of the final work.

- Moreover, the options of the elements to be "fixed", "added" or "created" provided by the software to the user, can also be taken as creative choices, if there are no other elements of the same kind or, even if they already exist, if they pretend to be applied on a different way or over an unexpected style of song, paint, novel, etc.

- *Degree of exploitation of the free and creative choices to stamp the author's personal mark.*

  - As this kind of programs allow the user intervention in every stage of the "creation" or "modification" process of the work, the user will be able to take creative free and creative choices, by selecting the elements suggested by the program that he wants to "add" to his work, depending on the intellectual conception that he has of the work to be executed.

    Notwithstanding the foregoing, to determine the extent in which the scope of free choices was exploited by the author, a case-by-case analysis must be conducted, so that the court can assess the expressive contributions made by the author. This because, if the author used the program to create an artwork, but he only chose between alternatives provided by the software that, at the end, were combined automatically, the court must assess if, such contribution, is expressive enough to bear the personal mark or style of the author.

    Following this idea, we can state that, even if the artwork is created by only choosing elements from the possible options provided by the software, it will be expressive enough to bear the authors' personal mark, as it is almost impossible that two different people, by using the same program, will take exactly the same decisions to reach the same outcome. This becomes more and more difficult depending on the program's complexity, since if it allows the user to make several arrangements on specified components, such as rhythms, compasses, colors, sizes, shapes, musical notes, sounds, duration, techniques, etc. the combinations to be achieved

would be limitless, thus, encountering two similar outcomes would be difficult.

Considering the above, it is clear that, if the result, i.e. the partly computer-generated artwork executed by an A.I.'s program passes the CJEU's two-stage test to be considered as an "authorial work", it would be subject to copyright protection under the legal framework of the EU.

Chapter III.-

C. Which exclusive rights are involved in the creation process of artworks carried out by A.I.'s programs?

As mentioned before, in order to achieve a result, A.I.'s programs must collect and analyze a large amount of data from internal (human pre-programmed information) and external sources (such as Internet), which in some cases involve copyright-protectable contents. Most of the times, such data is collected by making a digital copy of the content, without obtaining the prior authorization of the copyright holders whose artworks are being processed and copied. For this reason, the process of creation of artworks carried out by A.I.'s programs sometimes could interfere with the rights conferred to the authors by the copyrights of the artworks which are being collected and analyzed, such as the reproduction right. However, in practice, it is quite difficult to detect which rights are involved, as the A.I. need to analyze thousands (probably millions) of sources of information, which are generally not disclosed to the general public.

By the above, in order to determine if the collection and analysis of data carried out by a certain A.I.'s program interfere with the rights conferred by the copyrights of the works that are being used during the machine-learning process, first we must have a clear idea of: 1) what these exclusive rights are, and 2) which requirements or circumstances need to be fulfilled in order to trigger the exercise of such rights, as it is done below:

- **The reproduction right**. – According to Justine Pila and Paul Torremans, this right cover any: "(a) direct or indirect act (b) of temporary or permanent reproduction (c) by any means and in any form (d) of any authorial work or related rights subject-matter (e) in whole or in part (f) that is not exempted by Article 5(1) Information Society Directive"[60]. This right is provided by Article 2 of the Information Society Directive, which transcription is detailed as follows:

  > *"Article 2*
  > *Reproduction right*
  >
  > *Member States shall provide for the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part:*
  >
  > *(a) for authors, of their works…"*[61].

[60] Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 299.
[61] Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22 May 2001. Consulted on April 7th, 2019. Available in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0029&from=EN.

-The direct and indirect acts mentioned above refer to reproductions, that is to say, "the processes of copying something"[62], which are conducted by 'people who have direct or indirect access to the artwork' (Pila and Torremans, 2016). For example, the 3D scanning of paintings, as done in The Next Rembrandts Project, is an example of direct reproduction, while producing a painting according to a person's description of a landscape or an object could be considered as an indirect act of reproduction.

In this sense, if an A.I.'s program, in order to collect and analyze the data needed to achieve its final purpose, has direct or indirect access to a copyright-protected work when running its machine-learning process, it would fulfill with the requirement (a) of the reproduction right detailed above.

Notwithstanding the above, we need to mention that A.I.'s programs will have a direct access to the copyright works in most of the cases, since they need to generate a digital copy of the information contained in the artworks to be analyzed, which in several cases is available in machine-readable form through electronic files stored in electronic databases, such as ebooks[63], MP3[64] and JPEG's[65] files.

Moreover, it is important to point out that, A.I.'s programs that use "*perception systems*", need to transform the data perceived from the real world obtained by special hardware to machine-readable data, that is to say, in a binary code, so that information could be properly processed. Thus, all the information collected and analyzed by A.I.'s programs involve its direct reproduction, since they create electronic copies of such information by using binary codes which, when are read by a computer program, allow the reproduction of the artworks as they were created by their authors.

- The requirement (b) of the reproduction right definition detailed above, alludes to permanent and temporary acts of reproduction. The former are defined as 'copies that in order to be destroyed need the human intervention'[66], while, the latter are defined as 'copies that are automatically destroyed, without human intervention' (Pila and Torremans, 2016)[67].

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[62] Cambridge Dictionary. Definition of the word "*reproduction*". Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/reproduction.

[63] "*Ebook*". – "*An electronic book which can be read on a small personal computer*". Cambridge Dictionary. Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/ebook?q=ebooks.

[64] "MP3".- *"A type of computer file that stores high-quality sound in a small amount of space, or the technology that makes this possible".* Cambridge Dictionary. Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/mp3.

[65] *"JPEG".- "A type of computer file that contains pictures or photographs".* Cambridge Dictionary. Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/jpeg?q=JPEG.

[66] Id. 41. Page 300.

[67] Ibid.

By the above, each machine-learning process carried out by an A.I.'s program needs to be analyzed on a case-by-case in order to determine if the copies of the copyright-protected works created by the program are destroyed automatically without the need of human intervention once the information needed from it is obtained or, if for its destruction, a human act needs to be performed, which if is not carried out, generates a permanent storage of the copyright-protected content. Although this is a rule of thumb, since the actual requirements for a temporary act to be considered exempted from infringing the reproduction right of an author, are provided in Article 5 (1) of the Information Society Directive, its mention is enough for the purposes of this chapter, namely, for defining the reproduction right, as the requirements for the exemption to apply will be analyzed in the next chapter.

-Regarding the requirement (c) of the reproduction right definition mentioned above, it is important to mention that, in order to obstruct or interfere with such right, the copy generated by the A.I.'s program of a copyright-protected work could be done by any media and in any dimension. In order to clarify the terms "different media and/or different dimensions", we could refer to the *Case C-419/13 Art & All posters International BV v Stichting Pictoright EU:C:2015:27*, in which the CJEU, through the issue of a preliminary ruling held that: "the rule of exhaustion of the distribution right set out in Article 4(2) of Directive 2001/29 does not apply in a situation where a reproduction of a protected work, after having been marketed in the European Union with the copyright holder's consent, has undergone an alteration of its medium, such as the transfer of that reproduction from a paper poster onto a canvas, and is placed on the market again in its new form"[68].

Following the criteria applied by the Court on the case mentioned above, it does not matter if the A.I.'s program, by using a perception system, such as the scanning of the Rembrandt's paintings, changes the medium of the copyright-protected works (in that case canvas) legally obtained into a digital form (JPEG files), since it would be still reproducing the intellectual creation of the corresponding author on a different medium to the one in which the artworks were legally acquired (if this is the case).

- The requirement (d) of the reproduction right definition detailed above, refers to the fact that, the data reproduced or copied by the A.I.'s programs, must belong to a type of subject-matter that could be protected under the copyright legal framework, namely, authorial works such as literary works, songs, sculptures, paintings, and other expressive subject-matter as phonograms, films, databases, broadcasts and performances.

In this sense, if the data reproduced by the A.I.'s program is not contemplated as a protectable subject-matter under a copyright domestic legislation, generating an electronic copy of such content would not be deemed as an act of reproduction within the territory of that EU Member State. A clear example of this scenario could be that an A.I.'s program

[68] Case C-419/13 Art & All posters International BV v Stichting Pictoright EU:C:2015:27. InfoCuria. Consulted on April 7th, 2019. Available in: http://curia.europa.eu/juris/document/document.jsf?docid=161609&doclang=EN.

created and executed within a jurisdiction in which perfumes are not protectable under the copyright legal framework, such as in France (*case: Bsiri-Barbir v Haarmann [2006] ECDR 28*), makes a digital copy of the process or the technical elements for creating a perfume, in which case, such action would not have any repercussion on the copyrights that a third party has over such process in another country, within the jurisdiction of the country that does not recognize perfumes as a protectable subject-matter. However, creating that copy by an A.I.'s program created and executed in other jurisdiction, such as in the Netherlands, could be considered as an act of reproduction for copyright infringement purposes, due to the fact that perfumes constitute a protectable subject-matter under the copyright domestic legislation (case: Kecofa v Lâncome [2006] ECDR 26).

-Regarding the requirement (e) of the reproduction right definition mentioned above, it must be analyzed if the A.I.'s program copied the whole elements of a protected artwork, that is to say, the artwork as it is, or if it copied just some small pieces or elements of the same.

The difference between copying the whole artwork and copying some elements of it is that, in the first one, the action of copying will be automatically deemed as a reproduction act for copyright infringement purposes, while in the second one, a case-by-case analysis must be conducted in order to determine if the copied elements can be considered as a part of the artwork that "express the intellectual creation of its author", in which case they will be relevant for copyright infringement purposes as stated on the Case C-5/08 Infopaq International A/S v Danske Dagblades Forening [2009] ECR I-6569 (Pila and Torremans, 2016)[69].

In consequence, A.I.'s programs can, without any risk of liability, copy and use all the parts of copyright-protected works that do not reproduce the personal mark of their intellectual creator, which are classified as "non-literal elements of the work". This because such elements are not deemed protected under the copyright framework, as they are mere ideas, thus, they belong to the commons and hence, they can be used by all the people as part of exercising their freedom of expression rights.

The above is reinforced by The Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS"), which in its Article 9 (2) states the following:

> *"Article 9*
> *Relation to the Berne Convention*
> *1. Members shall comply with Articles 1 through 21 of the Berne Convention (1971) and the Appendix thereto. However, Members shall not have rights or obligations under this Agreement in respect of the rights conferred under Article 6bis of that Convention or of the rights derived therefrom.*

[69] Id. 41. Page 302.

2. Copyright protection shall extend to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such"[70].

The Article transcribed above provides that the protection of copyright will extend to the expression of the authors, but it will never comprise ideas, which as detailed before are non-literal elements of the work. Notwithstanding the foregoing, a case-by-case analysis must be done in order to determine if the data copied by the A.I.'s programs is considered as a non-literal elements of the works, due to the fact that some rulings of superior domestic European courts have stated that some type of ideas, such as the plot of a novel, the characters of a novel, the artistic technique of painting, the editing style of a film, etc. (see cases Lara's Daughter [1999] GRUR 984, [2000] IIC (BGH) and Designers Guild Ltd v Russell Williams (Textiles) Ltd [2000] UKHL 58), could be deemed as parts of what gives the works their artistic originality, and thus they will fall under the scope of protection of copyright (Pila and Torremans, 2016)[71].

-The requirement (f) of the reproduction right definition detailed above, states that, in order to deem the use of an artwork by an A.I.'s program as an act of reproduction, it does not have to be exempted by the Article 5(1) of the Information Society Directive, however, this requirement would be analyzed in a separate chapter, which would determine if the use of artworks as a whole or pieces of them, during the machine-learning process of A.I.'s programs, could follow under the "proportionate use" exception.

By the analysis conducted, we can reach the conclusion that, the creation processes carried out by A.I.'s programs to produce original and new artworks can involve a reproduction act, as long as they collect and analyze copyright-protected works, since they need to: 1) have direct access to the artworks to be analyzed, which in most of the cases are copyright-protected subject-matter under EU domestic legislations, and 2) create digital copies of the whole involved artworks or parts of them.

The above becomes clearer if we take the A.I.'s programs used as examples throughout this document, namely, The Next Rembrandt's Project, RACTER, AIVA and AI-powered Doodle, and analyze the following:

- Such A.I.'s programs carried out an analysis of artworks that are no longer under the protection of copyright, due to the fact that, their authors, i.e. Mozart, Beethoven, Bach and Rembrandt died more than 100 years ago, thus, the term of protection under the current EU legal frame work (90 years after the death of the author) has lapsed. For this reason, the collection and analysis of data executed by the A.I.'s program did not involve any risk of infringing third party copyrights.

- Notwithstanding the foregoing, as the A.I.'s programs remain increasing their functionality, efficiency, efficacy and accuracy, they would be used

[70] The Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS"). Morocco, 1994. World Intellectual Property Organization ("WIPO"). Consulted on April 8th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.
[71] Id. 41. Pages 202-303.

in the near future to create artistic works such as literary works, songs, sculptures, paintings, and other expressive subject-matter as phonograms, films, databases, broadcasts and performances. In order to achieve this goal, they will have to start collecting and analyzing recent artistic contents, which most probably would be protected under the copyright legal framework, in order to create new and original content that is susceptible of commercial exploitation.

- In view of the above, the collection of copyright-protected works (by generating digital copies of the same) carried out by A.I.'s programs, will constitute an act of reproduction under the current copyright EU legal framework, as long as the six elements of the definition of the reproduction right detailed before are fulfilled.

- By the above, the owners and/or programmers of the A.I.'s programs that pretend to collect and analyze copyright-protected material , will have to require the express and written consent of the authors of the collected artworks in order to prevent any risk of copyright infringement, unless the reproduction act falls under the exemptions provided by the Article 5(1) of the Information Society Directive.

Based on the analysis conducted throughout this chapter, we can conclude that the processes carried out by A.I.'s programs for the creation of new and original artworks can be related with the reproduction rights that the copyright holders have over the content used (*input data*). In this sense, if the processes carried out by A.I.'s programs to create artworks can involve acts of reproduction of previous copyright-protected works (*input data*), the question of whether there are limitations or exemptions to prevent copyright infringement while committing such acts arises.

Chapter IV.-

D. Is there any limitation or exemption to prevent copyright infringement by the use/analysis of protected artworks carried out by A.I.'s programs in the process of creation of new artworks?

Temporary acts of reproduction

(Mandatory exceptions that each Member State must provide to the reproduction right)

As mentioned in the previous chapter, the definition of the reproduction right contains 6 requirements which must be fulfilled in order to state that there is a reproduction act carried out by a natural person, a legal person or an A.I.'s program. The sixth requirement (*previously mentioned under letter (f)*), underlines that, for an action to be deemed as a temporary reproduction act it does not have to be exempted by the Article 5(1) of the Information Society Directive, which states the following:

> *"Article 5*
> *Exceptions and limitations*
>
> *1. Temporary acts of reproduction referred to in Article 2, which are transient or incidental [and] an integral and essential part of a technological process and whose sole purpose is to enable:*
> *(a) a transmission in a network between third parties by an intermediary, or*
> *(b) a lawful use*
> *of a work or other subject-matter to be made, and which have no independent economic significance, shall be exempted from the reproduction right provided for in Article 2"*[72].

This Article states that, for a temporary act of reproduction to follow under the exception it must fulfill with the following requirements:

1) To be transient or incidental;
2) To be an integral and essential part of a technological process;
3) Whose sole purpose is to enable: i) a transmission in a network between third parties and an intermediary, or ii) a lawful use; and
4) That it does not have an independent economic significance.

Now we need to analyze if, the reproduction acts made by A.I.'s programs which their main purpose is the creation of artworks, can meet the requirements mentioned above.

1) To be transient or incidental

According to Pila and Torremans, the terms 'transient or incidental' referred in the first requirement mentioned above, have been interpreted by the Court as

[72] *Id. 42.*

the ones "requiring an act that is limited in duration to what is necessary for completion of the relevant technological process and deleted automatically (without the need for human intervention) once its function in that process us complete (Infopaq)"[73]. In other words, such terms refer exclusively to temporary reproduction acts.

In this sense, for the first requirement to be fulfilled, a case-by-case analysis must be conducted in order to determine if, 1) the digital copies generated by the A.I.'s programs throughout the process of creation of an artwork, remain stored in the program's database once the purpose is achieved, i.e. after the creation of the new and original work and, 2) if such copies are deleted automatically by the programs' software or if a human act is necessary to delete them. Following this idea, the exception contained in Article 5(1) of the Information Society Directive would only apply to the acts of reproduction that are temporary, that is to say, when the digital copies of the copyright-protected works generated by the A.I.'s programs are automatically erase, once they have achieved their main purpose.

2) To be an integral and essential part of a technological process

Regarding this requirement, in order for the temporary reproduction acts to fall under the exception of Article 5(1) of the Information Society Directive, they must: 1) be "integral", that is to say, "necessary and important as a part of a whole"[74], and "essential", which means "necessary or needed"[75], and 2) contribute for the proper function of a process, namely, a set of 'actions taken in order to achieve a result'[76] related to the technology, that is the 'practical use of scientific discoveries'[77].

Following this idea, we can state that, when talking about A.I.'s programs, this requirement would be fulfilled, since they need to collect the copyright-protected works and analyze them, in order to find patterns between them, by applying special algorithms, which they will use to achieve their final purpose, namely, the creation of new and original artworks. Thus, the reproduction of the copyright-protected works, by the creation of digital copies, is an "integral" and "essential" part of a technological process, which is the collection, analysis and creation of a new artwork conducted by a computer program.

3) Whose sole purpose is to enable: i) a transmission in a network between third parties and an intermediary, or ii) a lawful use

This requirement has two different ways of being fulfilled, namely, 1) when there is a transmission, that is "the process of broadcasting something

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[73] *Id. 41. Page 305.*
[74] Cambridge Dictionary. Definition of the word "*integral*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/integral.
[75] Cambridge Dictionary. Definition of the word "*essential*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/essential.
[76] Cambridge Dictionary. Definition of the word "*process*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/process.
[77] Cambridge Dictionary. Definition of the word "*technology*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/technology.

by radio, television, etc."[78], between third parties and an intermediate, and 2) when a lawful use of the copyright artworks is made. The former definitely does not occur during the creation processes of artworks carried out by A.I.'s programs, since they collect and analyze the data (that could include copyright-protected works) in order to create other works different to the compared data, but do not involve any communication of such content to any third parties, by any network.

On the other hand, in order to see if the latter is fulfilled, namely, if the use of the protected works by the A.I.'s program (namely, the collection and analysis) could be qualified as "lawful", first we need to determine what does the "lawful use" term contained in Article 5(1)(b) of the Information Society Directive means. In this sense, it is important to mention that, the last sentence of Recital 33 of the preamble to Directive 2001/29 states the following: *"…A use should be considered lawful where it is authorized by the rightsholder or not restricted by law"*[79]. Considering the policymakers' general preamble, the Third Chamber, through the case: *C-302/10 Infopaq International A/S v Danske Dagblades Forening*, interpreted the term "lawful use", as detailed below:

- "When the acts of reproduction are not intended to enable a transmission in a network between third parties by an intermediary, the analysis must fall into whether the sole purpose of those acts is to enable the lawful use of a protected work or a protected subject-matter.
- As stated by Recital 33 in the preamble to Directive 2001/29, a use should be considered lawful where it is authorized by the right holder or where it is not restricted by the applicable legislation.
- In the present case, it should be noted that printing the extract of 11 words, the creation of the TIFF file and the creation of a final summary of the newspaper articles, do not intend to enable another use.
- In respect of the lawful or unlawful character of the use, it is not disputed that the drafting of a summary of newspaper articles is not, in the present case, authorized by the holders of the copyright over these articles. However, it should be noted that such an activity is not restricted by European Union legislation.
- In those circumstances, that use cannot be considered to be unlawful.
- In view of the foregoing, Article 5(1) of Directive 2001/29 must be interpreted as meaning that the acts of temporary reproduction carried out during a data capture process, such as those in issue in the main proceedings, fulfill the condition that those acts must pursue a sole purpose, namely the lawful use of a protected work or a protected subject-matter"[80].

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[78] Cambridge Dictionary. Definition of the word "*transmission*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/transmission.

[79] Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22 May 2001. Consulted on April 23rd, 2019. Available in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0029&from=EN

[80] Case C-302/10 Infopaq International A/S v Danske Dagblades Forening. InfoCuria. Consulted on April 23rd, 2019. Available in: http://curia.europa.eu/juris/document/document.jsf?text=&docid=118441&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=3795150.

In view of the above, we can conclude that the term "lawful use" refer to an activity authorized by the holders of the copyright or, in absence of such authorization, to any use of the artwork for a data capture and analysis process that is not restricted by the EU legislation. Furthermore, such activity must: a) fulfill with the requirements stated on Article 5 (5) of the Information Society Directive, namely, 1) to do not conflict with the normal exploitation of the work and, 2) to do not unreasonably prejudice the legitimate interests of the rightsholder, and b) not have an independent economic significance.

Applying the interpretation of "lawful use" mentioned above, we can state that, the collection and analysis of copyright-protected works carried out by A.I.' programs, during their creation processes for executing new, original and creative artworks, are activities that fall under the limitation provided in Article 5(1) of the Information Society Directive, as long as they fulfill with the following requirements:

1) The digital copies of copyright-protected works carried out by A.I.'s programs must be made from content that was legally acquired. For example, if the A.I. has as main purpose to create new songs, all the songs to be collected and analyzed for the creation process of a new work need to be either: i) purchased in an authorized commercial establishment or electronic platform or, ii) obtained from a public source through which, the author of the copyright-protected work to be collected and analyzed, communicated to the public his/her work for free.

2) The digital copies made must be transient or incidental, which means they should be deleted automatically by the programs' software once it has analyzed the copyright-protected works, without the need of a human intervention act. This requirement would determine if the act of reproduction is temporal or permanent, and only temporary acts can fall under the exception/limitation that is being analyzed.

3) The digital copies made by the A.I.'s program must be necessary and essential in the process for the execution of a new, original and creative artwork. Requirement that is fulfilled if the A.I.'s program has as main task the comparison of copyright-protected works for creating a different work belonging to the same category, due to the fact that, without such content, the program cannot achieve its main purpose.

4) The collection and analysis of the copyright-protected works by A.I.'s programs must not be restricted by the EU legislation or the EU Member States domestic legislations. This requirement is completely fulfilled when talking about A.I.'s programs which purpose is the creation of artworks, due to the fact that, the collection and analysis of information that was legally obtained is part of the rights to access information and freedom of expression.

5) The collection and analysis of the artworks carried out by A.I.'s programs must not conflict with the normal exploitation of the work. This requirement is also fulfilled, since the mere collection and analysis of an artwork would never interfere with the commercial exploitation of the work, as the artwork is not being communicated to the public or placed into the market, without the authorization of the respective author.

6) The collection and analysis of the artworks carried out by A.I.'s programs must not unreasonably prejudice the legitimate interests of their authors. This requirement is also fulfilled, due to the fact that, the copyright-protected work is not: a) being communicated to the public, b) being placed on the market, or c) being modified or altered in any way, thus the moral and economic rights of the authors do not suffer any damage.

7) The collection and analysis of the artworks carried out by A.I.'s programs must not have an independent economic significance. This requirement is fulfilled, since the digital copy made by the A.I.'s programs would be used for detecting patterns and finding not existing art combinations that could be reproduced in the new subject-matter to be created. Thus, the objective of the A.I.'s programs mentioned throughout this work is not to obtain an economic benefit from the use or alteration of pre-existing copyright-protectable works, but rather to create a new work completely different that could be exploited for generating profit.

In conclusion, if the collection and analysis of copyright-protected works (*input data*) carried out by A.I.'s programs can be qualified as temporary acts of reproduction, and fulfill with the requirements described above, they would fall under the limitation or exception provided in Article 5(1)(b) of the Information Society Directive. Thus, such acts of reproduction would be considered as "lawful uses" which could not be taken into consideration within a copyright infringement action.

Permanent acts of reproduction

(Non-mandatory exceptions that each Member State may in its discretion provide to the reproduction right)

According to the Article 9 of the Berne Convention, the EU Member States, at their sole discretion, can allow through their domestic legislations the reproduction of copyright-protected works by third parties, without these being at risk of infringing the rights of the authors, in special cases, provided that the reproduction does not hinder the regular exploitation of the works and does not unreasonably prejudice the legitimate interests of the authors. The Article mentioned above is transcribed as follows, for a quick reference:

> *"Article 9*
> *[…]*
> *(2) It shall be a matter for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author"*[81].

[81] Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention"). December, 1887. World Intellectual Property Organization ("WIPO"). Consulted on April 24th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=283698

The set of special cases in which the reproduction right is limited in each EU Member State, can be taken as "comprising an EU 'proportionate use' exception, corresponding to the 'fair use' exception of other jurisdictions"[82]. Furthermore, this set also contains the permanent acts of reproduction that are allowed by EU Member States, which harm the copyrights of authors to some degree, in order to ensure other rights of the society, namely, freedom of expression, education, respect for private life, freedom of thought and access to information.

Although EU Member States have the discretion for pointing out certain permanent reproduction acts as exceptions, through their domestic legislations, Article 5 (2) and (3) of the Information Society Directive lays down the institutions and the specific purposes to which such acts can be applied. They are detailed as follows:

Institutions:

1) 'Acts made by publicly accessible libraries, educational establishments, museums or archives, which are not for direct or indirect economic advantage;
2) Ephemeral recordings made by broadcasting organizations by means of their own facilities; and the preservation of these recordings in official archives; and
3) Reproductions of broadcasts made by social institutions pursuing non-commercial purposes (i.e. hospitals or prisons), on condition that the rightsholders receive fair compensation'[83].

Purposes:

a) 'Reproductions on paper or other similar medium, effected by the use of any kind of photographic technique;
b) Private use made by natural persons for non-commercial ends;
c) Illustration for teaching or scientific research;
d) Benefit of disabled persons;
e) Publishing articles on current economic, political or religious topics, or in connection with reporting a current event;
f) Quotations for criticism or review;
g) Public security or to ensure proper performance of administrative or judicial procedures;
h) Political speeches;
i) Religious celebrations;
j) Advertising the public exhibition or sale of artistic works;
k) Caricature, parody or pastiche;
l) Demonstration or repair of equipment; and
m) Communication for research or private study'[84].

[82] Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 330.
[83] Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22 May 2001. Consulted on April 25th, 2019. Available in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0029&from=EN.
[84] Ibid.

In this sense, we can state that, nowadays, the reproduction acts carried out by A.I.'s programs which purpose is the creation of artworks, could only fall within the exception of "private use made by natural persons for non-commercial ends". This because, the A.I.'s programs whose purpose is the creation of artistic works cannot be classified within the other limitations provided by Article 5 (2) and (3) of the Information Society Directive, due to the fact that, until now, 1) they have not being created, improved or used by the institutions mentioned within the provision, i.e. libraries, educational establishments, museums, public archives, broadcasting organizations or social institutions, and 2) they have not being used for teaching, scientific research, benefit of disabled people, journalism, criticism, public security, parody or repair of equipment, however, this may change in the near future.

By the above, we need to analyze if the exception of "private use for non-commercial ends" (also known as "private copying"), could apply when A.I.'s programs create digital copies of copyright-protected works and store them on a permanent basis.

In view of the above, first, we need to analyze the purpose of the private use exception. Such exception allows the owner of an original artwork or an original copy of it (*distributed by the author or the owner of the economic rights over the work*) to make a reproduction of the same, on any medium, for private ends. Attending to the meaning of the word "private", the use of such copy must be used only by one person or a group, and not by everyone[85]. This definition, in the field of copyright, must be related to the person, or group of persons, that were authorized by the author, in terms of the acquisition of the work, to use or to have access to the expressive material of the same. For this reason, the private use must be deemed to involve any reproduction of the artwork that allows the user: 1) the conservation of the work (*e.g. if the book is in bad conditions, the user can make photocopies of the same for being able to access to its contents*), or 2) the enjoyment of the work in other medium (*e.g. a song contained in a CD is transferred to the computer in a MP3 file, for the user to have access to it by other mediums*).

Following the above, it seems difficult that the private use exception could be applicable for A.I.'s programs, since the digital copies made by such, of copyright-protected material, would not pursuit any of the aims detailed above, as they would be used only for conducting a deep analysis over their expressive and non-literal elements, to contribute with the knowledge gain by such programs, when carrying on their machine-learning processes.

Parting from this line of argumentation, the private use exception would not be suitable for being applied to the digital copies made by A.I.'s programs, as they serve to different purposes to the ones used as rationale for the creation of the exception. Moreover, it is important to say that, even if an argument is found so that the purposes of generating digital copies for its analysis by A.I.'s programs fit under the term "private use", several upcoming challenges would be faced, as the ones detailed below:

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[85] "Private".- Only for one person or group and not for everyone. Cambridge Dictionary. Consulted on June 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/private.

1. If the programmer could be deemed as a "natural person" for the purposes of the exception, as they generally would be carrying out an economic activity (*by themselves or by an employee-employer relationship*):
2. If such activity would be some way considered to be related "directly" or "indirectly" with the exploitation of the expressive and non-literal elements of the artwork that is being copied;
3. If the artwork was lawfully acquired (*see case C-435/ 12 ACI Adam BV v Stichting de Thuiskopie EU:C:2014:254*);
4. If an obligation to pay a fair compensation would arise, which would depend on: a) the possible harm that could be generated to the author's rights, b) if such harm is considered to be minimal or not (*see Recital 35 of the Information Society Directive*), and c) if the author has previously received a payment for the use of his works.

In view of the above, we can conclude that, as the institutions and the specific purposes lay down on Article 5 (2) and (3) of the Information Society Directive, cannot be applied for the permanent acts of reproduction carried out by A.I.'s programs, namely, storing digital copies of artworks within the software and hardware of the system, on a permanent basis, such acts would infringe the copyrights owned by the authors of the works that are being collected and analyzed, at a certain degree.

Conclusion

Nowadays, technology corporations are focused on developing complex computer systems, whose main purpose is the imitation of human cognitive processes, that can provide efficient solutions to current social, political, scientific and economic problems. This type of computer systems is what we call "artificial intelligence", which use "supervise" or "unsupervised" machine-learning programs that allow them to learn and improve with every problem-solution process conducted, so they can later create a model to predict outcomes or solve problems set out by the programmers.

These A.I.'s programs combine their "supervise" or "unsupervised" machine-learning programs with "expert", "perception" or "natural-language" systems in order to collect data from machine-readable sources (e.g. databases) or from the real world (using a special hardware), analyze it, find patterns on it and, later on, use the data gathered and created to solve a determined problem, by applying a specific algorithm.

In particular, the use of A.I.'s programs has transcended to the field of "*artistic expression*", since now they are being used in order to collect and analyze artistic data from art works, such as songs, lyrics, paintings, photographs, sculptures, novels, etc. By doing so, they can find patterns within the same, i.e. technique, general composition of the work, elements reproduced, style, language used, plot created, rhythm, etc. and then, use the obtained data to execute a new outcome, namely, the creation of a new, original and creative art work, by applying a specific algorithm determined by the programmer. Some examples of this phenomena are the A.I.'s programs The Next Rembrandt's Project, RACTER, AIVA, AI-powered Doodle and XiaoIce.

The artworks created by those kinds of programs face three main issues for obtaining protection under the EU copyright legal framework. The first one is whether or not the domestic laws of the EU Member States, in which the protection is pursued, allow the A.I.'s programs to be recognized as the "authors" of their creations, which is answered in the negative, as although ownership over computer-generated works can be transferred to the programmers in such jurisdictions ("UK"), none of EU Member States jurisdictions allow such programs to be recognized as "authors", since humans are the only beings that can be subject to rights and obligations. The second one is whether or not artworks must be created by humans in order to be eligible for copyright protection, which is answered in positive, as the historical background of copyright protection is related with the human right to be recognized as the author of your creations, thus, they need to bear "*the expression of the thought*", "*the personal mark*" and/or "*the intellectual contribution*" of a human creator. The third one is, until what extent does artworks generated by computer programs need to involve human intervention to be able to attract copyright protection, question that is addressed by classifying the works generated by computer programs into three categories, namely, computer-assisted, autonomously computer-generated and partly computer-generated. By analyzing such categories, we reach the conclusion that, the first ones, will be able to attract copyright protection in all the cases, as the programs are used as mere tools for the creation of the works, the second ones will not be able to attract such protection in any case, as they do not allow the programmer or the user to participate within the creation process, thus,

they will not bear "*the expression of the thought*" of a human creator (*as the ones created by The Next Rembrandt's Project, RACTER, AIVA, AI-powered Doodle and XiaoIce*), and the third ones would be able to attract copyright protection as they involved, into a certain degree, the participation of the human within the creation process.

After detecting the computer-generated works that can attract copyright protection, attention is drawn to the category of partly computer-generated, as there are some A.I.'s programs that allow the execution of such kind of works (*such as Band-in-a-box, Amper and ScoreCloud*). By analyzing such programs, we conclude that, partly computer-generated works will be able to be considered for obtaining copyright protection if the program used for their creation: a) is used only for polishing an unfinished authorial work, although it does not allows the user to participate within the modification process, or b) lets the user to control the output data to be created, by allowing him to participate during the creation or modification process, as long as it can be demonstrated that the participation degree of the users was such that the artworks could be deemed as their creation instead that as creations of the software.

Once that the computer-generated works pass the test mentioned above, we can conduct the CJEU's two-stage test in order to determine if the works produced can or cannot be considered as "authorial works", which basically consist in identifying: "a) if the subject-matter leaves scope for free and creative choices; and b) the extent if any to which that scope has been exploited by the alleged author of the course of creating it such that the work bears her personal mark"[86]. By conducting the analysis, we state that the artworks that are created by software's that: 1) only "adjust", "modify", "polish" or "finish" a work created by a human, and 2) allow the users' participation within the "creation" or "modification" process of a work, will have high probabilities of passing the test and the reasons that support such argument.

Further, an analysis is conducted in order to determine which exclusive rights are involved within the creation process of artworks carried out by A.I.'s programs. During the analysis, we state that A.I.'s programs either will have to create a digital copy of the content in order to have the information in a machine-readable form for its analysis, or will have to receive the description of such works as "input" information provided by the programmer, thus, they would be reproducing the main expressive features and the non-literal elements of the work.

Finally, we analyze if there is any limitation or exemption to prevent copyright infringement by the use/analysis of protected artworks carried out by A.I.'s programs within the creation process of artworks. Which lead us to the conclusion that temporary acts of reproduction could be exempted, if all the legal requirements are met, however, permanent acts of reproduction do not fall into any of the exceptions, thus, they would be considered to infringe the authors' rights of the artworks analyzed.

[86] Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 243.

Bibliography

- "*Algorithm*". - A set of mathematical instructions or rules that, especially, if given to a computer, will help to calculate an answer to a problem". Cambridge Dictionary. Consulted on February 5th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/algorithm.
- "*Ebook*". – "*An electronic book which can be read on a small personal computer*". Cambridge Dictionary. Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/ebook?q=ebooks.
- *"JPEG".-*
"A type of computer file that contains pictures or photographs". Cambridge Dictionary. Consulted on April 7th, 2019. Available in:https://dictionary.cambridge.org/dictionary/english/jpeg?q=JPEG.
- "*Software*". - The instructions that control what a computer does"**.** Cambridge Dictionary. Consulted on May 31st, 2019. Available in:https://dictionary.cambridge.org/es/diccionario/ingles/software.
- [“MP3”.- *“A type of computer file that stores high-quality sound in a small amount of space, or the technology that makes this possible”.*Cambridge Dictionary. Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/mp3.
- [1] Cambridge Dictionary. Definition of the word "*imaginative*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/imaginative.
- Bell, Jason. Machine Learning: Hands-On for Developers and Technical Professionals. John Wiley & Sons, Inc. 2015. Page 2.
- Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention"). December, 1887. World Intellectual Property Organization ("WIPO"). Consulted on April 8th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.
- Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention"). December, 1887. World Intellectual Property Organization ("WIPO"). Consulted on April 24th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=283698
- Butler, Timothy L. Can a Computer be an Author? Copyright Aspects of Artificial Intelligence. HeinOnline. PDF Version. Page 13.
- Cambridge Dictionary. Definition of the word "*choose*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/choose.
- Cambridge Dictionary. Definition of the word "*creativity*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/creativity.
- Cambridge Dictionary. Definition of the word "*essential*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/essential.
- Cambridge Dictionary. Definition of the word "*free*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/free.
- Cambridge Dictionary. Definition of the word "*hardware*". Consulted on February 5th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/hardware.

- Cambridge Dictionary. Definition of the word "*integral*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/integral.
- Cambridge Dictionary. Definition of the word "*new*". Consulted on March 15th, 2019. Available in: https://dictionary.cambridge.org/dictionary/english/new.
- Cambridge Dictionary. Definition of the word "*original*". Consulted on June 8th, 2019. Available in: https://dictionary.cambridge.org/us/dictionary/english/original.
- Cambridge Dictionary. Definition of the word "*person*". Consulted on April 22nd, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/person.
- Cambridge Dictionary. Definition of the word "*process*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/process.
- Cambridge Dictionary. Definition of the word "*reproduction*". Consulted on April 7th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/reproduction.
- Cambridge Dictionary. Definition of the word "*technology*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/technology.
- Cambridge Dictionary. Definition of the word "*transmission*". Consulted on April 8th, 2019. Available in: https://dictionary.cambridge.org/es/diccionario/ingles/transmission.
- Case C-419/13 Art & All posters International BV v Stichting Pictoright EU:C:2015:27. InfoCuria. Consulted on April 7th, 2019. Available in:http://curia.europa.eu/juris/document/document.jsf?docid=161609&doclang=EN.
- Case C-302/10 Infopaq International A/S v Danske Dagblades Forening. InfoCuria. Consulted on April 23rd, 2019. Available in:http://curia.europa.eu/juris/document/document.jsf?text=&docid=118441&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=3795150.
- Copyright Act of 9 September 1965 (Federal Law Gazette I p. 1273), as last amended by Article 1 of the Act of 1 September 2017 (Federal Law Gazette I p. 33). Consulted on April 19th, 2019. Available in: https://www.gesetze-im-internet.de/englisch_urhg/englisch_urhg.pdf
- Copyright in the EU. Salient features of copyright law across the EU Member States. European Parliament. EPRS- European Parliamentary Research Service Comparative Law Library Unit. June, 2018. PE 625.16. Consulted on June 4th, 2019. Available in:http://www.europarl.europa.eu/RegData/etudes/STUD/2018/625126/EPRS_STU(2018)625126_EN.pdf. Page 262.
- Copyright, Designs and Patents Act 1988. Consulted on April 19th, 2019. Available in: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/772818/copyright-designs-and-patents-act-1988.pdf.
- Creation of Copyright Works: The Challenges of Artificial Intelligence. International Review of Law, Computers & Technology. February 22, 2017. Consulted on February 10, 2019. Available

in: https://www.tandfonline.com/doi/full/10.1080/13600869.2017.1275273.
- Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22 May 2001. Consulted on April 7th, 2019. Available in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0029&from=EN.
- Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22 May 2001. Consulted on April 23rd, 2019. Available in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0029&from=EN
- Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society. European Parliament and the Council of 22
- E.C. Jr. Lashbrooke. Legal Reasoning and Artificial Intelligence. Vol 34. 1988. HeinOnline. PDF Version. Page 10 (295).
- Eechoud, Mireille Van. Copyright Act- Auteurswet Unofficial Translation. Consulted on April 19th, 2019. Available in: https://www.ivir.nl/syscontent/pdfs/119.pdf.
- English Oxford Living Dictionaries. Definition of the word "*technology*". Consulted on February 5th, 2019. Available in:https://en.oxforddictionaries.com/definition/technology.
- Gershgorn, Dave. A Microsoft chatbot composes poetry by looking at photographs. August 13th, 2018. Consulted on March 11, 2019. Available in: https://qz.com/1354736/a-microsoft-chatbot-composes-poetry-by-looking-at-photographs/.
- Gervais, Daniel J. The Machine As Author (March 25, 2019). Iowa Law Review, Vol. 105, 2019. Consulted on June 4th, 2019. Available at SSRN: https://ssrn.com/abstract=3359524. Pages 26-27.
- Haanstra, Ben, Augustus, Ron and Dik, Joris. The Next Rembrandt. Can The Great Master Be Brought Back To Create One More Painting? Consulted on February 10, 2019. Available in: https://www.nextrembrandt.com/.
- Jiang Jie, Bianji. First AI-authored collection of poems published in China. People's Daily Online. May 31st, 2017. Consulted on March 11, 2019. Available in: http://en.people.cn/n3/2017/0531/c90000-9222463.html.
- L. Butler, Timothy. Can a Computer be an Author?- Copyright Aspects of Artificial Intelligence. Vol. 4. Comm/Ent L.S. 1981. HeinOnline. PDF Version. Page 10 (715).
- L.W. Sobel, Benjamin. Artificial Intelligence's Fair Use Crisis. 41 Columbia Journal of Law & the Arts. 2017. HeinOnline. PDF Version. Page 15 (58).
- Mccutcheon, Jani. (2013). The vanishing author in computer-generated works: A critical analysis of recent Australian case law. Melbourne University Law Review. 36. 915-969. Consulted on June 4th, 2019. Available in: https://www.researchgate.net/publication/289409001_The_vanishing_author_in_computer-generated_works_A_critical_analysis_of_recent_Australian_case_law. Page 929.
- Mccutcheon, Jani. (2013). The vanishing author in computer-generated works: A critical analysis of recent Australian case law. Melbourne

University Law Review. 36. 915-969. Consulted on June 4th, 2019. Available in: https://www.researchgate.net/publication/289409001_The_vanishing_author_in_computer-generated_works_A_critical_analysis_of_recent_Australian_case_law. Page 933.

- Niebla Zatarain, Jesus Manuel. The Role of Automated Technology in the
- Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 243.
- Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 299.
- Pila, Justine and Torremans, Paul. European Intellectual Property Law. Oxford University Press. 2016. Impression 3. Page 330.
- R.L. Adams. 10 Powerful Examples Of Artificial Intelligence In Use Today. Forbes. January 10, 2017. Consulted on February 10, 2019. Available in: https://www.forbes.com/sites/robertadams/2017/01/10/10-powerful-examples-of-artificial-intelligence-in-use-today/#70df0b78420d.
- ScoreCloud. Consulted on June 5th, 2019. Available in: https://scorecloud.com/.
- Shlomit Yanisky-Ravid. Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era: The Human-like Authors Are Already Here: A New Model. Michigan State Law Review. 2017. HeinOnline. PDF Version. Page 13 (670).
- The Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS"). Morocco, 1994. World Intellectual Property Organization ("WIPO"). Consulted on April 8th, 2019. Available in: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.
- The search for AIVA`s register melodies can be made in the following link: https://www.sacem.fr/en.
- Universal Declarations of Humans Rights. United Nations, 2015. Consulted on June 4th, 2019. Available in: https://www.un.org/en/udhrbook/pdf/udhr_booklet_en_web.pdf. Page 56.
- Unknown Author. Google. 2019. Consulted on March 22, 2019. Available in: https://www.google.com/doodles/celebrating-johann-sebastian-bach.
- Unknown author. Rights reserved to Aiva Technologies, S.A.R.L. Consulted on February 10, 2019. Available in: https://www.aiva.ai/about.
- Unknown. Amper. Consulted on June 4th, 2019. Available in: https://www.ampermusic.com/?ref=Welcome.AI.
- Unknown. Amper. Consulted on June 4th, 2019. Available in: https://www.ampermusic.com/music/.
- Unknown. EU copyright protection of works created by artificial intelligence systems. University of Bergen. June 1st, 2017. Consulted on April 19th, 2019. Available in: http://bora.uib.no/bitstream/handle/1956/16479/JUS399_V17_183.pdf?sequence=1&isAllowed=y.
- Unknown. PG music. Band-in-a-box. Consulted on June 4th, 2019. Available in: https://www.pgmusic.com/.

- WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence. Stanford University. March 25th to 27th, 1991. Page 56. Consulted on March 11, 2019. Available in: ftp://ftp.wipo.int/pub/library/ebooks/wipopublications/wipo_pub_698e.pdf.