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Is it possible to grant legal personality to artificial intelligence software systems?

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A B S T R A C T

The purpose of this paper is to determine whether Systems of Artificial Intelligence (SAI) can be deemed subjects of law. This aim is formulated according to the technical capabilities integrated in SAI and the SAI's ability to interact independently with other legal subjects. SAI features, such as direct connection with intellectual skills, the ability to understand, learn and make autonomous decisions may cause situations where autonomous systems based on AI will make decisions which will be in the best interests of individuals, even though conflicting with the user's own will.

To consider the possibility of SAI being recognized as possessing legal personality, we analyse the concept and features of SAI and define its operating principles. We give hypothetical examples to demonstrate the necessity of SAIs being recognized as such. The paper undertakes legal personality analysis of SAI performed: (i) using the philosophical and legal concepts of a subject (person); (ii) discussing artificial (unnatural subjects of law) as an alternative to the recognition of legal personality of SAI; (iii) using elements of legal personality set for natural and legal persons.

The analysis leads to the conclusion that the scope of SAI rights and obligations will not necessarily be the same as the scope of rights and obligations of other subjects of law. Thus, SAI could only have rights and obligations that are strictly defined by legislators. This conclusion suggests that the result of this paper may be its use in further research defining the scope of SAI rights and obligations.

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1. Introduction

"Can a machine think?" The question attracting more and more attention of scientists and practitioners was raised back in 1950 by *Alan Turing*[1] who thereby set a direction for the discourse on Artificial Intelligence (AI). AI is rather new discipline, which has no single definition yet. The concept of AI was first mentioned in 1956[2]; the system is often defined as artificially developed intelligence related to rapidly developing technologies, which enable computers to operate intelligently, i.e. in a human-like manner.[3] Systems of Artificial Intelligence (SAI) are different from other regular computer algorithms (programs) due to their uniqueness, since they are able to learn independently, gather experience and come up with different solutions based on the analysis of various situations independently of the will of their developer (programmer), i.e. SAI are able to operate autonomously rather than automatically.

Today, there is a great variety of information technologies based on the operating principle of SAI, for example, Google Self-Driving Cars, autopilots controlling airplanes, digital assistants such as Siri, Cortana and Google Now, robot nurses, mind-controlled Google smart glasses, etc. These and other technologies are known worldwide and their capacity as well as use is rapidly growing. As the use of technologies based on AI becomes more and more widespread, the number of associated incidents grows as well. For example: (i) in 1.7 million miles of travel, Google Self-Driving Car had 11 accidents resulting in damage[4]; (ii) speech recognition software could become a contributory factor to car accidents[5]; (iii) robot nurses reminding patients to take their medicines fail to ensure that the medicines are actually taken, which may lead to the patient's death.[6]

These specific examples show that SAI are not mere science fiction.[7] Information technology innovation based on SAI and the above examples allow stating that SAI are not mere objects, operation of which is influenced by others. SAI act like entities.[8] Regardless of the exceptional operating principle of such systems, none of the legal systems has recognized SAI subjects of law so far. However, is such legal status of SAI only a temporary attribute, which should change in time? Is it possible to grant legal personality to a System of Artificial Intelligence? Even though the problem at hand has already been addressed before,[9] it has attracted greater (proper) attention only in the recent years.

It should be noted that SAI that are capable of learning and making decisions independently can make the lives of people easier, but failure to manage such technology can lead to major existential threats.[10] Bill Gates claims that after a few decades, SAI and the level of their intelligence will lead to major concerns; therefore, it is necessary properly to prepare ourselves.[11] As the role of SAI in our daily lives becomes more and more important, we encounter various challenges: moral, ethical issues and problems. Legal regulation and legal system itself are not an exception. Discussions on the status of SAI that are able to make more and more complicated decisions independently in the legal systems of countries become increasingly frequent and extensive at the academic level,[12] in the political arena of various countries[13] as well as in the context of its shaping, and in the society.

The ability of SAI to learn from their own personal experience leads to independent conclusions and autonomous decision-making, i.e. what can lead them to their legal personality. Due to their ability to make decisions independently, technologies based on such systems like Machine Learning, Expert Systems or Neural Networks can no longer be treated as objects. Therefore, the aim of the paper is to determine whether SAI can be deemed subjects of law. The object of the paper is legal personality of SAI and the methods of research are information collection, systematizing, generalizing, valuation, comparison, analysis of scientific literature, synthesis and deduction.

The paper consists of five sections. Section 1 presents the concept of SAI and analyses the concept and main features of such system, and defines its operating principle. Section 2 answers the question whether it is necessary to recognize SAI as subjects of law. Section 3 analyses legal personality of SAI. The analysis is performed using the philosophical and legal

[1] Alan Turing, 'Computing Machinery and Intelligence' (1950) 49 (236) Mind 433–460.

[2] Paulius Čerka, Jurgita Grigienė, Gintarė Sirbikytė, 'Liability for damages caused by Artificial Intelligence' (2015) 31 (3) Computer Law &Security Review 376 – 389.

[3] William Raynor, *The international dictionary of artificial intelligence* (The Glenlake Publishing Company 1999) 13.

[4] Dan Moren, People Keep Crashing Into Google's Self Driving Cars (2015), <http://www.popsci.com/people-keep-crashing-googles-self-driving-cars> accessed 13 June 2015.

[5] IBN Live, *Apple's Siri could crash your car* (2014), <http://ibnlive.in.com/news/apples-siri-could-crash-your-car/504671-11.html> accessed 13 June 2015.

[6] Kseniya Charova, Cameron Schaeffer, Lucas Garron, *Robotic Nurses* (2011).<http://cs.stanford.edu/people/eroberts/cs181/projects/2010-11/ComputersMakingDecisions/robotic-nurses/index.html> accessed 13 June 2015.

[7] John Haugeland, *Artificial Intelligence: The Very Idea* (Massachusetts Institute of Technology 1989).

[8] Marshal S. Willick *Constitutional Law and Artificial Intelligence: The Potential Legal Recognition of Computers as "Persons"* (1985) < http://ijcai.org/Past%20Proceedings/IJCAI-85-VOL2/PDF/115.pdf> accessed 01 June 2015.

[9] Marshal S. Willick, 'Artificial Intelligence: Some Legal Approaches and Implications' (1983) The AI MAGAZINE; Lawrence B. Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70 North Carolina Law Review 1231, 1231.

[10] Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press 2014) 18.

[11] Peter Holley, Bill Gates on dangers of artificial intelligence: "I don't understand why some people are not concerned" (2015)) < https://www.washingtonpost.com/news/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-some-people-are-not-concerned/> accessed 13 June 2015.

[12] For example: Nils J. Nilsson, 'The quest for artificial intelligence. A history of ideas and achievements' (2010); Migle Laukytė, 'Artificial and Autonomous: A Person?' (2012); Kathleen Mykytyn & Peter P. Mykytyn, & Jr. Craig W. Slinkman, Expert Systems: A Question of Liability (1990); Luke Muehlhauser & Anna Salamon, *Intelligence Explosion: Evidence and Import* (2012); Curtis E.A. Karnow, *Liability For Distributed Artificial Intelligences* (1996) and the others.

[13] *RoboLaw Regulating Emerging Robotic Technologies in Europe. Robotics Facing Law and Ethics*. Collaborative Project FP7 GA 289092 information <http://www.robolaw.eu/> accessed 20 July 2015.

concept of a subject (person). Section 4 discusses artificial (unnatural) subject of law as an alternative to the recognition of legal personality of SAI. Section 5 analyses the legal personality of AI using elements of legal personality set for natural and legal persons.

2. Revealing the concept of a system of artificial intelligence through the use of definitions of artificial intelligence

AI is a new discipline, which covers an extensive field. Therefore, it has no single definition. Development and research of SAI began with the emergence of the first personal computers.[14] John McCarthy first mentioned the concept in 1956.[15] Even though the use of SAI is becoming more and more extensive in the everyday lives of many people, it is still rather difficult to come up with an accurate definition of SAI. The latter covers wide fields of processes from basic tasks, such as legal reasoning, to specific ones such as playing chess, checking mathematical theories, etc.

In their papers, various authors[16] define AI as artificially developed intelligence; for example, a software system that is able to imitate human ways of thinking with the help of a computer or other device (house management systems integrated in household devices, robots, self-driving cars, etc.).[17] Stuart Russel and Peter Norvig distinguish two main directions for the concept of Artificial Intelligence[18]:

- related to thinking processes and motivation (system that *thinks*);
- related to behaviour (system that *acts*).

Georg F. Luger, Prof. Dr. of mathematics and applied mathematics, states that AI is a branch of information technology science related to automation of intelligent behaviour.[19] The International Dictionary of Artificial Intelligence defines AI as a system concerned with rapidly developing techniques to allow computers to act in an intelligent manner, such as a human would.[20]

In the context of a SAI, there are two approaches to understand intelligence.[21] The first one is usually acceptable to philosophers who see intelligence in SAI as something possessing all skills and characteristics attributable to human intelligence also known as *strong intelligence*. As an alternative to this approach, there is intelligence imitated by computer programs also known as *weak intelligence*.[22] Weak intelligence is best demonstrated by the Turing test[23] developed to reveal the level of intelligence of a computer. The test is carried out by asking a person and a computer the same questions. If the person asking the questions cannot tell the difference between the answers given by the person and the computer, the machine is said to have passed the test and is deemed AI, regardless of how the person asking the questions understood these questions.[24]

All of the above definitions of AI suggest a conclusion that AI has direct connection with intellectual skills, the ability to understand, learn and make autonomous decisions independent of the will of the developer or user. The main difference of AI and human intelligence is its artificial (synthetic) nature.

3. Is it necessary to recognize SAI as subjects of law?

The issue of possibly granting legal personality to various objects, including SAIs, is becoming increasingly relevant in the public domain. For example, on 20 April 2015, representatives of the *Nonhuman Rights Project* organization announced that, for the first time in history, the Manhattan Supreme Court had recognized two chimpanzees (Hercules and Leo) as legal persons.[25] Even though SAIs have not been granted legal personality either at a court or statutory level, the topic is widely analysed by academics.[26] When the question whether SAIs could be recognized as legal persons is raised, the necessity to grant such status is rarely addressed. Therefore, in this section, the authors of the paper discuss the latter topic, i.e. the need to

[14] Ibid.

[15] Stuart Russell, Peter Norving, *Artificial Intelligence: A Modern Approach*. (3rd edn, NJ Prentice Hall 2009) 3.

[16] Ibid; Gabriel Hallevy, 'The Criminal Liability of Artificial Intelligence Entities – from Science Fiction to Legal Social Control' (2010) 4 Akron Intellectual Property Journal 171, 175.

[17] Paulius Čerka, Jurgita Grigienė, Gintarė Sirbikytė, 'Liability for damages caused by Artificial Intelligence' (n 3).

[18] Russell, Norving (n 19) 4–5.

[19] George F. Luger, *Artificial Intelligence, Structures and Strategies for Complex Problem Solving* (England 2005) 1.

[20] William J. Raynor, *The international dictionary of artificial intelligence* (Chicago 1999) 13.

[21] Daniel C. Dennett, 'When HAL Kills, Who's to Blame? Computer Ethics' (1997) in *HAL's Legacy: 2001's Computer as Dream and Reality*, D. G. Stork (ed.) (Cambridge) 351.

[22] Benjamin D. Allgrove, 'Legal personality for artificial intellects: Pragmatic Solution or Science Fiction' (2004) in SSRN Electronic Journal, 3, <http://dx.doi.org/10.2139/ssrn.926015 > accessed 25 November 2015.

[23] Russell, Norving (n 19) 947.

[24] Allgrove (n 27) 4.

[25] 'Judge Recognizes Two Chimpanzees as Legal Persons, Grants them Writ of Habeas Corpus', in The Nonhuman Rights Project http://www.nonhumanrightsproject.org/2015/04/20/judge-recognizes-two-chimpanzees-as-legal-persons-grants-them-writ-of-habeas-corpus/? accessed 25 October 2015.

[26] *See, e.g.*, Evan J. Zimmerman, *Machine Minds: Frontiers in Legal Personhood*, Machine Minds (February 12, 2015). Available at SSRN: http://ssrn.com/abstract=2563965 or http://dx.doi.org/10.2139/ssrn.2563965; Francisco Andrade, Paulo Novais, Jose Neves, *Issues on Intelligent Electronic Agents and Legal Relations*, Proceedings of the LEA 2004 – Workshop on the Law of Electronic Agents, Roma, Italia, Cevenini C. (ed), Gedit edizioni, ISBN 88-88120-54-8, pp 81–94, 2004; Samir Chopra, Laurence White, Artificial Agents – Personhood in Law and Philosophy (2009), Department of Philosophy, City University Graduate Center; Elettra Stradella, Pericle Salvini, Alberto Pirni, Angela Di Carlo, Calogero Maria Oddo, Paolo Dario, Erica Palmerini, Robot Companions as Case-Scenario for Assessing the "Subjectivity" of Autonomous Agents. Some Philosophical and Legal Remarks, This work was supported in part by the EU under the CA-RoboCom Project (FP7-ICT-2011-FET-F, P.N. 284951); Robert A. Freitas Jr., *The Legal Rights of Robots*, *Student Lawyer* 13(January 1985):54–56; Lawrence B. Solum, *Legal Personhood for Artificial Intelligences, North Carolina Law Review, Vol. 70, p. 1231, 1992; ect.*

recognize SAI as legal subjects, using pseudo-situations and devices based on SAIs.

A growing number of articles and papers on the achievements of systems based on AI[27] lead to a question, what awaits us tomorrow, in a month, year, ten or twenty years? Can we be sure that, as the use of smart houses based on the operating principles of SAI become increasingly popular, one day, owners of such houses may face resistance from their AI entity or any other active operation, which, even if it is appropriate and correct, might be unacceptable to the owner. This would be similar to the original Disney Channel movie *Smart House* (produced back in 1999), where *Pat*, a computer system controlling the house, displays its excessive care and traps its owners in the house.[28]

3.1. *Example based on a hypothetical situation*

Let us imagine that household appliances conclude that their owner X is overweight, which threatens their health and maybe even life, and decides to force their owner to follow a health promotion programme. As a result, electronic scales of the smart house with a smart bracelet monitoring the owner's heart rate *cooperate* with the fridge and shelves used to store fresh food and send orders to the owner's e-wallet, electronic system administering their bank account and all other electronic systems in charge of e-trade and delivery of food, and serving customers of fast food diners and snack-bars. Let us imagine that the order includes an encoded message asking it to take care of the owner's health and life and prevent that person from buying, storing and keeping fat high-cholesterol foods in the smart house. So, without even planning to start eating healthily, the owner X is forced to do so, because their e-wallet or bank account will not respond if they attempt to pay for unhealthy foods. In addition, even though the owner somehow manages to get unhealthy food, the smart house system would work in way rendering such food not fit for human consumption. For example, the fridge would stop operating and the storage room would stop the ventilation system failing to maintain the necessary temperature. This way, the smart house system acting exclusively in the interests of the owner X and seeking to make them healthier or even to save their life, would restrain their actions and free will by preventing them from purchasing what they really want and making their own lifestyle choices.

When looking at the above example in terms of trends observed in 2016,[29] this entire tragicomic situation, which seems more like an episode from a fantasy or science fiction, can come true or come close to reality. The rapid advancement in SAI observed today will soon lead to situations, where, having assessed threats and hazards to persons, autonomous systems based on AI will make decisions which will be in the best interests of individuals, even though conflicting with their own will.

Let us say that a car with an integrated smart safety system preventing the car from starting, when the driver is under the influence of alcohol, will not allow the person who had a drink, but is able to drive and understands the environment perfectly, to take a severely injured person to a hospital from a farmhouse far from the city. The SAI integrated in the car will make a decision, which is in the interests of the driver, i.e. it will prevent them from driving under the influence of alcohol. However, it will restrict their actions by preventing the driver from fulfilling their duty to save another person's life.

3.2. *Legal liability of systems of artificial intelligence*

Restriction of a person's free will is linked with the restriction of the person's rights, which are permitted only in cases provided for in the laws (this is usually linked to prohibition to interfere with the rights of others). As SAI become immediately involved in people's lives and are able to make autonomous decisions, situations will arise where decisions made by AI and the appropriate actions affecting free will and lifestyles of individuals (biological creatures), will undoubtedly occur. The problem at hand raises a question as to how to control Systems of AI so that they do not interfere with the rights of others, when actively operating in society, even if driven by good intentions; and how can we ensure that the damage caused by such systems is compensated.

Seeing that, if considered an object of law, Systems of AI would be unable to compensate the damage, it would have to be decided what other person (subject of law) would be liable for the damage as someone who is responsible for the System of AI. After all, according to one of the principles of compensation of damage, the offender compensates the latter personally or by a person who is responsible for the actions of the offender. Some may believe that the problem at hand could be solved by holding the developers, operators or producers of a System of AI liable. Others may think that it would be sufficient to reprogram or shut down the system.

However, in this context, it should be noted that holding the developers, operators or producers of Systems of AI liable is not that easy, because of the specific characteristics of such systems, i.e. their ability to make autonomous decisions, independently of the will of their developers, operators or producers, as well as their ability to learn and gather experience.[30] An explanatory note to Article 12 of the UNCITRAL Secretariat on the United Nations Convention on the Use of Electronic Communications in International Contracts states

[27] *See, e.g.*, Nils J. Nilsson, *The quest for artificial intelligence a history of ideas and achievements* (Cambridge University Press 2009) 578 p.; Juan Carlos Kuri Pinto, 'Some Achievements of Artificial Intelligence (For Skeptics)' (2013), <http://immortallife.info/articles/entry/some-achievements-of-artificial-intelligence-for-skeptics> accessed 05 June 2015.; Artificial Intelligence News <http://www.sciencedaily.com/news/computers_math/artificial_intelligence/> accessed 05 June 2015; Irving Wladawsky-Berger,'Soft' Artificial Intelligence Is Suddenly Everywhere (2015) <blogs.wsj.com/cio/2015/01/16/soft-artificial-intelligence-is-suddenly-everywhere/> accessed 05 June 2015; etc.

[28] For example: LeVar Burton movie *Smart House* (1999) <http://www.imdb.com/title/tt0192618/>.

[29] For example: Defense Advanced Research Projects Agency <http://www.darpa.mil/>; Jack Clark, '*Why 2015 Was a Breakthrough Year in Artificial Intelligence*' (2015) http://www.bloomberg.com/news/articles/2015-12-08/why-2015-was-a-breakthrough-year-in-artificial-intelligence> accessed 05 August 2016.

[30] Paulius Čerka, Jurgita Grigienė, Gintarė Sirbikytė, 'Liability for damages caused by Artificial Intelligence', (2015) 31 (3) Computer Law &Security Review 376 – 389.

a general principle that a person (whether a natural person or a legal entity) on whose behalf a computer was programmed should ultimately be responsible for any message generated by the machine.[31] However, Article 12 itself covers automatically generated messages of electronic agents, rather than autonomous electronic systems. In addition, if errors of automatic systems are easy to identify and persons responsible for the occurrence of such errors are easy to identify too, this is not the case with autonomous Systems of AI. Such systems make independent decisions, making it very difficult to determine the causal link between the improper decision of the system and the actions of its developer, operator or producer. Therefore, making the developers, operators or users of Systems of AI liable for the results of independent decisions of such systems would be more complicated than it might seem.

It is also important to note that there is a danger of liability for any independent decision of AI being transferred to its producer and, ultimately, the programmer, i.e. the final element in the liability chain. In this case, the burden of responsibility would be disproportionate to that person. An excessive burden of legal liability could lead to the programmer's fear and unwillingness to reveal their identity in public, or it could otherwise impede the progress of technology development in the official markets, moving all the programming work to unofficial markets. Even if we assume that this is not possible, it is obvious that applying a product liability model in the case of AI is more difficult[32] than a regular product.

Those who believe that the problem could be solved by shutting down or reprogramming a System of AI should keep in mind that this is a temporary solution, effective only with primitive Systems of AI. Such systems are unique, because they are able to learn, gather experience and make autonomous (not automatic) decisions.[33] This is why reprogramming of a System of AI would not necessarily ensure that in future such a system would make completely different decisions than those made prior to the reprogramming.

3.3. *The need to recognize legal personality*

It is also unclear as to what should (will have to) be done in cases, where Systems of AI are able to *hide,* making it difficult to detect them even by the most sophisticated programmers? What should be done in cases, where a System of AI, which is able to make independent decisions, seen as a particular form of expression of will, asks the persons who are about to shut it down not to destroy it? The idea is not new. On 16 September 2003, during the biennial convention of the International Bar Association in San Francisco, a mock trial was held, during which Martine Rothblatt argued a particularly difficult case, where a computer, discovering corporate plans to shut it down, sued for the right to exist.[34] Even though the mock trial was closed with a compromise decision of the Judge, *Letting the issue be resolved by the hypothetical legislature (I think I would deny the injunction, because I do not think that standing was in fact created by the legislature – whatever legislature we're talking about – and I doubt very much that court has that authority in the absence of the legislature*[35]). The question as to what should be done with the System of AI 'believing' that it has the right not to be destroyed remained unanswered. The authors believe that the question could be answered by solving the problem of legal personality of AI.

So, could a System of Artificial Intelligence be recognized as a subject of law, and is this necessary? To answer the question of the need to grant legal personality to Systems of AI, it is necessary to perform a philosophical and legal analysis of the concept of a subject of law. When analysing the idea of recognizing SAI subjects of law, it is important to take into account and properly assess the operating principles of SAI and their relationship with the environment, in which they operate. In this context, it is impossible to ignore the idea of Robert M. Geraci based on the belief of Lawrence B. Solum and Woodrow Barfield that, as we come to interact with robots and SAI as though they are persons, we will increasingly grant them legal rights.[36]

If the society treats Systems of AI as autonomous subjects, this has to be reflected in the legal framework. For example, in cases where an agent (fiduciary relationship between agent and principal) has a relatively well-defined task in relation to an investment fund, i.e. to maximize profits, they could use a System of AI to receive expert opinions prior to making important investment decisions. The system will not only perform better analysis and present more reliable conclusions than a human, it could also serve as the main tool to prevent abuse on the part of the agent.

Society accepts agents as legal entities, which are recognized subjects of law, so why could SAI not be granted the same status? These systems possess the elements characteristic of subjects that have been granted legal personality: SAI are intelligent, able to make autonomous decisions, learn from their own experience – memorize, plan, demonstrate complexity, formality and ability to manipulate structures, which let them

[31] Ugo Pagallo, *The laws of robots: crimes, contracts, and torts* (Springer 2013) 98.

[32] Čerka, Grigienė, Sirbikytė (n 34) 376 – 389.

[33] For example: This unique feature enables AI to act differently in the same situations, depending on the actions previously performed. This is very similar to human experience. Cognitive modeling and rational thinking techniques give more flexibility and allow for the creation of programs that can "understand," i.e. that have the traits of a reasonable person (brain activity processes). Hayes argues that "in their complexity and operating principles, certain software programs imitate certain processes of the human brain," the functioning of which is based on an artificial neural network. In Maruerite E. Gerstner, 'Liability Issues with Artificial Intelligence Software' (1993) 33(1)Santa Clara L. Rev.,239 <http://digitalcommons.law.scu.edu/lawreview/vol33/iss1/7> accessed 25 September 2013, Citing *Cariad Hayes*, 'Artificial Intelligence: The Future's Getting Closer', (1988) AM. LAW, 115.

[34] Robert M. Geraci, *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual reality* (Reprint ed., Oxford University Press 2012).

[35] Martine Rothblatt, Amara D. Angelica, 'Biocyberethics: should we stop a company from unplugging an intelligent computer?' (2003) <http://www.kurzweilai.net/biocyberethics-should-we-stop-a-company-from-unplugging-an-intelligent-computer>, accessed 19 May 2016.

[36] Geraci, Robert M, *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual Reality* (Kindle Edition, Oxford University Press 2010) 217; Lawrence B. Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70 North Carolina Law Review 1231–1287.

interact with other subjects of law. Another reason to recognize Systems of AI subjects of law is their immediate interaction with other subjects of law, optimum protection of whose rights and interests requires clearly defining the legal status of Systems of AI. Under the current legal regulation at national and international level, where Systems of AI are seen only as objects of law, the issue of liability for damage caused by actions of Systems of AI is rather unclear.[37]

Therefore, it is obvious that ensuring optimum protection of interests of other subjects of law (both natural persons and artificially developed legal entities) without restricting the exercise of their rights and interests, Systems of AI should be recognized subjects of law. It should be noted that the legal system provides for situations, where natural persons can enter into transactions. However, the parties in a contractual relationship have to be recognized subjects of law and must be able to express their free will. Transactions between two virtual agents, i.e. autonomous systems, even though considered to be valid,[38] are not complete, because rights and obligations under such transactions cannot be separated from the persons (both natural persons and legal entities) overseeing the operation of such agents. In cases where several independent Systems of AI enter into a transaction and it is impossible to identify the persons responsible for their actions, this would create a situation with a valid transaction, but without responsible subjects of law exercising the rights and fulfilling the obligations under the transaction. An even more unusual situation would occur if a transaction entered into by several interacting Systems of AI activated another System of AI related to the performance of such transaction, where the results of its operation created rights and obligations for third parties who are subjects of law.

Being able to learn independently and make decisions, SAI can make the lives of people easier. However, failure properly to control the technology could lead to a serious existential threat.[39] Bill Gates claims that after a few decades SAI and the level of their intelligence will lead to major concerns; therefore, it is necessary properly to prepare ourselves.[40] Google software engineer Ray Kurzwail and his followers believe that by 2045 a superintelligence will already be developed, which will lead to technological singularity or an intelligence explosion, where SAI will become able to coordinate, rebuild, repair, modify themselves and develop new Systems of AI without human interference.[41]

Today, the singularity theory developed by researcher Irving John Good in 1965,[42] which gained momentum in 1991 when Vernor Vingei gave a definition of the theory,[43] still receives criticism. However, more and more people believe that we should already pay more attention to challenges, including threats, related to the advancement of Systems of AI. In early 2015, several thousand interested individuals, including Stephen Hawking and Elon Musk, signed an open letter: *Research Priorities for Robust and Beneficial Artificial Intelligence: an Open Letter*, focusing on the impact of AI on the society[44] and setting guidelines and priorities for research into Artificial Intelligence.[45]

Public concern with the threats posed by AI has led to an active search for solutions to the problem at the technological level and in terms of possible changes to the legal regulation covering Systems of AI. In this context, it should be noted that the modelling of legal regulation changes is important, not only because of potential threats caused by involvement of Systems of AI in the public life, but also to regulate legal relationships properly, which change and will undoubtedly change as society interacts more actively with rapidly evolving SAI (including robots).

An example of such interaction could be the intensive use of smart technology possessing elements of Systems of AI in our everyday lives. The current smart revolution[46] reflects the changing relationship between humans and technology. This sometimes surprises in terms of the shifting attitudes towards technology, but there is also a certain degree of imprudence manifesting itself as excessive reliance on technology and a failure to understand the fact that human interaction with technology can be both beneficial and harmful from the legal point of view. As people become increasingly dependent on technology, the balance in the relationship changes, which leads to the use of technology incorporating SAI regardless of potential consequences, legal assessment of which has not yet been carried out. For example:

[37] Čerka, Grigienė, Sirbikytė (n 34) 376 – 389.

[38] The article 12 of United Nations Convention on the Use of Electronic Communications in international Contracts adopted in 23 November 2005, says that A contract formed by the interaction of an automated message system and a natural person, or by the interaction of automated message systems, shall not be denied validity or enforceability on the sole ground that no natural person reviewed or intervened in each of the individual actions carried out by the automated message systems or the resulting contract.

[39] Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press 2014) 18.

[40] Michael Sainato, 'Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence' (2015) Observer <http://observer.com/2015/08/stephen-hawking-elon-musk-and-bill-gates-warn-about-artificial-intelligence/> accessed 15 September 2015.

[41] Ray Kurzweil, *The Singularity is near. When Humans transcend biology* (NY Penguin Group 2005); Ray Kurzweil, *The Law of Accelerating Returns*. (2001) <http://www.kurzweilai.net/the-law-of-accelerating-returns> accessed 4 September 2013; Ray Kurzweil, *The Age of Spiritual Machines* (NY Penguin Books 1999) <http://www.us.penguingroup.com/static/packages/us/kurzweil/excerpts/exmain.htm> accessed 14 September 2013;

[42] Irving J. Good, 'Speculations Concerning the First Ultraintelligent Machine', (1965) vol. 6 Advances in Computers, 31–88.

[43] Vernor Vinge, 'The Coming Technological Singularity: How to Survive in the Post-Human Era', (1993) In ISION-21 Symposium sponsored by NASA Lewis Research Center and the Ohio Aerospace Institute.<https://www-rohan.sdsu.edu/faculty/vinge/misc/singularity.html> accessed 15 December 2015.

[44] 'Research Priorities for Robust and Beneficial Artificial Intelligence: an Open Letter', <http://futureoflife.org/AI/open_letter#signatories> accessed 28 March 2016.

[45] 'Research priorities for robust and beneficial artificial intelligence', <http://futureoflife.org/static/data/documents/research_priorities.pdf> accessed 28 March 2016.

[46] Charles Orton-Jones, 'The smart tech revolution', (2015) <http://raconteur.net/technology/the-smart-tech-revolution> accessed 20 March 2016.

- Smartphones are extremely widely used, although it is well-known that being an owner of such phone means making one's private life is accessible to others and therefore our privacy is at risk;
- Achievements in robotics are both praiseworthy and exciting,[47] such as where a one-handed robot defeated a samurai in a sword duel[48];
- The use of virtual reality glasses is being increasingly promoted,[49] regardless of the fact that this could lead to loss of the social life in reality;
- Rapid development of mind-controlled technology has been observed,[50] even though the mere possibility to read person's mind should be a concern;
- Self-driving cars and their introduction in the market have been the object of extensive discussions, even though no unanimous decision has been made as to liability in cases of accidents involving such cars;
- People are being encouraged to share their health-related data with smart bracelets or watches,[51] even though these items, being part of the internet of things, interact with other devices and disclose the information to those seeking to profit from it[52];
- The world observes the evolution of smart homes with awe,[53] hoping that in the near future, our homes will be smart allowing the control of all appliances with a touch of a button, even if the owner is hundreds of kilometres away.[54] However, no thought has been given to the fact that a push of a button will not only perform the operator's command, it will also send the data to those who collect and analyse the information to draw up profiles and build data as to the habits of users.[55]

Autonomous systems change not only the world of technology, gathering individual experience and making autonomous decisions independent of the will of programmers or users, but also peoples' attitudes towards technology. Rapid development and evolution of these technologies, encouraging legal specialists to pay more attention to the field, also makes one wonder whether legal regulation of the interaction and relationships between individuals and technology would become less complicated if SAI were granted legal personality. Granting legal personality to SAI would allow separation of such systems from their operators, manufacturers, developers/programmers and their will. Legal personhood simply means that AIS can be taken seriously by courts: it can be treated as a thing separate from human persons who created the AIS. It could be similar to legal personhood of corporations. Such separation of SAI would not interfere with technological progress and could make the legal relationship (its interpretation and application) between technologies and persons less complicated.

4. Legal subjectivity of SAI according to philosophical and legal concepts of the subject

Once we arrive at the conclusion that recognizing SAI as subjects of law would facilitate involvement of these technologies in the civil and legal circulation, another important question arises: could a System of Artificial Intelligence, as such, be recognized as a subject/field of law in legal terms? One of the definitions of *subjectivity* given by the *Oxford English Dictionary* is *consciousness of one's perceived states*. In philosophical terms, subjectivity is defined as an individual's consciousness and experience to the extent that it is related to the sense of perspective, feelings, beliefs and wishes. Moreover, even though, in philosophical terms, the concept is predominantly applied to human beings,[56] i.e. it sees human beings as the main actors benefiting from the law; this does not necessarily mean that only human beings can be treated as the subjects of law.[57]

For example, legal subjectivity of a foetus varies depending on the legal system and legal regulation existing in various countries. According to the European Court of Human Rights, foetuses should not be treated as persons in terms of Article 2 of the European Convention for the Protection of Human Rights and law, even though the Convention provides that everyone's right to life protects Fundamental Freedoms, and no one shall be deprived of his life intentionally.[58] A similar position is expressed in Article 16 of the International Covenant on Civil and Political Rights (ICCPR)[59] in which the basic human right to be recognised as a person before the law is guaranteed

[47] *See, e.g.*, DARPA, Robotics challenge finals 2015, (2015) <http://www.theroboticschallenge.org/> accessed 28 March 2016;
[48] *See, e.g.*, Yaskawa bushido project, 'Industrial robot vs sword master', (2015) <https://www.youtube.com/watch?v=O3XyDLbaUmU> accessed 23 March 2016.
[49] *See, e.g.*, Oculus Rift, <https://www.oculus.com/ja/rift/> accessed 23 March 2016.
[50] *See also* Kelly Dickerson, '*Brain-to-Brain Link Makes 'Mind Control' Possible*' (2014) Live Science <http://www.livescience.com/48694-instant-brain-to-brain-communication.html> accessed 14 April 2016; Mind- Helen Thompson, 'Controlled Technology Extends Beyond Exoskeletons' <http://www.smithsonianmag.com/science-nature/mind-controlled-technology-beyond-exoskeletons-180951710/> accessed 14 April 2016.
[51] For example: Runtastic Orbit, apple Watch.
[52] Michael O'Dwyer, 'How companies can make the most of big data', (2014) <https://powermore.dell.com/business/companies-can-make-big-data/> accessed 23May 2016.
[53] Mitch Bowling, 'The evolution of the smart home' (2013), <http://corporate.comcast.com/comcast-voices/the-evolution-of-the-smart-home> accessed 26 May 2016.
[54] For example: Dave Johnson MoneyWatch, 'Ring: a smart doorbell you'll actually want', (2015) <http://www.cbsnews.com/news/ring-is-the-smart-doorbell-you-never-knew-you-wanted/> accessed 26 may 2016; Rick Delgado, '5 Smart Home Technologies That will Save You Money', <http://freshome.com/2013/03/25/5-smart-home-technologies-that-will-save-you-money/> accessed 26 may 2016.
[55] Catherine Clifford, 'Why business that use 'big data' make more money (infographic)', <http://www.entrepreneur.com/article/243450> accessed 23May 2016.
[56] Benjamin D. Allgrove, 'Legal Personality for Artificial Intellects: Pragmatic Solution or Science Fiction?', (2006) <http://dx.doi.org/10.2139/ssrn.926015>, 30.
[57] John Finnis, *The priority of persons* (Oxford Essays in Jurisprudence, 2000) 1–3.
[58] ECHR judgment of 8 July 2004, no. 53924/00, Vo v. France [GC].
[59] Article 16 says: *that Everyone shall have the right to recognition everywhere as a person before the law*.

from birth until death.[60] In some common-law countries, aborting a foetus is treated as a deprivation of life of a person.[61] For example, the Unborn Victims of Violence Act adopted by the U.S. Congress in 2004 provides for criminal liability in cases of any act of violence against a child in utero (smoking, consuming alcohol, lack of personal care, etc.).[62]

Therefore, the question as to why some subjects are treated as subjects of law without granting legal personality to others could be answered taking into account society, morality, economics, politics, history, differences in ethical views, philosophical theories and national traditions.[63] To define the elements of legal subjectivity and determine the main characteristics/factors for granting legal status to subjects, references are made to the analysis by Benjamin D Allgrove *Legal Personality for artificial intellects: Pragmatic Solution or Science Fiction* as well as to works of other authors.[64]

In their analysis of the main characteristics of subjects of law, Benjamin D. Allgrove[65] adopts three methodologies, which help to determine three conditions that have to be met to recognize an entity the subject of law:

- The first methodology is focused on the metaphysical nature of the entity.[66] The main question here is: 'what attributes does X need to possess in order to qualify as a legal person?' For example, being rational and autonomous.[67] However, this methodology has received criticism because of its narrowness. If philosophical subjectivity was the necessary condition for the recognition of X as the subject of law, all 'non humans' and objects would be eliminated from the list of potential subjects of law. People in a coma, children, mentally disabled people etc. would be also deprived of the status of a legal subject. It should be noted that, with a clear separation of the philosophical subjectivity from the legal one, the latter is not required to be linked to the philosophical subjectivity.[68]
- As an alternative to the first methodology, consequence-based methodology seeks to answer the following question: 'what consequences of imposing legal rights and obligations on X have to be evident for X to qualify as a legal person?'[69] Even though the consequence-based methodology draws a clear line between legal approaches from the philosophical one, the following entities are not treated as subjects of law under this approach: foetuses, young children, and people in vegetative states, clones and inanimate objects. However, the consequence-based methodology seems to be more appealing than the methodology based on the metaphysical nature of an entity. This type of methodology makes it easier to classify entities of a non-human nature, the functioning of which can affect rights and obligations of other entities, as subjects of law.[70]

Unfortunately, the simplicity of this methodology is its downfall, since one cannot ignore the importance of the nature of the entity. Especially so, where behavioural reactions are relevant.[71] One needs to know whether the entity is able adequately to respond to legal stimuli or engage in legal relations.[72]

- The third type of methodology, i.e. conditions-based methodology, draws a clear line between the philosophical and legal personality, and analyses conditions under which X is treated as a legal person by the law.[73] The methodology is based on the philosophy of H. L. A. Hart[74] and includes in the list of subjects of law including young children, incapacitated persons, etc. Under this approach, it is meaningless to search for analogies between human X and corporation Y to demonstrate legal personality of Y, because this methodology does not help to answer a question as to why some entities are treated as subjects of law, while others are not. This legal subjectivity (personality) is the common denominator on which the legal system is built: granting rights and obligations to a certain group of persons or entities.[75] For example, even though, in philosophical terms, personalities of a human and a corporation are essentially different, both of them are treated as subjects of law from the legal point of view.[76] This third approach is relevant in the case at hand, because it allows recognition of both human and artificial entities (e.g. legal entities) as subjects of law.

According to the traditional concept, subjects of law are persons/entities capable of having mutual rights and

[60] *Background conference document prepared by the Office of the United Nations High Commissioner for Human Rights* in the fifth session of the Ad Hoc Committee on a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities (24 January to 4 February 2005) 5.

[61] Allgrove (n 60) 39.

[62] Ibid.

[63] Ibid 38.

[64] *See, e.g.*, Marshal S. Williek, 'Artificial Intelligence: Some Legal Approaches and Implications' (1983) AI Magazine Volume 4 Number 2 (© AAAI); Lawrence B. Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70 North Carolina Law Review 1231, 1231; Nils J. Nilsson, *The quest for artificial intelligence. A history of ideas and achievements* (2010); Migle Laukytė, *"Artificial and Autonomous: A Person"? (2012)*; Kathleen Mykytyn & Peter P. Mykytyn, & Jr. Craig W. Slinkman, Expert Systems: A Question of Liability (1990); Luke Muehlhauser & Anna Salamon, *Intelligence Explosion: Evidence and Import* (2012); Curtis E.A. Karnow, *Liability For Distributed Artificial Intelligences* (1996).

[65] Allgrove (n 60) 30.

[66] Ibid 31.

[67] Michael S. Moore, *Law and Psychiatry: Rethinking the Relationship* (Cambridge University Press 1984) 44–112.

[68] Allgrove (n 60) 31–36.

[69] Allgrove (n 60) 36.

[70] Allgrove (n 60) 37.

[71] Nicola Lacey, 'Philosophical Foundations of the Common Law: Social not Metaphysical' (OUP, 4th series 2000) In J Horder (ed), Oxford Essays in Jurisprudence; Oxford Legal Studies Research Paper No. 57. Available at <http://dx.doi.org/10.2139/ssrn.2126577>, 17, 29.

[72] Allgrove (n 60) 36–37.

[73] Ibid 38.

[74] H.L.A. Hart, 'Definition and Theory in Jurisprudence' (1954) 70 L.Q. Review 37, 56.

[75] David P. Derham, 'Theories of legal personality' (1958) in Leicester C. Webb, ed., *Legal Personality and Political Pluralism*, (Melbourne University Press; 1958) 1, 5; Hans Kelsen, *General Theory of Law and State* (3ed., The Lawbook Exchange, Ltd. 2009) 95, 97.

[76] Allgrove (n 60) 38–44.

obligations.[77] In terms of the conditions-based methodology, this definition is particularly attractive. An entity's obligations in this case are seen as the core of the concept of subject of law.[78] If the law imposes a legal obligation upon an entity, it would seem logical to treat the entity as the subject of law, whereby it fulfils its legal obligation.

Entities are normally seen as subjects of law with free will and legal obligations.[79] However, such definition of the subject of law has its limitations. For example, the will of a corporation (legal entity), which has no philosophical personality, is expressed through its authorized representatives, because the legal entity (corporation) itself cannot express its will. The same is true for minors or mentally disabled people etc. who, even though they possess philosophical personality, cannot express their free will in terms of law.[80] This, notwithstanding the above entities is seen as subjects of law with rights and obligations.[81] According to the above examples, especially that of the legal entity, one could claim that SAI, although void of philosophical personality and the ability to express their will in ways usual for natural persons, could be granted the status of the subject of law as derivative, artificial subjects of law.

5. Artificial subjects of law in legal systems

Existing civil law and common law traditions recognize two types of subjects of law: natural persons and legal entities.[82] A natural person is often defined as a subject of law who is not assimilated with a legal entity.[83] According to Hans Kelsen, it would be wrong to identify a natural person with a biological status of human being, because a natural person is a mere personalization of legal norms granting rights and imposing obligations that govern human behaviour.[84] J. Austin believes that a natural person is a human being with rights and obligations and an equivalent of a biological being.[85] The existing conflict clearly shows that, despite long-standing legal traditions, sameness of a natural person as the subject of law and a biological being still raises discussions among legal philosophers. In this context, it should be noted that SAI and issues related to their legal personality will remain a relevant topic of discussion for many years to come.

In additional to natural persons as subjects of law, there is another category of entities, i.e. unnatural or artificial subjects of law (legal entities), which are a fiction of law with limited capabilities.[86] This means that unnatural entities do not possess all rights granted to natural persons and are unable to fulfil all obligations stemming from the previously mentioned rights. Legal entities are limited by the *ultra vires* doctrine, which enable them to enter only into such contracts that do not conflict with their objectives provided for in the documents of incorporation.[87]

In view of the fact that the aim of this paper is to determine whether SAI, which cannot be treated as a natural person due to its non-biological nature, could be seen as the subject of law, it is important to analyse the legal personality of legal (artificial) entities, which are analogous to Systems of AI. To identify attributes of the legal personality of a legal entity, three approaches defining unnatural, i.e. artificially created subjects of law, are adopted.

Benjamin D. Allgrove refers to the work of Martin Wolff[88] and identifies four key theories, which provide the clearest definition of the concept of unnatural subject of law[89]:

5.1. *Concession theory*

Concession Theory is not an independent theory defining unnatural subjects of law; it is rather a theory concerning their source.[90] According to Concession Theory, corporate personality does not exist unless it is granted. In theory, only incorporated and registered legal entities have legal personality. However, legislation allowing actions to be run on behalf of partnerships, trade unions or other entities can indirectly confer limited legal personality.

The aim of Concession Theory is to explain the legal treatment of incorporated and unincorporated legal entities.[91] For example, an incorporated legal entity (defendant) enters into an *ultra vires* transaction with a plaintiff and the transaction is ratified by the meeting of shareholders who also treat it as binding on the defendant. Later, the defendant decides to reject the unprofitable transaction. The plaintiff applies to the court due to the breach of contract. The court decides that legal entities can only enter into transactions that are not in conflict with the objects provided for in the documents of incorporation. In view of the fact that the plaintiff concluded the transaction with the defendant on an *ultra vires* basis, the court voids the transaction *ab initio*. The court also finds that, when concluding the transaction with the defendant, the plaintiff was supposed to be aware of the objects provided for in the

[77] Roxana Topor, 'Some Aspects regarding Juridical Documents that can be contracted by different classes of Natural Persons distinguished in relation to their legal competence' (2014) 6 (1) Readings in Law and Social Justice, 742; Alfonsas Vaišvila, *The Theory of law* (2nd ed., Justitia 2004) 409; James Goetz, 'Natural Unity and Paradoxes of Legal Persons' (2007) The Journal Jurisprudence, 28.

[78] Arthur W. Machen, 'Corporate Personality' (1911) 24 (4) Harvard Law Review, 263.

[79] Thom H. Morawetz, *The Philosophy of Law: An introduction* (Macmillan NY 1980) 202.

[80] Allgrove (n 60) 45.

[81] Michael Moore, *Placing Blame: A General Theory of the Criminal Law* (Clarendon Press Oxford, 1997) 62–65.

[82] George F. Deiser, 'The Juristic Person I' (1908) 57 (3) The University of Pennsylvania Law Review and American Law Register, 131–142; Deiser, 'The Juristic Person: II' (1909) 57 (4) University of Pennsylvania Law Review and American Law Register 216–235, Deiser, 'The Juristic Person: III' (1909) 57 (7) University of Pennsylvania Law Review and American Law Register, 300–314.

[83] Hans Kelsen, *General Theory of Law and State* (3ed., The Lawbook Exchange, Ltd. 2009) 94.

[84] Ibid 95.

[85] John Austin, *Lectures on Jurisprudence* or, The philosophy of positive law (J. Murray, London 1885) 350.

[86] Abhijit Kumar Pandey, 'The Concept of Corporate Personality: a critical analysis' (2008) The ICFAI University Journal of Corporate and Securities Law, 54.

[87] Ibid.

[88] Martin Wolff, 'On the Nature of Legal Persons' (1938) 54 Law Quarterly Review.

[89] Allgrove College (n 60) 55.

[90] John Dewey, 'The Historical Background of Corporate Legal Personality' (1926) 35 Yale Law Journal 655, 666.

[91] Allgrove (n 60) 55.

documents of incorporation of the defendant. Therefore, it could not be concluded that the plaintiff's rights were undefended.[92]

5.2. *Fiction theory*

Legal entities are subjects of law with no legal personality and the latter is conferred only as a legal fiction.[93] Only entities that have not existed *a priori* can be granted corporate personality. Under the Fiction Theory, legal entities are only a legal construct having no factual foundations. It is intangible and artificial, being attributed to a category of subjects of law[94] and being the mere creature of law the legal entity acts only within the limits of its articles of association.[95] The advantage of the Fiction Theory is its jurisprudential pedigree, where legal entities are seen as artificial in the sense that their functioning requires the involvement of individuals. Fictitious entities have no will or ideas; therefore, natural persons express their will.

5.3. *Symbolist theory*

Symbolist Theory is related to Fiction Theory. Under this theory, legal entities are devices created by law, which can exercise rights within the limits of their articles of association.[96] From the symbolist point of view, legal entities are legal shorthand for describing the interactions with, and between, the humans as well as the corporate relations.[97] According to the Symbolist Theory, legal entities are separate subjects of law. A legal entity is more than its members, just as a state extends beyond its citizens.[98] However, the theory has received criticism.

H. L. A. Hart believes that the Symbolist Theory explains such basic things, which are not worth attention.[99] The Symbolist Theory seeks to deny that legal entities possess will. Regardless of the fact whether the will of a legal entity is to be classified as philosophical or not, the overall decision-making process and the impact of self-interest of the board and employees often interfere with the interests of the legal entity. The fact that an individual member can vote against a decision of the meeting of shareholders is evidence enough of that.[100] As a legal entity grows/expands (in economic terms), differences between the will of the legal entity and that of its members are unavoidable.[101] In the event of such differences, the Symbolist Theory should be applied with particular caution.[102]

5.4. *Realist theory*

The Realist Theory holds that legal entities cannot be treated as natural persons, because:

- they act indirectly, i.e. through human/virtual agents, the management or servants;
- decisions are normally made collectively, rather than individually;
- not all punishment incentives can be imposed upon legal entities (e.g. arrest);
- legal entities may be granted different legal statuses and the resulting different rights and obligations.[103]

The Realist Theory best explains the nature of unnatural artificially created legal entities.[104] According to this theory, legal entities are neither symbols nor fiction, but rather objectively real entities personalized by us.[105] The Realist Theory has no internal inconsistency evident in the Concession and Symbolist Theories. If legal entities are mere creatures of law, the law itself grants reality to them.[106] The fact that legal entities are artificially created does not negate the fact that they exist and are real. For example, contracts are artificial creatures, but they are not fictional, they are real.

The Realist Theory reveals that, even though artificially created, legal entities exist and are real. According to the theory, the same is true for SAI: even though they are artificial, this does not negate the fact that they exist and are real. To sum up, for an entity to qualify as the subject of law, it has to meet conditions of legal personality. In this case, legal capacity and capacity to act, which affect the possibility to grant legal personality, are important. Legal capacity is seen as being attributed to a subcategory of subjects of law, in which the subjects of law, i.e. both legal entities and natural persons, are capable of acquiring rights and assuming obligations. Rights and obligations of the subjects of law are defined in laws. Capacity to act

[92] The Case: *Ashbury Railway Carriage and Iron Co v Riche* (1875) LR 7 HL 653.

[93] Arthur W. Machen, 'Corporate Personality' (1911) 24 Harvard Law Review 347; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[94] The case of U.S. Supreme Court: *Bank of the United States v. Deveaux* (1809) 9 U.S. 5 Cranch 61 61.

[95] Allgrove (n 60) 57.

[96] Ibid 60.

[97] Max Radin, 'The Endless Problem of Corporate Personality' (1932) 32 Columbia Law Review 643,658; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[98] Wesley Newcomb Hohfeld, 'Nature of Stockholders, Individual Liability for Corporation Debts' (1909) 9 (4) Columbia Law Review Association, Inc. 290; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[99] Hart (n78) 37, 54.

[100] Gunther Teubner, 'Enterprise Corporatism: New Industrial Policy and the "Essence" of the Legal Person' (1988) 6 American Journal of Comparative Law, 130, 150; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[101] Robert Michels, *Political Parties: A Sociological Study of Oligarchical Tendencies of Modern Democracy* (Dover 1959) 389; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[102] Allgrove (n 60) 64.

[103] Ibid 68.

[104] Michels (n 105).

[105] Harold J. Laski, 'The Personality of Associations' (1916) 19 *Harvard Law Review* 405; Katsuhito Iwai, 'Persons, things and corporations: the corporate personality controversy and comparative corporate governance' (1999) 47 (4) American Journal of Comparative Law 2.

[106] Machen (n 97) 255.

is the ability of a subject of law to exercise specific rights and assume civil obligations. Once the elements of legal subjectivity have been defined, it is important to analyse attributes of SAI equivalent to the elements of legal personality.

6. Legal personality of artificial intelligence based on the elements of legal personality attributed to natural persons and legal entities

The ability of an entity to acquire rights is one of the characteristics defining the subject of law.[107] However, making the legal status conditional on the mere ability of the entity to have rights would excessively expand or narrow down the list of subjects of law, as all living entities capable of feeling would either be treated as subjects of law or, on the contrary as inanimate entities, would be eliminated from the category. Therefore, to determine whether an entity can be treated as a subject of law, the following conditions should be taken into account: viz the ability to acquire rights and fulfil obligations.

Persons who participate in legal relations are subjects of law.[108] For a person or corporation (legal entity) to qualify as a subject of legal relations, they have to possess certain characteristics comprised of two structural elements:[109] (i) legal capacity; (ii) capacity to act. In this context, a natural question arises: is it possible to apply the above elements of legal personality, i.e. legal capacity and capacity to act, to Systems of Artificial Intelligence.

In the background conference document, the United Nations High Commissioner for Human Rights defines legal capacity as:

> 'The capacity and power to exercise rights and undertake obligations by way of one's own conduct, i.e. without assistance of representation by a third party. This concept logically presupposes the capability to be a potential holder of rights and obligations (static element), and entails the capacity to exercise these rights and to undertake these duties to create, modify or extinguish legal relationships (dynamic element).[110]

Professor of legal philosophy Alfonsas Vaišvila defines legal capacity as the ability to acquire subjective rights and undertake obligations granted by legal norms: 'legal capacity is a permanent and integral civil state of each individual; legal precondition for their ability to acquire and retain rights; and prohibition of legal discrimination.'[111] In Roman law, legal capacity (legal status) was used to define the legal position of individuals as subjects of law (citizens).[112] Legal capacity is seen and defined as a legal condition, i.e. a classification based on laws rather than acquired independently.[113] Legal capacity means being part of the subcategory of subjects of law. This subcategory defines limits for different types of legal treatment.

In the civil codes of civil-law countries, the concept of passive civil capacity is understood as being the ability to acquire civil rights and assume civil obligations (passive civil capacity) extended to all natural persons. Legal capacity of legal entities is defined as the ability of private legal entities to acquire and enjoy any civil rights and obligations, except those conditional on such attributes of a natural person as gender, age and consanguinity.

Capacity to act on the subject of law means the ability to do something.[114] In other words, it is the ability of the subject of law to exercise specific rights or undertake obligations conferred by the legal status. For example, a three-year-old child has the legal status and the relevant rights of a minor, but the child cannot exercise the rights and is not required to fulfil any obligations.[115]

The background conference document of the United Nations High Commissioner for Human Rights mentioned above defines the main attributes of capacity to act: "capacity to act is subject to the possession of such additional requirements as (i) minimum age and (ii) the capacity to understand the meaning of one's actions and their consequences."[116] According to this document, to be granted capacity to act, a person has to be of full legal age (which varies depending on the country) and have full freedom to make independent decisions and to understanding their consequences (i.e. a court has not recognized the person incapable to act): "Capacity to act can be limited or restricted only when individuals become unable to protect their own interests. In these cases, the person remains the holder of substantive rights (e.g. the right to property or the right to inherit), but cannot exercise them (e.g. sell his/her property or accept an inheritance) without the assistance of a third party appointed in accordance with the procedural safeguards established by law."[117]

However, a legal entity's capacity to act is often conditioned on other criteria, different from those applicable to natural persons, e.g. a legal entity's capacity to act cannot be conditioned on its age or absence of capacity to act or other criteria. Legal capacity of a legal entity arises with its capacity to act; therefore, the term *capacity to act* is usually avoided with legal entities and is sometimes replaced with *subjectivity, which* covers the concepts of legal capacity and capacity to act. Legal capacity of a legal entity arises from the moment of its registration; where this is not required, from the moment of its incorporation. An important element of the subjectivity of legal entities is the fact that they themselves cannot enjoy the powers conferred by legal capacity and capacity to act. Legal

[107] Cass R. Sunstein, 'Standing for Animals' (1999) Public Law and Legal Theory Working paper No 6, 3–8.
[108] Pranciškus Stanislovas Vitkevičius, 'Civilinės teisės subjekto ir civilinio teisinio subjektiškumo problemos' (2004) 55 (47) Jurisprudencija 102.
[109] Vaišvila (n 81) 409.
[110] *Background conference document prepared by the Office of the United Nations High Commissioner for Human Rights* (n 64) 13.
[111] Vaišvila (n 81) 412.
[112] Ronald Harry Graveson, *Status in the Common Law* (Athlone Press, 1953) 4–5.
[113] Ibid 2.
[114] Carleton Kemp Allen, *Legal Duties and Other Essays in Jurisprudence* (The Clarendon Press 1931) 47.
[115] Beth Walston-Dunham, *Introduction to Law* (5th edition New York 2009) 417.
[116] *Background conference document prepared by the Office of the United Nations High Commissioner for Human Rights* (n 64) 14.
[117] *Background conference document prepared by the Office of the United Nations High Commissioner for Human Rights* (n 64) 14.

entities can exercise their rights and fulfil their obligations only through their authorized representatives.

In this context, it is important to note that, due to the technical capabilities integrated in SAI (autonomous decision-making, the ability to learn from experience, memory, planning, complexity, formality and the ability to manipulate structures), such systems possess characteristics typical of entities that have the capacity to act, i.e. they are able to exercise specific rights or be subject to obligations imposed by their legal status. With the characteristics necessary to be granted the capacity to act, SAI would be able to fulfil obligations and determine consequences of its actions. From this point of view, SAI would even precede legal entities (corporations) tied by the will of their authorized representatives and unable to personally exercise rights, fulfil obligations and assess potential consequences.

Therefore, legal subjectivity of a legal entity is narrower than that of a natural person (biological creature) with the capacity to act. This is due to the specific nature of legal entities: they have no personality and cannot exercise those civil rights and fulfil those civil obligations, which require such traits of a natural person as gender, age and consanguinity. Due to the specific properties of SAI (algorithm-based operation), respectively the scope of their rights and obligations (should they be found subjects of law) would not necessarily be the same as the scope of rights and obligations of other subjects of law. Similarly, to legal entities, such systems are merely a result of activities of other persons. Thus, SAI could only have rights and obligations strictly defined by legislators. The definition of such rights and obligations would facilitate the existing and future relations between technologies based on SAI and other subjects of law. If legal analogy was used, granting legal personality to SAI could be expressed as granting them certain rights and obligations with well-defined scope, as well as registering them or introducing authentication certificates allowing for their identification in each instance of operation and limiting the possibility to change the identification details.

7. Conclusions

Artificial Intelligence is a rather new discipline covering a wide area. Therefore, there is no single definition of the concept yet. In their papers, various authors define the concept of Artificial Intelligence as artificially created intelligence, for example, a software system able to imitate human thinking processes with the help of computers or other devices. Stuart Russel and Peter Norvig distinguish two main directions for the concept of Artificial Intelligence: (i) related to thinking processes and motivation (systems that think); (ii) related to behaviour (systems that act).

Today, there are numerous technologies based on the operating principle of SAI such as *Google* Self-Driving Car, autopilots controlling airplanes, digital assistants such as Siri, Cortana and Google Now, robot nurses, mind-controlled Google smart glasses, etc. These and other technologies are well known to people all over the world. Their possibilities rapidly improve and the extent of their use is developing fast. As the use of technologies based on AI become more extensive, the number of relevant incidents grows as well. Specific examples presented in the Introduction of this paper show that SAI are no longer mere objects of science fiction. Information technology inventions based on SAI permit the conclusion that such systems are not mere objects, the operation of which are influenced by others, but operate as entities. Despite the unique operating principle of such systems, no legal system to date has recognized them as subjects of law. However, the current lack of legal status of SAI should only remain a temporary attribute, which should change in time.

As society accepts agents as legal entities, which are recognized subjects of law, then why could SAI not be granted the same status? These systems possess all the necessary elements typical of entities recognized as subjects of law: intelligence, autonomous decision-making, the ability to learn from their own experience, memory, planning, complexity, formality and the ability to manipulate structures. Systems of AI should be granted legal personality due to their interactions with other subjects of law, optimum protection of whose rights and interests requires a clear definition of the legal status of Systems of AI. Under the existing legal regulation, at both national and international level, Systems of AI are seen only as objects of law and the issue of liability for damage caused by actions of Systems of AI remains unclear.

Rapid advancement in SAI observed today will soon lead to situations where, having assessed threats and hazards to persons, autonomous systems based on Artificial Intelligence will make decisions, which are intended to be in the best interests of individuals, even though conflicting with their will. Restriction of a person's free will is linked to the restriction of the person's rights, which is permitted only in cases provided for in law (this is usually linked to prohibition to interfere with the rights of others). As Systems of AI, capable of making independent decisions, become immediately involved in the lives of people, situations will undoubtedly occur where AI makes decisions and appropriate actions taken that affect the free will and lifestyles of individuals (biological creatures). This is one of the reasons to grant at least partial legal personality to SAI. They need to be prevented from interfering with the rights of others, when actively operating in the society, even though their actions are driven by good intentions, and to decide on their legal liability in cases where damage is caused.

The ability to gather individual experience and make autonomous decisions independent of the will of programmers and users will mean that autonomous systems drive change in the world of technology and attitudes towards technology. Legal regulation of the interaction and relationships between individuals and technologies would be less complicated if SAI were granted legal personality. This would allow separating SAI from their operators, manufacturers, developers/programmers and the will of these persons. Legal personhood simply means that SAI could be taken seriously by the courts: it could be treated as an object separate from humans developing SAI. It could be similar to a corporate personality. Separating SAI from individuals, i.e. granting legal personality to SAI would not interfere with technological progress and make the legal relationship (its interpretation and application) between technologies and persons less complicated. Although void of philosophical personality and the ability to express their will in ways usual for natural persons, SAI could be granted the status of the subject of law as derivative, artificial subjects of law.

To qualify for legal personality, an entity has to meet the conditions necessary for its recognition as a subject of law. In the case at hand, the elements of legal capacity and the capacity to act are important, since they affect the possibility to grant legal personality. Legal capacity is seen as being attributed to a subcategory of subjects of law, in which the subjects of law, i.e. both legal entities and natural persons, are capable of acquiring rights and assuming obligations. Rights and obligations of the subjects of law are defined in the laws. The capacity to act is seen as the ability of a subject of law to exercise specific rights and assume civil obligations.

Due to the technical capabilities integrated in SAI (autonomous decision-making, the ability to learn from experience, memory, planning, complexity, formality and the ability to manipulate structures), such systems possess characteristics typical of entities that have the capacity to act, i.e. they are able to exercise specific rights or be subject to obligations imposed by their legal status. With the characteristics necessary to be granted the capacity to act, SAI would be able to fulfil obligations and determine the consequences of its actions. In this aspect, SAI would be superior to legal entities (corporations) tied by the will of their authorized representatives and unable to personally exercise rights, fulfil obligations and assess potential consequences.

Because of the specific nature of SAI (algorithm-based operation), should they be found to be subjects of law, the scope of their rights and obligations would not necessarily be the same as the scope of rights and obligations of other subjects of law. Similar to legal entities, such systems are merely the result of activities of other persons. Thus, SAI could only have rights and obligations strictly defined by legislators and the definition of such rights and obligations would facilitate the existing and future relations between technologies based on SAI and other subjects of law. If legal analogy was used, granting legal personality to SAI could be expressed as granting such systems certain rights and obligations within a well-defined scope.

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