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COMPUTER PROGRAMS LEGAL PROTECTION FRAMEWORK WITH SPECIAL REFERENCE TO ARTIFICIAL INTELLIGENCE *CHATGPT***

Summary

Computer programs are protected by copyright both in the comparative law and in the positive law in Serbia. One or more computer programs together with electronic databases make up information systems. With the development of artificial intelligence, a wide range of sophisticated information systems have been created that can, as a rule, create or generate text based on user queries (e.g. ChatGPT). This paper provides a case study related to the generative artificial intelligence ChatGPT. Legal regulation of artificial intelligence-generated products from the aspect of copyright poses a special challenge. In this paper, the author puts a special emphasis on the comparative presentation of the legislation that regulates artificial intelligence from the aspect of copyright, stating the legal theory positions and judicial practice that claim that artificial intelligence-generated products have no place in intellectual property law. After the exhaustive comparative legal analysis and the case study, the author will propose de lege ferenda the legal protection framework for artificial intelligence.

Keywords: computer program, information system, copyright, artificial intelligence, ChatGPT.

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PRAVNI OKVIR ZAŠTITE RAČUNARSKIH PROGRAMA SA POSEBNIM OSVRTOM NA VEŠTAČKU INTELIGENCIJU *„CHATGPT“*

Sažetak

Računarski programi kako u uporednom pravu, tako i u pozitivnom pravu Srbije štiti se autorskim pravom. Jedan ili više računarskih programi zajedno sa elektronskim bazama podataka čine informacione sisteme. Razvojem veštačke inteligencije, stvoren je širok spektar sofisticiranih informacionih sistema koji mogu, po pravilu, na osnovu upita korisnika, da načine ili generišu tekst (npr. ChatGPT). U radu će biti izvršena studija slučaja vezana za generativnu veštačku inteligenciju ChatGPT. Poseban izazov predstavlja kako pravno regulisati proizvode koje stvara veštačka inteligencija sa aspekta autorskog prava. Autor će kroz ovaj članak poseban akcenat dati na uporednom prikazu zakonodavstava koji su regulisali veštačku inteligencije sa aspekta autorskog prava, ali će navesti i one stavove pravne teorije i sudske prakse koji smatraju da proizvodi koji stvoreni od strane veštačke inteligencije nemaju mesta u pravu intelektualne svojine. Nakon celokupne uporednopravne analize i studije slučaja, autor daje predloge de lege ferenda pravnog okvira zaštite veštačke inteligencije.

Ključne reči: kompjuterski program, informacioni sistem, autorsko pravo, veštačka inteligencija, ChatGPT.

1. Introduction

In the today's era of digital transformation of all social processes, one can pose a justified question, is this the end of intellectual property as we know it or a new beginning? In this regard, let us consider first the example of Estonia, which, in accordance with the centralized e-Estonia platform, currently has an efficient, transparent and safe eco-system and as much as 99% of services provided by the government to the citizens available online, with the advantages of digitization coming to the fore especially during the COVID-19 pandemic crisis (Ćemalović, 2021, p. 701). The development of artificial intelligence is inevitably connected with digital transformation.

The study of artificial intelligence (hereinafter: AI) poses a challenge from a scientific and professional aspect in the sphere of both technical and social sciences, including economics, law, medicine, psychology, sociology, etc. The

widespread adoption of AI systems and the continued AI development are of research interest considering the complexity of automatic data handling, code, and the AI model itself (Steidl, *et al*., 2023, p. 120). The European Commission Communication "Artificial Intelligence for Europe", dated 25 April 2018, points out the need to "consider the relationship between artificial intelligence and intellectual property rights, from the perspective of both Intellectual Property Offices and the users, in order to encourage balanced innovation and legal certainty" (Živković, 2020, pp. 619-620). Human intelligence has always been important to us humans, and there is a great interest in the study of AI from a scientific aspect considering that AI can now understand and create things only humans are capable of creating. "We humans call ourselves Homo sapiens - smart man - because our intelligence is so important to us. For thousands of years, we have been trying to understand how to think, that is, how nothing more than a handful of matter can perceive, understand, predict, and govern a world far larger and far more complex than that matter itself. The field of artificial intelligence, or AI, goes even further: it tries not only to understand, but also to create intelligent entities." (Russell & Norvig, 2011). In essence, artificial intelligence can be defined as "a general name for advanced computer systems that strive to simulate the functioning of human intelligence in such a way that machines are capable of replacing the roles and work of humans in various activities, from simple to complex". The work and development of technologies that artificial intelligence is based on relies on previously entered information and parameters entered by humans (Andonović, 2020, p. 112).

After the initial introduction, the main part of the paper provides a summary of the computer programs copyright provisions in various legislation in the technical context of software and information systems, and proceeds to analyze the (in)ability of copyright to protect AI-generated works, with a special emphasis provided through a comparative presentation of a few pieces of legislation that recognize AI protection from the aspect of copyright, to close with a case study of the extremely popular generative AI *ChatGPT*. Finally, the conclusion provides a brief summary of the research findings including the *de lege ferenda* proposals.

2. Differences Between Computer Program Definition in Comparative Law and Software and Information System Technical Terms

The prevailing scientific and legal opinion in comparative law is that computer programs are protected as an author's literary work. This paragraph defines the conditions and duration of such legal protection (Marković, 2018, pp. 149-150).

This position has received its international confirmation in the Agreement on Trade-Related Aspects of Intellectual Property Rights (hereinafter: TRIPS), with Article 10, Paragraph 1, stipulating that computer programs, whether in source code or object code, are protected as literary works under the Berne Convention (Agreement on Trade-Related Aspects of Intellectual Property Rights – TRIPS Agreement). This pragmatic rule has also been confirmed in Article 4 of the WIPO Copyright Treaty of the World Intellectual Property Organization, stipulating that *computer programs are protected as literary works* within the meaning of Article 2 of the Berne Convention, and that this protection applies to computer programs, regardless of the way or form of their expression (WIPO Copyright Treaty – WCT). The term "source code" implies a computer program expressed in one of the programming languages, while the term "executive" or "object code" refers to a computer program converted into a digital machine record that a computer can understand and execute (Marković, 2018, p. 150).

This position was adopted by both the Republic of Serbia (hereinafter: Serbia) and the neighboring countries Bosnia and Herzegovina (hereinafter: BiH) and the Republic of Croatia (hereinafter: Croatia). Article 4, paragraph 2, subparagraph a) of the BiH Law on Copyright and Related Rights stipulates: "A work of authorship shall be considered in particular: a) written works (literary texts, studies, manuals, articles and other writings, as well as computer programs)", while Article 4, paragraph 1, of the same Law stipulates: "An individual spiritual creation from the field of literature, science or art is considered an author's work, regardless of the type, method and form of expression, unless otherwise determined by this law". Article 14, paragraph 1 of the Croatian Law on Copyright and Related Rights stipulates the following: "(1) A work of authorship is an original intellectual creation from the literary, scientific or artistic field that has an individual character, regardless of the manner and form of expression, type, value or purpose, unless otherwise determined by this Law", while paragraph 2 of the same Article prescribes:"(2) Author's works are: linguistic works, such as written works, spoken works and computer programs, which include the expression of a computer program in any form, including preparatory design material". Finally, Article 2, paragraph 1, of the Serbian Law on Copyright and Related Rights prescribes: "A work of authorship is an original intellectual creation of the author, expressed in a certain form, regardless of its artistic, scientific or other value, its purpose, size, content and manner of manifestation, as well as the permissibility of public communication of its content", while Article 2, paragraph 2, subparagraph 1 of the Serbian Law on Copyright and Related Rights prescribes: "written works (books, brochures, articles, translations, computer programs with all accompanying technical and user documentation in any form of their expression, including preparatory material for their creation, etc.).

Analyzing the Serbian, Croatian and BiH comparative legislation, one can draw several conclusions. Firstly, the ZASP BiH stipulates that the author's work is an *"individual spiritual creation",* and this definition lacks the word "original" in comparison with Serbia and Croatia, where the legislator, when defining the author's work, points out that it is an "original spiritual creation" (Serbia) or "original intellectual creation" (Croatia). Secondly, the term "computer program" as prescribed by the BiH, Serbian and Croatian legislators, which could be protected by copyright, should be distinguished from the term "*software*" in the technical and legal sense. Software is a broader term than a computer program, and can consist of one or more computer programs, preparation of designed material (program description), and additional, i.e., accompanying (user) documentation, and potentially other elements. From the point of view of copyright, a computer program and preparatory design material can represent a special type of author's work, provided that they are an "original intellectual creation" in the sense of Article 2, paragraph 1 of the Serbian Law on Copyright and Related Rights.

This view is supported by the French text of the Computer Program Directive, where the terms "computer program" and "software" are clearly distinguished, and protection is provided only to computer programs! One can conclude that the legal term "computer program" includes the technical term "computer program" and the accompanying technical documentation (Kunda, Matanovac Vučković, 2010, pp. 85-132). In Article 2, paragraph 1 of the ZASP RS, Serbia has expanded the definition of a computer program as an author's work, bringing the definition of a computer program closer to the technical term "software".

It has to be noted that in the era of digital information and transformation technologies, with the digital transformation of all social processes, ready-made "package" solutions have come to the fore in the banking sector, telecommunications, companies, electricity distribution, and other sectors. These are widely known as "information systems". "Information system" is a broader term than "software", and such systems consist, *inter alia*, of (electronic) database models and application software (i.e., computer program and program description, or accompanying technical documentation), which "manages" the aforementioned database. An information system may contain a copyright on one or more computer programs (which together constitute software), as well as a copyright on the database structure, and another special *sui generis* right of the database producer (Živković & Hasić, 2022, p. 315). Article 137 of the ZASP RS defines a database producer as "a natural or legal person who has made a significant investment, in a quantitative or qualitative sense, in obtaining, checking or presenting the content of the database". From the aspect of AI, personal data protection, trade secret and unfair competition rules are of particular importance. The AI rests

on a machine learning system that learns from content that may be copyrighted. Data and text mining may require extensive data sets copying and collections which may include copyrighted works resulting in the copying of the creative elements that make up the copyrighted work (Bogataj Jančić, 2023, p. 180). Understanding what an information system represents, and which intellectual property rights apply to it is of key importance for the study of the generative artificial intelligence *ChatGPT* as it includes sophisticated information systems that are, as a rule, based on user queries and can create or generate text, and whose legal analysis and the case study will take a special place in this paper.

Finally, AI systems can be connected to and embedded into hardware, creating advanced robots, drones, and software applications that are connected to the so-called *Internet of Things* (Andonović, 2020, p. 114). This issue can relate to computer programs of technical character and can be protected by a patent. A computer program can be protected by a patent in two cases.[1]

3. (In)ability to Protect Artificial Intelligence-Generated Works Through Copyright

An author's work can be defined as a human creation that has a spiritual content, a certain form, and is original. One can conclude that the elements of the author's work are: 1) human creation; 2) spiritual content; 3) definiteness of form, and 4) originality (Marković & Popović, 2017, p. 38.).

Human creation is underlined as the first element of the author's work, suggesting that only human-created works can be considered an author's work, and that human creation does not include any pre-existing content that a human found in nature and presented as his/her work. In the conditions of modern transformative technologies, AI computer programs are no longer just an ordinary auxiliary tool, and are often solely responsible for the created content, with the developer responsible only for the AI program itself. In the above case, the man is the author of the "author" of the work itself. Given that one of the conditions for the existence of the author's work is that it is a human creation, it is clear

[1] The first case is when a computer program algorithm solves a technical problem in the functioning of the computer, which can refer to both operating and application software, which in interaction with the computer (hardware) produces the so-called "additional technical effect." The second case refers to software for automatic management of a production process or other processes, consisting of sensors (which register data and monitor the process in connection with the overall system operation), hardware, i.e., computers (that process these data), and finally a control mechanism (which ensures that the operation of the system that is monitored is maintained within the prescribed values) (Šokinjov, 2023, pp. 57-58).

that only a human being can have the status and position of the author. Subjective copyright extends over the author's life and 70 years after the author's death. Article 3 of the Berne Convention on the Protection of Literary and Artistic Works stipulates that protected authors are citizens of one of the countries of the European Union for their published or unpublished works. In the German copyright system, according to the principle of personal creation (German: *Shöpferprinzip*), the author can only be a man, as the creator of the work. It should be pointed out that at the time when the Berne Convention was concluded, computer programs, especially advanced transformative and information technology as we know it today, did not exist (Ašković, 2019, pp. 14-16).

Legal experts point out that, even in countries whose regulations do not explicitly speak of copyright as a human creation, the prevailing view is that only human creations should be protected by copyright. Such is the position of the Austrian Supreme Court. In the judgment of the Supreme Court of Austria, the court finds "that the concept of copyright is based on the protection of those creative achievements that a human being produces as a creator. Therefore, only the product of the human mind should be protected by copyright" (Lučić, 2022, p. 189). The US Copyright Office Manual states "it will register an original copyrighted work provided that the work is made by a person" (Bogataj Jančić, 2023, p. 191). An interesting case of the US Copyright Office regarding the submission of Dr Stephen Thaler's application for the AI program "DABUS". The US Copyright Office ultimately concluded "the work lacks the requisite human authorship and that Thaler has not provided evidence of sufficient creative input or intervention by a human author in the work".[2] In addition, the US Supreme Court took the position that copyright belonged only to men.[3]

[2] What makes this case particularly interesting is that the applicant, Dr. Thaler, acknowledged the AI program as the "author" of the artwork, but at the same time claimed copyright for himself as the owner of the machine, and not for AI. The US Copyright Office Review Board rejected this request with the following explanation: "Thaler must prove that the work is the product of human authorship or convince the Office to depart from the centuries-old (legal) theory of copyright". Finally, the Review Board rejected Thaler's additional argument that the work in question was the result of a contract for the commission of an author's work for the simple reason that AI does not have the legal capacity to enter into contracts (Lučić, 2022, p. 188-189).

[3] Thus, the judgment of the US Supreme Court *Burrow-Giles Lithographic Co. v Sarony states*, *inter alia*, that "copyright is the exclusive right of man to the products of his genius or intellect". The US Supreme Court in the case of *Burrow-Giles Lithographic Co. v Sarony* 111 US 53, 58, 1884, held that copyright belongs only to man. In the aforementioned judgment, the Supreme Court decided whether a photograph meets the conditions for copyright protection, as well as whether a photographer can have the status of an author. The practice of the US Supreme Court is in line with the practice of the US Copyright Office, according to which the fruits of intellectual labor that reside in the creative powers of the mind are protected. The Office will reject the request for

From the above, it can be concluded that one of the biggest obstacles for artificial intelligence-created works to receive protection under copyright is that the work is not created by a human.

If we consider the second element of the author's work, *spiritual content,* it is clear that all human creations, including all author's works, have a spiritual content. Spiritual content, which can be emotional or rational, gives the author's work sense and meaning. In a sociological sense, an author's work is a social creation that is a means of communication between people. The communication that the author's work establishes between people must be immediate, i.e., based on sense and meaning that are immanent in the work itself. For example, a credit card or a traffic sign cannot be works of authorship because they have no spiritual content and acquire sense and meaning only through the rules for their use and interpretation (Marković & Popović 2017, p. 38). Computer programs do not meet this requirement, because their work has no spiritual content. However, if this condition is viewed only from the perspective of direct communication, i.e., whether a work acquires sense and meaning only through the rules for its use, it could be claimed that computer-generated works meet this condition. For example, if we look at a picture or listen to music without knowing that it was created by a computer program, we will certainly find sense and meaning in it, in the same way as if it originated from a person (Ašković, 2019, p. 16). In the context of this element, the author will underline the case law of the Higher Regional Court in Berlin, which in January 2020 found "that a product image generated on a computer does not enjoy protection even as a work protected by copyright in the sense of Art. 2, nor as a photograph according to Art. 72 of the German Copyright Act", and took the position that "a photograph that lacks the author's creative freedom, i.e., the possibility for the author to express his creative spirit in an original way, does not meet the copyright protection requirements". [4]

the registration of the author's work if it determines that a human being did not create the work considering that copyright is limited to the author's original creations. Finally, Section 313.2 of the US Copyright Office Manual lists examples of works that lack human creation, and lists works created by a machine or a purely mechanical process operating randomly or automatically without any creative input or intervention from the human author (Ašković, 2019, p. 24).

[4] "In the specific case, the plaintiff, a perfume manufacturer, had product images of his perfume bottles created on the computer using the so-called USA Tools, representing computer tools used by professional designers to help them design. "The defendant used these images on its website to advertise the products without the plaintiff's consent. A court in Berlin eventually ruled that images of virtual objects created on a computer using electronic commands do not constitute copyrighted works. In principle, computer animations or graphics can also enjoy this protection if they are not based solely on computer activity. However, the photographs in question lacked the author's creative freedom, that is, the possibility for the author to express his creative depth in an original way". (Lučić, 2022, p. 190).

The third element of the author's work, *originality*, implies unequivocally that an author's work must be original. Originality means uniqueness or the individuality of the work. The reason why the law recognizes copyright protection for a specific work is precisely its originality, which is the essential and most significant characteristic of an author's work. The originality of the work is derived from the author's personality. The copyright science has taken the position "that every spiritual creation that is not the result of nominal or unconscionable support of already existing cultural heritage or intellectual work that is strictly determined by external frameworks that leave no room for the expression of the personal spiritual individuality of the one who works, is original". [5]

We can conclude that originality is a *conditio sine qua non* for a work to be protected by copyright, regardless of whether it meets all other conditions. Copyright protection extends only to the original elements of the author's work. Determining originality is the most difficult of all elements. The concept of originality is not defined or determined by the positive law governing this matter, and it is left to judicial practice to provide interpretations and clarifications of originality. The originality concept interpretation varies depending on national legislation and has changed throughout history". [6]

In the USA today, it is generally accepted "it should be an independent creation with a modicum of creativity". Here, instead of effort, the emphasis is on originality, and mere collections of information no longer enjoy copyright protection and are not considered original, unless that information is coordinated, selected or organized in such a way that the end result is original. The US Supreme Court in

[5] This practice gave birth to the view that a work is original if it is different from all existing works. There are areas of human creativity that are determined from all sides by practical, technical, functional or logical conditions, and they do not leave room for the manifestation of personality traits (e.g. creating alphabetical lists of tenants, a list of electricity consumers, a list of telephone subscribers), and these works cannot fulfill the condition of originality (Marković & Popović, 2017, pp. 39-41).

[6] In the USA, until 1991, the valid copyright law doctrine was "sweat of the brow", according to which copyright protection was provided primarily to reward the author's time, effort and the invested resources, while the originality of the work was neglected. Cf. for this doctrine, we can point out that databases and, for example, a telephone directory are also considered works of authorship because their authors made an effort to collect the information that makes them up (Živković, 2020, p. 628). Rural Telephone Service Co. decided in 1991 that the basis of copyright protection is not effort but originality, even in a minimal form, and that without originality there is no copyright protection as soon as the "sweat of the brow" doctrine was officially rejected. The plaintiff and defendant in the case of *Feist Publications, Inc. v Rural Telephone Service Co.* 499 U.S. 340 (1991) was a telephone directory in which the US Supreme Court held that the plaintiff's telephone directory (Rural TSC) was not a copyrighted work (*United States Supreme Court, Feist Publications, Inc. v Rural Telephone Service Co.* Inc. 499 U.S. 340 (1991).

the case of F*eist Publications, Inc. v Rural Telephone Service Co.* Inc. 499 U.S. 340 (1991) does not specify the minimum of creativity, but notes that, to qualify for copyright protection, the end result must be new, innovative, or surprising. In its decisions, the European Court of Justice took the position that originality means "that the work is the author's intellectual creation, which is present when the author can express free and creative choices and leave his stamp on the work, and which is not present when expression is limited by technical or functional rules, such as where there is only one way to express an idea, or expression is predetermined by a specific goal or narrowed rules that leave no room for free and creative choices".[7]

In its decisions, the European Court of Justice gave guidelines to national courts on how to review the originality of a work. Let us consider "The Next Rembrandt" project, where algorithms were written to find what constitutes the personal stamp of the famous Dutch painter Rembrandt. The goal of the project is to create a painting as if it were painted by Rembrandt himself. "The Next Rembrandt" project is an example of a not fully automated AI, that is, there is a significant human contribution. The teams of people who worked on "The Next Rembrandt" considered the possibilities for creativity, and that creativity was contained in the necessary algorithms that were written, and not in the painting that we are considering here. The portrait itself is the result of an algorithm or a computer program (Živković, 2020, p. 629).

Although it has not been officially confirmed by the court, legal experts point out that projects such as "The Next Rembrandt" AI or "Ai-Da" AI, which is an artistic robot that draws and paints using cameras in its eyes and its robotic arm, cannot challenge the condition of originality because they are not copies of already existing works. However, as the work must be shaped by the expression of the human spirit and human will, creativity must be expressed at the level of human consciousness, AI, however sophisticated, will never be able to reach this level. In order for a work to be protected by copyright, it must be shown that it was created not only thanks to AI, but also thanks to the person who has managed and trained AI (Lučić, 2022, p. 187).

The fourth and last element of the author's work is the *determination of the form*. "A certain shaping of the spiritual content has the character of the form of the author's work and gives that work its identity. Thanks to this, the author's work is separated from the personality of the author and becomes suitable for communication

[7] The decisions of the European Court of Justice that provide a more precise interpretation of originality include: *Infopaq International A/S v Danske Dagblades Forening from 2009, Bežpočnnostni softwarova asociace v Ministerstvo kultury from 2010, Football Associatin Premier League v QC Leisure and Karen Murphy v Media Proteciton Services from 2011, Eva Maria Painter v Standard Verlays Gmb from 2011, and Football Dataco v Yahoo! from 2012*" (Ašković, 2019. pp. 16-22).

and commercial use". The definiteness of the form, in the sense of determining the legal term of the author's work, does not mean the material form in which the work becomes factually accessible to people's senses. The form of an author's work is "a certain arrangement of signs (codes) that people use in their communication". [8] For example, in the "The Next Rembrandt" project, the image was first created in digital format to be subsequently transformed into a real image with the help of a 3D printer. The conclusion is that computer-generated works meet the copyright protection requirement in terms of the definiteness of the form element.[9]

4. Analysis of Comparative Legislation Prescribing Artificial Intelligence-Generated Works Protection Through Copyright

In comparative legislation, some countries classify computer-generated works as works of authorship, despite the fact that they only meet the condition of the definiteness of the form and/or the condition of originality. Consider, as the first example, Article 9, paragraph 3 of the UK Copyright, Designs and Patents Act (hereinafter: CDPA UK) stipulating that the author in the case of written, dramatic, artistic or musical works created partly by a computer program is considered to be the person who took the necessary measures to create the work, while Article 214 of the CDPA UK stipulates that the protection provided to computer-generated works extends only to literary, dramatic, musical and artistic works, and it does not apply to media works. Article 178 of the CDPA UK provides the definition of computer-generated works, stipulating that these are all works created in

[8] There are examples of national legislation that prescribes a mandatory material form as a condition for the existence and protection of an author's work. For example, in the USA, the spiritual content must be recorded on a physical medium (Marković & Popović, 2017, p. 39). A similar solution exists in the UK Copyright, Designs and Patents Act, which stipulates that there can be no copyright on literary, musical and dramatic works unless these works are recorded in writing or in some other form (Ašković, 2019, p. 22).

[9] In terms of material form, computer-generated content is always in digital format, unlike traditional works that exist in analog formats (books, paintings on canvas, sculptures in marble, etc.), i.e., in tangible form. Despite the fact that computer-generated works are essentially "ones and zeros", that is, an abstract mathematical expression, this does not pose a problem for copyright considering that digital form is material form, the only clear specificity being that our senses do not allow us to perceive analog copies of the work immediately, e.g., just by opening a book or looking at a painting or sculpture. However, the difference is reflected in the fact that in order to perceive a work in digital format, we need to have a device or apparatus through which we can, for example, listen to music on a compact disc, while our senses allow us to perceive analog examples of the work immediately by simply opening a book or looking at a picture. Most works that exist in digital format can also be recorded in analog format and vice versa (Ašković, 2019, p. 22).

such circumstances when there is no human author of the work, while Article 12(7) of the same Law specifies that copyright on computer-generated works lasts for 50 years from the end of the calendar year in which the work was created (Copyright, Designs and Patents Act, 1988, United Kingdom). It can be concluded that the UK positive copyright law accepts that literary, dramatic, musical and artistic works can be created by AI in the form of a computer program, and provides them copyright protection, specifying the right holder and prescribing the duration of copyright on these works. What remains disputed is that it fails to define more closely what constitutes the necessary creation actions that define the author of the work. As the Law does not specify or give any examples of the actions that are sufficient or necessary, would clicking the mouse button be enough for a person to be considered an author? Is the author the programmer who created the computer program or the computer user or a third natural and/or legal person? (Ašković, 2019, p. 24).

Another example is the Republic of Ireland Copyright and Related Rights Act, which specifies computer-generated works as works created in such circumstances that the author is not an individual (person, individual) (Copyright and Related Rights Act of the Republic of Ireland). The EU legal experts suggest that computer-generated works, which are regulated under the UK and Ireland CDPAs, should be categorized as a special (new) related right, the protection of which requires no human creative contribution, and in some cases, no economic investment.[10] In addition, the Serbian legal experts, i.e., national legal experts, have provided *de lege ferenda* proposals for the development of a separate related law that would protect AI-created artistic and literary works in the cases where they do not meet the condition of originality (Milosavljević, 2023, p. 102). Apart from the United Kingdom, the Republic of Ireland, and countries that "classified computer-generated works as works of authorship", other countries that have given the status of author's work to computer and AI-generated works and provide copyright protection include the Republic of India and New Zealand, while the Italian Copyright Law, in Article 8, paragraph 1, stipulates "the author is an entity (and thus not necessarily a human being) who is stated to be the author according to custom, or who is indicated as the author in acting, performing or presenting or broadcasting the work", meaning that there is a possibility that the Italian positive legislation also allows for AI-created works to have the status of an author's work. Finally, the EU Convention or

[10] In most cases, the designated holder of the related right will be the AI user, and not the AI system developer, because the user is the one who initiates the process on the AI program, the result of which will be the subject of protection. In addition, there may be cases where the data collection that will be created with the help of AI will remain without any protection if the results do not meet the copyright protection criteria, and at the same time, are not protected by any of the related rights, nor by the *sui generis* related right of the database producer data (Bogataj Jančić, 2023, p. 191).

Directive neither prohibits the protection of AI-created works, nor contains a provision allowing it, and it can be concluded that there is a legal void in this respect. The United States of America, as the country where the concept of AI was born, shares similar views. Thus, the Compendium (US Copyright Registry Administrative Manual) of the US Copyright Office practice states in paragraph 306 that the Bureau will only register the copyrighted work provided that the work was *created by man*. According to the Copyright Bureau practice, the fruits of intellectual labor that reside in the creative powers of the mind are protected. The Bureau will reject applications for registration of the copyrighted work if it determines that that the work was not created by a human being as the copyright is restricted to the original works by an author.[11]

Finally, it is worth to mention the practice of the Chinese court that has granted protection to an article written by AI where it completely avoided justifying the decision based on the determination of human contribution as the author. Namely, they failed to determine whether the creative decisions of a person participated in the creation of the article, and decided, based on a certain measure of the originality of the work, that the work meets the conditions for copyright protection.[12]

5. How to Determine the Copyright Holder for AI-Created Works?

In the Anglo-Saxon legal tradition, in the case of works created to order, i.e., in an employment relationship, there is an exception to the rule that the original copyright holder is the author, i.e., the person who actually created the work.

[11] For example, the practice of the U.S. Supreme Court, which in their ruling in B*urrow-Giles Lithographic Co. v Sarony* states, *inter alia,* that "copyright is the exclusive right of man to the products of his ingenuity or intellect." In addition, paragraph 313.2 of the Compendium provides examples of works that lack human creation, and lists "works created by a machine or a pure mechanical process that operates randomly or automatically without any creative input or human intervention." Based on the above and taking into account that very few countries provide copyright status to computer-generated contents, it can be concluded that, at least for the time being, copyright protection of AI-generated work will not be universally accepted in intellectual property law (Živković, 2020, p. 631).

[12] The AI, in this case, is "Tancet Dreamwriter AI Writing Robot". In the court proceedings, the defendant was "Shanghai Yingxyun Technology Company", who pointed out "that the articles that were copied were not protected by copyright, because their author was not a human being, and therefore they were in the public domain, which means that anyone could use them. Nevertheless, the court decided that the form of expression of the article corresponds to the requirements of a written work, and the content shows the selection, analysis and evaluation of relevant stock market information and data, and that the structure of the article is reasonable, the logic is clear and has a certain originality" (Bogataj Jančić, 2023, p. 192).

If the work was created in an employment relationship or to order, the employer or the customer (individual or legal entity) is considered the author, regardless of the fact that the work was essentially created by an employee or a contractor under the order contract for the work (Živković, 2020, p. 631). In the Anglo-Saxon legal theory, the solutions for determining the copyright holder in the case of AI-created works have been found in the application of the "work to order", i.e., "work in employment" doctrine. If this doctrine is applied to the programmer, as the author of a super developed computer program that represents AI, the programmer would be treated as the employer, and the AI program would be the employee, and the programmer, as the author of the "author" of AI, would remain the original copyright holder (Bridy, 2011, p. 26). From the aspect of general social utility, the prevailing views are that the goal is to encourage AI development, and that, consequently, the fairest solution would be to assign the copyright to those who are most deserving of its development, namely its investors, i.e., software companies, research institutions, international organizations and universities, which could then, as the holders, assign property rights over the author's work to end users (Živković, 2020, p. 631).

This solution is certainly easier to apply in the Anglo-Saxon legal tradition, where there is a legal assumption for the "work to order" or "work in employment" doctrine that the original copyright holder, who retains both moral and property-legal powers, is considered to be the person commissioning the work, i.e., the employer. In the European-continental system (which includes Serbia), the situation regarding the original copyright holder is different. Firstly, Article 9 of the ZASP RS stipulates that the author is the individual who created the work of authorship. Therefore, legal entities cannot be authors, but they can be copyright property rights holders. Article 95, paragraph 1, of the ZASP RS stipulates: "If a computer program is created based on a contract on the order of an author's work, the client shall acquire all rights to use the computer program, unless the contract stipulates otherwise", while Article 98, paragraph 4 of the ZASP RS prescribes: "If the author's work is a computer program or a database, the permanent holder of all exclusive property rights for the work is the employer, unless otherwise stipulated by the contract". The author is entitled to special remuneration if that is provided for by the contract. [13]

[13] Article 2/3 of the EC Directive on the legal protection of computer programs stipulates that, in the case of creation of a computer program upon the instructions by the employer in the course of performance of an obligation from the employment relationship, Member States must incorporate into their legislation a rebuttable presumption in favor of the employer on the basis of which he has the exclusive right to retain property rights components of copyright on the computer program thus created (Gliha, 2006, p. 818).

6. *ChatGPT* Case Study

While there are different types and divisions of AI, this paper will analyse *ChatGPT* as one of the most popular and used AI platforms.[14] *ChatGPT* is a language model created by the San Francisco-based AI company *OpenAI. ChatGPT* can generate natural language responses to various end-user queries. Its main focus is on language modelling, which includes creating plausible models that can accurately predict the following word in a given sequence based on the previous words. Such a system can generate text in any language, in any format, and on any topic in a few seconds. Considering the enormous influence of such systems, this has opened numerous legal and ethical issues, especially in the area of copyright. Language modelling is achieved by training models on large volumes of textual data. The goal of language modeling is to create a system that can accurately generate human responses and recognize natural language input, making it an essential component of modern natural language processing applications (Lucchi, 2023, p. 2-3.). The definition of what *ChatGPT* is was given by *ChatGPT* itself at the user's request, and it can be claimed that *ChatGPT* is an AI language module developed by *OpenAI* that uses natural language processing to generate human-understandable text in response to various user inputs.[15]

One of the most contentious and complex questions relates to the ownership of the *ChatGPT*-created content. The owner is usually the holder of the copyright property rights, i.e., the author of the texts[16] created using tools such as *ChatGPT,*

[14] Here we will mention only some of the AI types. Thus, according to the similarity to the human mind, or its level of development, AI is divided into four main types: 1) reactive machines; 2) machines with limited memory; 3) theory of mind, and 4) consciousness. In addition to this division, three additional AI types are recognized, specifically: 1) Artificial Narrow Intelligence - ANI, which refers to the ability of a computer to perform a specific task at a high level; 2) Artificial General Intelligence - AGI, which refers to whether a computer can perform any intellectual task that a human could, and 3) Artificial Superintelligence – ASI, that surpasses human intelligence (Joshi, 2019).

[15] This is essentially a "chatbot" that automatically generates and delivers data from various sources, processes it, and produces grammatically correct and contextually appropriate responses. Having been trained on a huge volume of text data, constantly learning and improving, it can serve as customer support in a variety of ways. It collects information from various sources such as books, magazines, websites, articles, which results in an original and interesting discussion. If a user asks *ChatGPT* about the essence of existence, the answer may at first seem insightful and lucid, but it may still lack a comprehensive understanding of the philosophical principles and hypotheses underlying the research (Lucchi, 2023, pp. 5-6).

[16] The distinction of whether someone is the author or the holder of copyright property rights is important in the Serbian and BiH legal systems, in which the author can only be an individual who can only own copyright moral rights, while the holder of copyright property rights can be both a legal person or a natural person.

the individual or the organization (legal entity) that provided the original ideas and data the system is based on or that issued the appropriate instructions. The AI language model that creates the generated text cannot be protected by copyright, considering that copyright in general recognizes *a human as the author of the original work* on which the human retains copyright. However, in some cases, the generated text may be considered original enough to be protected by copyright if there is *sufficient human input or intervention in its creation*.[17]

When analysing the cases of generative AI ChatGPT, legal theorists claim that the UK solution that the author is "the person who took the necessary steps to create the work" is outdated because it was created back in 1988, and the AI systems available today differ to a great extent from the information systems at that time. A particularly contentious issue is how to determine the person who took the necessary steps to create the work, and that often needs to be resolved on a case-by-case basis. In addition, given the complexity of the modern-day AI programming, there is *significant legal uncertainty in that respect* (Lucchi, 2023, pp. 6-7).

Another controversial question relates to *how an AI will exercise its rights* (seek copyright protection, assert claims) if it lacks reasoning capabilities. Every persons has a general (complete, universal) legal capacity, *meaning* "the subject's ability to have rights and obligations," in contrast to business and delictual capacity, which not everyone has.[18] Other problems relate to errors during the creation of the AI, control of the programmers and their personal responsibility, potential hacker attacks, and feeding artificial intelligence the "prejudices" of the author of the AI itself. As an example, we will take our case study about the generative artificial intelligence *ChatGPT* and the "criticisms" that it makes jokes about Krishna, but not about Jesus Christ and Prophet Muhammad (Avramović & Jovanov, 2023, p. 173). In order for AI to receive the status of the author, the legal order needs to recognize AI platforms as subjects in the eyes of the law, similarly as individuals and legal persons.[19] As an AI language model, *ChatGPT* has no legal identity and

[17] For example, AI-generated work could be considered unique enough to qualify for copyright protection if someone uses the responses as a starting point and then adds significant creative or original content, such as editing, commenting, analysis, or merging work. The person who would add additional creative or original content in this scenario would usually own the copyright on the final product (Lucchi, 2023, pp. 6-7).

[18] There are human beings that are not characterized by reason, such as, for example, small children, conceived unborn human beings *(lat. nasciturus*) or mentally ill persons who do have legal capacity, but they do not have business and delictual capacity. As for business and tort capacity, these persons are appointed their legal representatives who represent their rights and fulfill their obligations in accordance with positive legal regulations (Babić, 2008, pp. 69-78).

[19] Throughout history, not all people have had legal subjectivity, such as, for example, slaves, women and children. In the period before the American Civil War (1861-1865), African Americans

no ability to own property because it is not human. Even if the AI-created content were original enough to qualify for copyright protection, AI will not own it. According to different laws, the AI copyright for the final product could belong to the individual or legal person who has legal authority over the AI, such as the AI developer or owner. In some cases, the copyright on the content may also belong to the users – the persons who contributed to or edited the AI-generated work.[20]

The third contentious issue relating to AI *ChatGPT* is that of *originality*. While such generative AI systems excel at generating responses that engage people in conversation, these responses sometimes run the risk of being contrived, unoriginal, or simply repeating past information. Ownership of intellectual property is closely related to the uniqueness, individuality and originality of AI *ChatGPT*. The originality condition is a requirement for granting copyright protection to literary, dramatic, artistic and musical works. Although there are different approaches to defining the originality threshold, such as "the minimum degree of creativity" in the US, according to the EU originality standards, AI-created works may not qualify for copyright protection due to *lack of creative choices and personal expression*.[21]

The fourth issue relates to whether the use of copyrighted material to train generative AI programs such as *ChatGPT* constitutes *copyright infringement,*[22] and could machine learning be subsumed under "fair use" or is it a copyright infringement.[23]

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who were born as slaves were not considered US citizens, nor did they have the right to property, and patents for their inventions were awarded to their masters, i.e., slave owners (Johnson, 2017, America's always had black inventors – even when the patent system explicitly excluded them).

[20] A practical approach would be to assign copyright to the people behind the machine's relationship, i.e., AI developers, users, and owners. The key stakeholders are the people behind the AI production process. From the common law perspective, taking into account the originality doctrine and the requirement of human authorship, there is no copyright on AI-created works without human authorship, and copyright-free works naturally belong to the public domain (Lucchi, 2023, p. 8).

[21] In addition to the fact that *ChatGPT* can provide quality answers and save users' time thanks to its extensive database, this AI does not have the necessary human input to meet the requirement of copyright protection. In addition, robots and AI technologies, regardless of their level of autonomy, cannot be considered persons under the ethical and legal frameworks. This distinction is based on the understanding that copyright protection aims to encourage and reward the unique and subjective contributions of human creators (Lucchi, 2023, pp. 9-10).

[22] Various techniques are used to facilitate the training of AI algorithms, including text and data mining and generative deep learning techniques. The challenge however lies in the fact that AI systems cannot learn from art in the same way that humans do for the simple reason that they need an exact copy of the artwork in their training dataset, and this is how datasets of millions are made, for example, as copies of copyrighted images, videos, audio or text messages (Lucchi, 2023, p. 12).

[23] Big companies like *Google, Facebook, Amazon* and *Open AI* have access to large collections of image and language data that they can use for AI development purposes and this can be seen as a competitive advantage that can improve their products and services. In addition, one of the problems

Currently, text and data harvesting is considered to be fair use in the US. However, *OpenAI* and other prominent generative AI platforms are currently facing lawsuits over alleged copyright infringements for training AI systems.[24] These cases are pending and their outcomes are uncertain. That will certainly provide the legal foundations for the use of AI from the aspect of copyright infringement. If the plaintiffs' claims are upheld by the courts, they could potentially have a significant impact on the advancement of the AI technologies. Contrary to the US, the EU has established a greater degree of responsibility for data use in AI training, governed by the Directive on Copyright in the Digital Single Market, which provides for broad exemptions regarding text and data mining and the application of the GDPR regulation. It is the developer's responsibility, when developing and training *ChatGPT,* to ensure that data is used without any copyright infringements. Article 4(1) of the Directive on Copyright in the Digital Single Market stipulates that individuals such as commercial AI system programs and educators may reproduce works or databases to extract information from text and data. They may keep these copies for as long as they are needed for the AI training process. However, the rights holders have the option to opt out of text and data mining with mining parties to protect their commercial interests (Lucchi, 2023, p. 15).

Finally, studying the development of technology through the provision of that technology requires a basic knowledge of contract law and intellectual property law (Meeker, 2018, p. 1). This complex issue could be addressed by concluding contracts that would regulate in detail intellectual property rights and personal data protection. Such contracts can establish restrictions, contract licenses (authorizations for use) for materials protected by copyright and related rights, as well as industrial property rights in the AI training processes, contract copyright, and license fees, to ensure that all parties in this legal transaction are satisfied in a fair manner (Lucchi, 2023, pp. 17-18).

The USA practice license agreement must be distinguished from the license agreement prescribed by Article 686 of the Serbian Law on Obligations, which regulates granting of the right to use objects protected by industrial property rights (inventions, technical knowledge and experience, trademarks, samples or models) for a fee. The right to use a computer program for a fee is not a contract

is that the corpus of training works also consists of works protected by copyright. This raises the question of whether the use of the work is legal and under what circumstances (Lucchi, 2023, p. 12).

[24] Specifically, in the case *Tremblay v Open AI Inc*., the plaintiff claims that *OpenAI* used their copyrighted books without obtaining proper authorization to train *ChatGPT*. Furthermore, in the case of *Silverman et. al. v OpenAI Inc*, the plaintiffs allege that *OpenAI* engaged in the unauthorized use of copyrighted work for the purpose of training *ChatGPT*, specifically a book titled "*The Bedwetter*" (Lucchi, 2023, pp. 13-14).

in the sense of the Serbian Law on Obligations. What creates confusion in the practice of countries that have an almost identical Laws on Obligations, which were created in the territory of the former Yugoslavia (such as Serbia, Montenegro, Bosnia and Herzegovina, and Croatia) is that the license refers exclusively to industrial property rights, while a computer program is protected by copyright, and it would be best to use the wording "granting the right to use a computer program" to the holder of copyright property rights in order to avoid confusion with the license that refers to industrial property rights.

7. Conclusion

The vast majority of national legislation, including in the USA, as the country where the concept of "artificial intelligence" was born, maintains the *exclusivity of human* as the only possible author. Irrespective of that, some countries in their positive legislation regulate computer (generated) works and works where the author is not a human. These include the United Kingdom, the Republic of Ireland, Italy, and New Zealand. However, in the United Kingdom, the author is considered to be the *person who has taken the necessary measures to create the work*, but this wording is not precise enough because it can lead to different interpretations in practice, and in order to regulate this issue, a solution is needed that would be more precise and specific, and regulated by a legal norm. Other objections relate to the UK Copyright, Designs and Patents Act, which entered into force back in 1988 and needs to be harmonized with the AI development to reflect the considerable progress that has been achieved since the adoption of this law.

Based on the analysis of the Serbian, Croatian, and Bosnia and Herzegovina comparative legislation in the field of copyright with a special emphasis on computer programs, the author proposes *(de lege ferenda)* that when adopting a new Bosnia and Herzegovina Law on Copyright and Related Rights or amending the existing one, following the example of Serbia and Croatia, the definition of a computer program should be extended to include the accompanying technical and user documentation in any form of expression, including preparatory material for their creation and preparatory design material. Such a solution would ensure that the concept of a computer program in the legal sense is aligned to a greater extent with the technical term "software" and add the term "original" when defining the author's work consisting of one or several computer programs and databases.

As for the proposal concerning AI and copyright, the *first de lege ferenda* proposal is to apply the "works to order" or "works in employment" doctrine to

AI-created works where the programmer is treated as the employer, and the AI would be the employee, with the developer remaining the original copyright holder, as the author of the "author" of the AI. This proposal is more adapted to the Anglo-Saxon legal system, where both individuals and legal persons can appear as the author, while in Serbia and the European continental type countries, the author of the work can only be an individual, while a legal person can only have property rights.

Some AIs can meet the originality requirement, while others, such as *ChatGPT,* often cannot meet this requirement due to the lack of creative choices and personal expression, and consequently, another *de lege ferenda* proposal could be *to introduce a new related sui generis right* that would imply less strict conditions than those required for copyright, to give room to legal regulation of AI-created works.

The third *de lege ferenda* proposal concerning the AI development and learning (which can be seen in particular in the resulting court cases in the USA brought against the owners of generated AIs such as *ChatGPT*) is to regulate the use and prohibition of copyright infringement *through contracts* between authors, i.e., copyright holders, on the one hand, and the owners who developed AI, on the other, to possibly regulate the terms of use of copyrighted works, royalties, and personal data protection, and this could be the fairest solution from the point of view of the protection of authors, as well as from the aspect of the AI owner, and the continued future AI development.

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