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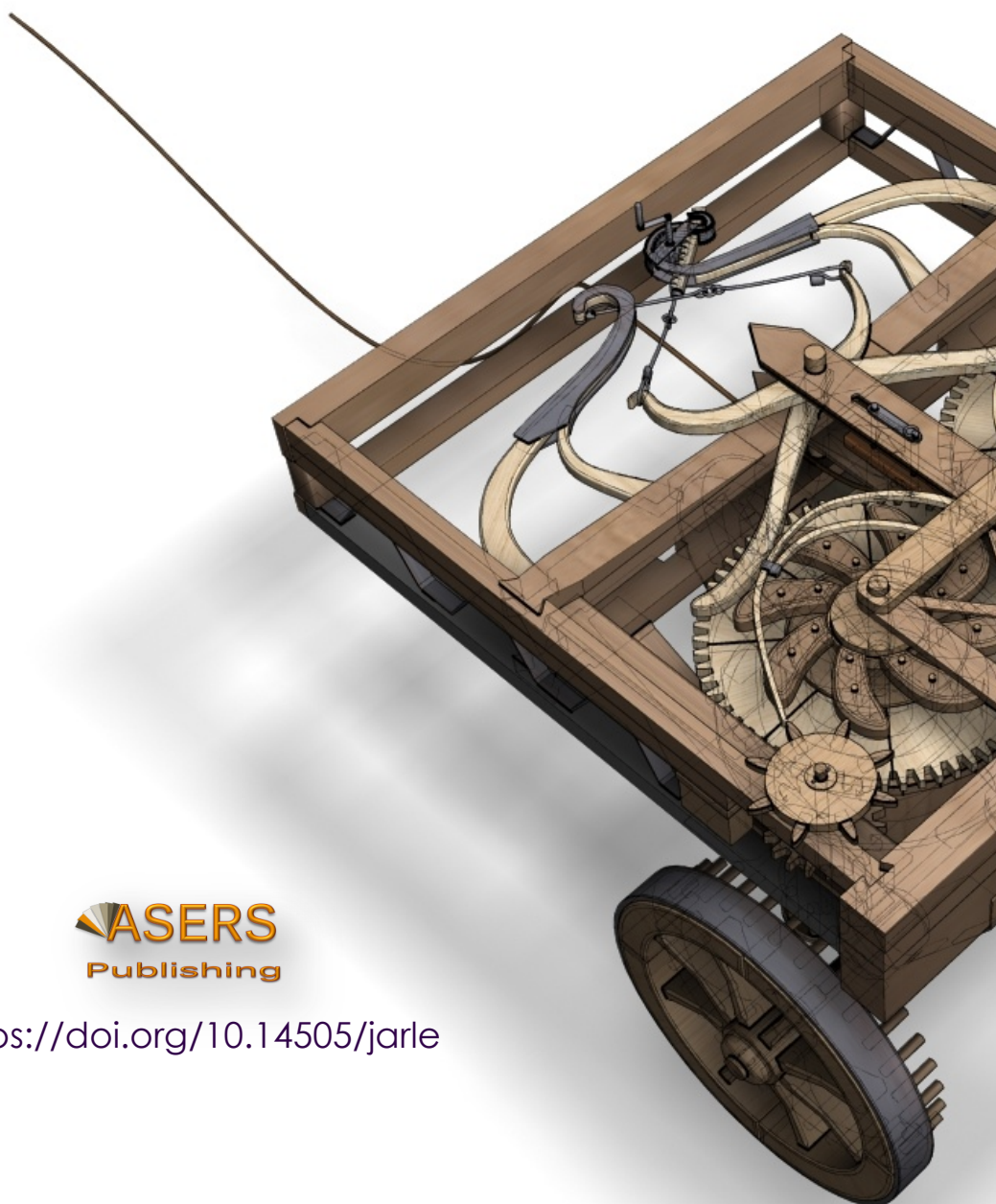
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Peculiarities of Patenting Artificial Intelligence in the United States and Countries of the European Union

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Abstract:

The article examines legal aspects of patenting of the algorithm and architecture of artificial intelligence under laws of the United States and countries of the European Union (Germany, France, the United Kingdom). The article suggests different approaches to the definition of artificial intelligence. It also analyzes conformity of artificial intelligence to conditions of patentability in various legal systems. Based on the performed analysis of the US and EU legislation, the article addresses certain problematic issues of patenting artificial intelligence and suggests their solutions.

Keywords: artificial intelligence; patent law; artificial intelligence algorithm; architecture of artificial intelligence.

JEL Classification: K11, K24, O30.

Introduction

Technologies of artificial intelligence (hereinafter – AI) have become widespread and are used in medicine, defense, business, and engineering. Major countries of the world are now actively developing and implementing AI technologies, among which the United States (the US) is the world's absolute leader. This state holds the largest number of applications for patenting AI in the world (15 317 applications as of 2010-2014), the largest number of employees engaged in this field (approximately 850 000), and the largest share of private investments (66% of the total number of investments) (Lemaire *et al.* 2018). Furthermore, according to the World Intellectual Property Organization, companies that make a specialty of developing robotics and AI are mostly registered in the US – 40%, in Germany – 8%, in the United Kingdom – 5%, and in France – 4% (Keisner *et al.* 2015). At the same time, rapid development of AI raises new challenges before intellectual property legislation. There arise two particularly sharp questions, which are, firstly, patenting of the very technologies of AI, and, secondly, patenting of inventions generated by AI.

In our opinion, the priority issue comprises patenting technologies of AI. Namely, without understanding the concept of AI, its types and features, conformity to conditions of patentability it will be quite difficult to resolve complex issues of patenting inventions generated by AI. Patenting AI assumes the possibility to protect intellectual property rights for algorithms and software architecture as integral elements of AI. Many high-tech companies such as IBM, Google, Amazon, Microsoft, Samsung, AT&T develop new AI algorithms to make their products better, more convenient and understandable (Patenting Artificial Intelligence 2018). The main value of an AI algorithm stands in a new way of solving a task, changing functions and expanding the scope of a device, hence, it is a question of perceiving the algorithm as an invention that relates to a method.

At present, the issue of the feasibility to patent AI remains unresolved in legislations of most states. Accordingly, there is a necessity to solve these issues comprehensively, to elaborate a unified strategy and to take into account the world's best experience. Adoption of the roadmap in the field of AI will avail companies of taking advantage of its potential, whereas the civil society will be fully confident in new technologies (USA-China-EU Plans... 2018). In this paper, we consider legal issues of patenting AI, its algorithms and architecture under laws of the United States and countries of the European Union (France, Germany, the United Kingdom).

1. Legal Regulation and Definition of AI in the US and Countries of the EU

AI emerged as one of the sections of computer science, but the rapid pace of its development entailed the need for legal regulation, in order to minimize negative effects of its implementation. In so doing, regulation of AI requires a detailed determination of the legal status of robots, compensation for damages caused by robotics, liability for offenses committed by dint of AI, ethical aspects of development and application, legal aspects of patenting AI as a means of protecting intellectual property rights. There is no specialized legal regulation of AI in the United States, yet the current legislation keeps the possibility of patenting AI open in case an object meets requirements of patentability. Special regulation is expressed only as separate bills. In particular, the bill 'On Artificial Intelligence' has been introduced, and the National Artificial Intelligence Research and Development Strategic Plan is being elaborated.

In the EU, the first step towards regulation of AI was made when adopting the Resolution 'Civil Law Rules on Robotics' in 2017. The given Resolution on intellectual property rights provides a technologically neutral approach that applies to various areas wherein robotics can be used (European Parliament Resolution... 2017). As is obvious, such regulation of intellectual property issues is rather superficial, for which reason it is necessary to regulate this sphere in greater detail. Among the EU countries, particular consideration is claimed by the legislation of France. In 2018, the state shaped 'The National Artificial Intelligence Strategy' paying considerable attention to ethical aspects of AI development, and setting requirements for development of transparent algorithms that may be checked for ethical compliance in the field of patenting.

There is presently no legislatively prescribed, exhaustive and unambiguous definition of AI, although such necessity undoubtedly exists, given that this concept may be interpreted differently. Defining AI would afford to establish the subject-matter of legal regulation, legal mechanisms of regulation, and would contribute to further development of this sphere. In scholarly literature, AI is understood as the ability of a device to perform actions that could be expected on the part of the human brain. These activities comprise the ability for knowledge, as well as the ability to acquire them. It also includes the ability to understand relations and, at the very least, to produce original thoughts (Borana 2016).

AI is also interpreted as 'the simulation of human intelligence processes by machines, especially computer systems'. In other words, AI is 'the development of computers that are able to do things requiring human intelligence without human intervention'. However, there is no single definition, despite various attempts to reach it. Understanding this concept is not straightforward, and one of the reasons behind that is that there are a number of synonyms to AI, namely, self-learning, neural network and machine learning. Hence, the unambiguous definition is turning to become more complex, as it is extended to other concepts (Rönnerhed 2018).

The Resolution 'Civil Law Rules on Robotics' provides the criteria, by establishing which it could be claimed that AI technologies are involved:

- acquiring autonomy via sensors and/or exchanging data with the environment;
- self-learning from experience and interaction (optional criterion);
- being at least insignificantly physically supported;
- adapting behaviors and actions to the environment;
- lacking life in the biological sense (European Parliament Resolution... 2017).

An important element of AI is a software algorithm, which is a step-by-step instruction for performing a specific task. The algorithm as an element of a computer program is the primary category of programming. Still, in

order for the algorithm to perform a task, an executor is required. In this regard, not only a computer program may act as an executor, but any entity able to understand the system of algorithm commands including a human being (Filippovich 2017).

The architecture of AI is a broader concept. The software architecture of a system or a set of systems consists of all-important project solutions on structures of a program and interactions between these structures. Project solutions ensure a desirable set of properties that are to be sustained by the system in order to perform tasks. Project solutions provide for a conceptual framework for the system design, maintenance and service (McGovern *et al.* 2004). The architecture of AI affords to accomplish tasks by arranging software systems. It is worthwhile to note that in order to accomplish one task, AI may apply a variety of architectures, which necessitates their patenting.

Speaking of differences between AI and ordinary software or computer systems, it should be pointed out that a work created by the use of a software or system belongs to someone who has applied this software or system lawfully. However, in case of AI, software acts within the creation process more like an independent source of intelligence (Gürkaynak *et al.* 2017). Today, two concepts of AI are distinguished by the criterion of independence from a human: the concept of weak AI and the concept of strong AI. Weak AI targets highly specialized issues, performs only one task and provides an auxiliary function to people. Weak AI is exemplified by AlphaGo computer program that, in 2015, first defeated 18 times world champion and holder of the 9th dan rank in Chinese 'Go' game Lee Sedol. Strong AI is the closest to human intelligence, able to perform several tasks, and to act bypassing obstacles. Such type of AI will bear the ability to perform functions inherent in human beings (Borana 2016). It should be emphasized that such division of AI is quite arbitrary, since it enjoys no reflection in legislations of states, whereas is subsidiary in understanding AI.

2. Terms and Conditions of Patenting AI under Legislations of the US and the EU

When patenting AI, the most controversial issue is still patenting the algorithm of AI software. The traditional approach assumes that algorithms are not patentable, since they are only detected and not invented. In addition, they do nothing, but merely providing instructions. Computer programs may use many algorithms, but these are programs, not algorithms in the traditional sense, that ensure performance of functions (Roitblat 2018). We agree that neither the algorithm itself nor software makes AI patentable. However, in case they entail a technical, useful, material result, such as improvement of functioning of an electronic device, the ability to perform functions not previously performed by devices, essentially turning them into inventions, this enables such algorithm or software to acquire patent protection.

It is worth mentioning that the approach prohibiting software algorithms from being patented is equally bad in terms of inability to protect genuine technological breakthroughs and inventions in fields that are likely to shape the future of many technology areas (Roitblat 2018). In addition, taking into account the need for innovation and the tendency to submit patent claims for AI algorithms and architecture that will continuously increase, we believe patent protection of AI algorithms is necessary.

USA. The United States is one of the world's main markets for selling and licensing innovative technologies, as well as for selling goods based on state-of-the-art technologies or those with patented elements. The legal basis for patentability of 'patents for artificial intelligence' comprises the United States Patent Law (2016), whose Section 101 (hereinafter 35 U.S.C. 101) establishes patentability of 'any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof'. Patent claims aimed at abstract ideas (for instance, a mathematical algorithm), natural phenomena or laws of nature shall not subject to patenting; the Supreme Court of the United States reasoned that 'they are the basic tools of scientific and technological work', and that providing monopolies on these tools by virtue of patent rights might hinder innovation (Artificial Intelligence Collides... 2018).

Among examples of patenting AI in the US, it is worth referring to *McRO, Inc. v. Bandai Namco Games America Inc.*, where '[a] method for automatically adjusting computer graphics' was subject to patenting. The above-mentioned method provided a way to automatically animate synchronization of lips and facial expressions in animation of computer graphics. The United States Court of Appeals for the Federal Circuit determined that this method was eligible for protection, since it was not aimed at an abstract idea. In this regard, it was noted that the automation method applied a series of specific algorithms converting information into a certain format that was used for character animation. The Federal Circuit also emphasized that implementation of these rules entailed technical improvement of conventional technologies of computer animation. Despite the fact that the invention used a computer to automate the animation process, the use of a computer itself, without applying specific rules prescribed in patent claims, would not produce effects achieved by the invention. The *McRO, Inc.* case

demonstrates that '[p]rocesses that automate tasks that humans are capable of performing are patent-eligible if properly claimed' (Hashiguchi 2017).

The European Union. Pursuant to Art. 52(1) of the European Patent Convention (EPC), European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application (European Patent Convention 2016).

Art. 52(2) of the EPC establishes exceptions to patent protection. In particular, the following shall not be considered as inventions within the scope of paragraph 1:

(a) discoveries, scientific theories and mathematical methods;

(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers (European Patent Convention 2016).

The European Patent Convention excludes computer software 'as such' from patentability. For the inventive step, the EPC requests that a claimed invention reaches the technical effect. Anything 'non-technical' is excluded from complementing the inventive step and commercial / business related information, and outcomes are regarded non-technical (IP for AI... 2017). Such requirements also cover inventions related to AI.

France. In Art. L611-10 of the Intellectual Property Code (Code de la Propriété Intellectuelle 2015), French legislation establishes that 'Inventions which are susceptible of industrial application, which are new and which involve an inventive step shall be patentable'. The following shall not be considered as inventions in the meaning of paragraph one of the same Article: a) discoveries, scientific theories and mathematical methods; b) aesthetic creations; c) schemes, rules and methods for performing intellectual activities, playing games or doing business, and computer programs; d) presentations of information.

An example of patenting AI in France is the case of *Proseccion Électrique Schlumberger*, where the company applied to the French patent office requesting a patent for 'a method relating to the exploration of petroleum in geological environments'. The method comprised of six steps. Some steps were performed by using a computer program. The French National Institute of Intellectual Property rejected the patent application by Schlumberger, reasoning that the invention was directed to a series of instructions for machine calculations. Schlumberger appealed to the Court of Appeal of Paris that reversed the decision of the Institute. The Court listed three reasons, for which Schlumberger's method revealed the technical character. Firstly, its purpose was related to the industry of petroleum exploration. Secondly, it applied a number of concrete steps. Thirdly, the method of obtaining information on physical characteristics of geological environments was useful in the industry. Aside from that, the Court of Appeal reasoned that a method cannot be deprived of patentability on the score that some of its steps are performed by a computer program. The Court admonished that denial of patentability in such cases would mean that important novel inventions involving the use of computer programs would be deprived of patent protection (Hashiguchi 2017).

Germany. German Patent Law (2017) is the main regulatory act in the field of protection of inventions and utility models 2017. It establishes a circle of objects protected by a patent, the procedure for obtaining a patent, the structure and functions of the Patent Office and the Patent Court, the responsibility for violating patents. The judicial practice of the Patent Court plays a significant role in Germany. The German Patent Law (2017) in Section 1(1) prescribes that patents shall be granted for any inventions in all areas of technology, provided that they are new, involve an inventive step, and are susceptible of industrial patent application. Yet, Subsection (3) establishes that the following shall not be recognized as inventions in the meaning of Subsection (1): 1. discoveries, scientific theories and mathematical methods; 2. aesthetic creations; 3. schemes, rules and methods for performing mental acts, playing games or doing business and programs for computers.

So far, the German Patent Office, the German Patent Court and the Supreme Court of Germany have been very cautious in granting patent protection to software. With regard to Art. 52(2)(b) of the EPC and pursuant to Section 1(3) of the German Patent Act, patentability of software is strictly limited to the technical nature of the entire invention. Computer programs can be patentable, if they provide for a technical function within the scope of the invention, which means that software products should cause a technical effect beyond the computer on which they are executed. Although this principle seems to be plain, its application by the German Patent Office, the German Patent Court and the Supreme Court of Germany has produced a very complicated case assessment of patentability of computer inventions. Many unexpected decisions have predetermined the situation, when even experts could not foresee with sufficient certainty whether a computer invention is of the technical character, and whether it will pass the examination by way of the patent application process (Dorn 2010).

United Kingdom (UK). In the United Kingdom, the Select Committee on Artificial Intelligence of the House of Lords has been launched. Its main tasks are to develop and manage AI, as well as to establish centers of ethics and innovation.

In its two judgments delivered in cases AT&T Knowledge Ventures and CVON Innovations Ltd, the English High Court identified five issues that can be used to establish whether a computer program is patentable:

- (1) whether the claimed invention in the form of software has a technical effect on a process which is performed outside of a computer?
- (2) whether the claimed technical effect entails that a computer operates in a new way?
- (3) whether the technical effect is produced irrespective of computer operation or program running?
- (4) whether there occurs an increase in the speed and reliability of a computer?
- (5) whether the claimed invention overcomes a technical problem? (Patent Protection for Software..., 2016).

The United Kingdom has developed a different approach than that introduced by the EPC. The UK applies a higher bar for the legislative exclusion and a lower bar for the inventive step (since 'non-technical' features are not excluded). The EPC provides for a low bar for the legislative exclusion and a higher bar for the inventive step. As a usual thing, the UK approach reaches the same results as the EPC (IP for AI... 2017).

3. Problematic Issues of Patenting AI

The analysis of laws and the judicial practice of the United States and European countries affords arguing that patenting AI is exposed to many problems associated with the absence of special legal regulation, the legal and patent practice, and a sufficient number of experts in the field of AI. It is equally important that AI may not always meet requirements of patentability (a novelty, an inventive step, an industrial susceptibility), which limits the scope of inventions that, although pertaining to AI technologies, are formally incompatible with requirements of legal protection. The most common are the following problematic issues:

- (1) An installation or invention is not aimed at an abstract idea and does not perform human mental processes. The concept of an abstract idea is currently undefined, and the court interprets this concept differently on a case-by-case basis. There is the need for a unified approach to interpreting these concepts by reinforcement in statutory legal acts.
- (2) Complexity of describing an AI related invention. When applying for a patent for an invention in the field of AI, it is necessary to describe the problem that is solved by the invention, as well as the technical effect of the invention. An invention in the field of AI may include a large number of neural networks, instructional data and software algorithms, which makes it impossible to describe the entire technical effect of the invention and will result in insufficient legal protection.
- (3) In case of patenting AI, it is difficult to identify an inventive step which is considered to be established, if it does not explicitly follow from the prior art for an expert. Given the nature of certain AI inventions, meeting this requirement may be a daunting task. The scope of a claim will depend on which set of characteristics described in the claim is known to an expert in the field. In our opinion, the very procedure of patenting AI requires modifications, as long as the existing procedure fails to meet requirements of the present time.

The above-listed problematic issues are far from being exhaustive. Under existing conditions, it is challenging to find a unified approach to solving all issues under consideration, for which reason it is essential to develop comprehensive regulation of patenting AI, its algorithms and architecture, not only at the international level, but also at the legislative level of individual states.

Conclusions

Summarizing the performed research, it could be stated that AI is increasingly developing, and its introduction is a priority field of activities for states. At this point, legal regulation of patenting in the United States and countries of the European Union is under way.

When patenting AI in the United States, a patent claim is in the first place examined in terms of meeting requirements of legal protection and being not aimed at abstract ideas, human mental processes, laws of nature or natural phenomena, whereas whether the invention performs technical functions is of less importance. In contrast to the United States, the European Union establishes that AI should provide material technical results achievable outside of computer systems (non-technical achievements, as well as business and commercial related information are excluded). This means that the matter concerns high standards of the inventive step.

Nevertheless, it is worth mentioning that employment of different approaches does not significantly affect development of AI. The following measures are essential for countries that intend to create conditions for introducing AI:

- (1) to adopt regulatory acts 'On Artificial Intelligence', 'The National Artificial Intelligence Research and Development Strategy' that would regulate the issue of conformity of AI to requirements of patentability, determine whether an invention is aimed at abstract ideas or human mental processes, regulate in details the procedure for patenting AI, protect intellectual property rights for AI;
- (2) to establish 'The National Artificial Intelligence Development Agency', whose duties would include issues of establishing conformity of AI to ethical aspects of administering law, integration of the legal and judicial practice of patenting AI, development and improvement of regulatory acts in the field of AI, research activities in the AI industry;
- (3) to qualify experts in the AI field that would possess special technical, legal and economic knowledge in the area of AI, and could provide an expert opinion on conformity of AI to requirements of patent protection and a range of other issues arising from specific cases of patenting AI.

References

- [1] Artificial Intelligence Collides with Patent Law. Center for the Fourth Industrial Revolution. 2018. Available at: http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf
- [2] Borana, J. 2016. Applications of Artificial Intelligence & Associated Technologies. *Proceeding of International Conference on Emerging Technologies in Engineering, Biomedical, Management and Science [ETEBMS-2016]*, 5-6 March. Available at: http://www.sdtechnocrats.com/ETEBMS2016/html/papers/ETEBMS-2016_ENG-EE7.pdf
- [3] Brayne, S; McKellar, S. and Tzafestas, K. 2018. Artificial Intelligence in the Life Sciences & Patent Analytics: Market Developments and Intellectual Property Landscape. Available at: <https://www.ip-pragmatics.com/media/1049/ip-pragmatics-artificial-intelligence-white-paper.pdf>
- [4] Code dela Propriété Intellectuelle (version consolidée au 23 février). 2015. Available at: http://www.wipo.int/wipolex/en/text.jsp?file_id=363403
- [5] Dorn, S. 2010. German Supreme Court Widens the Door for Software Patents. Available at: <https://www.ipeg.com/german-supreme-court-widens-the-door-for-software-patents/>
- [6] European Parliament Resolution of 16 February with Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)). 2017. Available at: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0051+0+DOC+XML+V0//EN#BKMD-12>
- [7] European Patent Convention (16th Edition, June). 2016. Available at: [http://documents.epo.org/projects/babylon/eponet.nsf/0/029F2DA107DD667FC125825F005311DA/\\$File/PC_16th_edition_2016_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/029F2DA107DD667FC125825F005311DA/$File/PC_16th_edition_2016_en.pdf)
- [8] Filippovich, M. 2017. Protective Capability of the Algorithm. *V International Legal Forum 'Legal Protection of Intellectual Property: Problems of Theory and Practice'*. Sourcebook, Vol. 2. Moscow: Publishing Centre of the Kutafin, Moscow State Law University (MSAL).
- [9] German Patent Act as Amended Up to Act of October 8. 2017. Available at: <http://www.wipo.int/wipolex/en/details.jsp?id=17611>
- [10] Gürkaynak, G., Yilmaz, I., Doygun, T. and Ince, E. 2017. Questions of Intellectual Property in the Artificial Intelligence Realm. Available at: <http://www.gurkaynak.av.tr/docs/8b791-rj-september-october-2017-.pdf>
- [11] Hashiguchi, M. 2017. The Global Artificial Intelligence Revolution Challenges Patent Eligibility Laws. *Journal of Business and Technology Law* 13(1). Available at: <http://digitalcommons.law.umaryland.edu/jbt/vol13/iss1/2>
- [12] IP for AI: Can We Patent an Artificial Human Expert? 2017. Barkel Brettell Intellectual Property. Available at: <https://www.barkerbrettell.co.uk/ip-ai-can-patent-artificial-human-expert/>
- [13] Keisner, C.A., Raffo, J. and Wunsch-Vincent, S. 2015. Breakthrough Technologies – Robotics, Innovation and Intellectual Property. *Economic Research Working Paper*, No.30. Available at: http://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_30.pdf

- [14] Lemaire, A., Lucazeau, R. and Rappers, T. 2018. Artificial Intelligence – A Strategy for European Startups. Available at: https://www.rolandberger.com/publications/publication_pdf/roland_berger_ai_strategy_for_european_startups.pdf
- [15] McGovern, J., *et al.* 2004. *A Practical Guide to Enterprise Architecture*. New Jersey: Prentice Hall.
- [16] Patent Protection for Software in the UK – A Practical Approach. 2016. Available at: <https://www.elkfife.com/news-and-views/2016/03/02/software-patents-in-the-uk>
- [17] Patenting Artificial Intelligence. 2018. Available at: <https://www.canadianlawyer.com/author/elizabeth-raymer/patenting-artificial-intelligence-15387/>
- [18] Roitblat, H. 2018. Is Artificial Intelligence Patentable? Should It Be? Information Management. Available at: <https://www.information-management.com/opinion/is-artificial-intelligence-patentable-should-it-be>
- [19] Rönnerhed, J. 2018. Artificial Intelligence Outsmarting the Human Perception of What Is Patentable? – An EU Examination of the Patentability of Artificial Intelligence. JAEM03 Master Thesis: Lund University. Lund (Sweden). Available at: <https://lup.lub.lu.se/student-papers/search/publication/8945625>
- [20] U.S. Patent Law, 35 U.S.C. §§ 1 et seq. 2015. Available at: <http://www.wipo.int/wipolex/en/details.jsp?id=15705>
- [21] USA-China-EU Plans for AI: Where Are We? 2018. Available at: https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/DTM_AI%20USA-China-EU%20plans%20for%20AI%20v5.pdf.



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