

Legal Aspects on the Implementation of Artificial Intelligence

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Abstract

Artificially Intelligent agents are more and more present in society. They have the potential to improve our daily life and social welfare. But, the introduction of AI already brings some technologic, industrial and regulatory challenges. The robots operating autonomously, without the intervention or awareness of humans will raise questions regarding attribution of rights or restrictions / obligations for them, liability for their actions, taxation, data privacy, robotic labour replacing human labour. The change of liability paradigm from the operator of the vehicle to the manufacturer started with the imposition of liability for damages arising from an autonomous car. Should robots pay taxes? Maybe it is not fair to tax artificially intelligent agents for benefiting from public expenditure, because the use of public services or infrastructures by an AI agent it's not a benefit for the agent, but for the user or designer. It can be a necessity, for reasons related to altering patterns of consumption or employment within the economy. The risk of losing control over AI agents are not only related to damages, but also to the protection of personal data and public safety. This can happen due to malfunctions, security breaches, the superior response time of computers compared to humans, unsafe explorations, hacking and so on. In this paper we aim at demonstrating that, with the proliferation of artificial intelligence, questions will come up and legal frameworks will inevitably need to adapt.

Keywords: embedded ethics, A.I's liability, motivational control, capability control.

Received on DD MM YYYY, accepted on DD MM YYYY, published on DD MM YYYY

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doi: 10.4108/_____

1. Introduction

The rigid principles of law are becoming more and more powerless for constraining the evolving intelligent robots' behaviour. Nowadays it is considered that we should determine a set of ethics to warrant friendly robotics behaviour with human safety centric regulation in mind. The discussion on moral machines, embedded ethics, or even robot rights still treats robots as a utility than a co-habitant in the society. The subject of robot personhood is only at the beginning with inappropriate application of human-centric legal regime in the robotic system. Robotics' development was focused on technical interpretations of autonomy until its development was extended to entail the philosophical analysis of autonomy focusing on the ability of the robot to select its own goals, choosing the way in which the goals can be executed, or

simply what exactly dictates the robot's intelligence (Saripan & Putera, 2016, pp. 824-831).

Robotics facilitates humans in understanding various aspects of autonomy and intelligence, but nowadays we should perceive the idea of technological singularity. Law experiences an imminent adaptation in the old fashion law making. The aim of producing thinking machines developed the dialogue between legal scholars. "From Mary Shelley's Frankenstein's Monster to the classical myth of Pygmalion, through the story of Prague's Golem to the robot of Karel apek, who coined the word, people have fantasized about the possibility of building intelligent machines, more often than not androids with human features; Humankind stands on the threshold of an era when ever more sophisticated robots, bots, androids and other manifestations of artificial intelligence ("AI") seem poised to unleash a new industrial revolution, which is likely to leave no stratum of society untouched, it is

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vitaly important for the legislature to consider all its implications” (Parliament, 2016).

The analysis revealed that the human perception towards robotics is changing, we are acknowledging the social valence of the present days’ robots, related to the social response invoked for any other robots physically responding to the environment with the ability to sense and think (Calo, 2015, pp. 102-147).

Once machines are considered as “agents” or a representation of some legal person, the existing product liability laws are adequate to address the legal issues associated with the machines without important modifications. The law is not certain in its application to inevitable future events whereby these machines cause injury (Vladeck, 2014, pp. 117-150).

To solve the imposition of liability based on fault or wrong, argument appears as to accord agents with constitutional rights and to be consider as a legal person. The objection to this theory is based on the difficulties of intelligent machines when encountering the problem of shifting of circumstances, moral of choice and deciding legal options (Automotive, 2013, pp. 4-35). Another argument is that only natural persons are entitled to such constitutional rights (Brock, 2015, pp. 769-788).

The European Commission recently funded RoboLaw (“Regulating Emerging Robotic Technologies in Europe: Robotics facing Law and Ethics”), a project with the objective to analyze ethical and legal issues raised by robotic application and to suggest if new regulation is needed. The conclusion of the project are included in a report titled “Guidelines on Regulating Robotics” (Palmerini, 2014).

There are still great confusion and lack of information around the terms of robotics and the artificial intelligence incorporated into robots. The European Parliament passed a resolution with recommendations to the European Commission on civil law rules on robotics (Parliament, 2016). Among the proposals it was highlighted the desire to establish ethical principles for developing and using AI-based robotics and solving the numerous liability issues. In this context, The Parliament is calling the European Commission to consider introducing a specific legal status for intelligent robots, to establish a European agency for robotics and artificial intelligence, in order to provide technical, ethical and regulatory expertise required to meet the challenges and opportunities arising from the development of robotics (Hauser, 2017).

Human safety, privacy, integrity, dignity, autonomy, data ownership are the main topics of a proposal for the establishment of a “Charter on Robotics” which aims at setting up an ethical framework for the design and use of robots. The principles contained in the Charter are very broad defined and require top researchers in the field of robotics which should comply with the principles of beneficence (robots should act in the best interests of humans), non-maleficence (robots should not harm a human), autonomy (the capacity to make an informed, uncoerced decision about the terms of interaction with robots) and justice (Parliament, 2016).

Intelligent machines are claim to appear lacking of some essential elements of personhood such as souls, consciousness, intentionality or feelings. Lastly, the objection is derived from the perception that as a human creation, intelligent machines should remain nothing more than a property.

2. Robots and Artificial Intelligence

The intelligence itself is accessed by all kinds of lively species, in nature. Animals, plants, not necessary using logic or reasoning, have a small capacity of problem solving. Not depending of the container, the artificial intelligence also may manifest itself with a different degree of intensity. Considering this, we may classify AI in four categories: reactive machines, limited memory, theory of mind and self-awareness (<http://theconversation.com/understanding-the-four-types-of-ai-from-reactive-robots-to-self-aware-beings-67616>).

Robots are not only walking and talking machines. The terms robots and artificial intelligence are used with minimum rigor. The robot is defined as a machine capable of conducting a series of actions automatically, a computer – capable of carrying out a complex series of actions automatically. It is closely linked to the “robotic process automation”. This concept encompasses the software computer and programs that have the purpose of replacing human activity that require repetitive rules-based tasks, not necessary conducted by psychical machines. But for sure the machines that perform simple tasks, such as heating food or shredding paper, dependent on human initiative, and are not part of this concept (Alexandre, 2017)

The word robot can refer to both physical robots and virtual software agents, but the latter are usually referred to as bots. Robots tend to possess some or all of the following abilities and functions: accept electronic programming, process data or physical perceptions electronically, operate autonomously to some degree, move around, operate physical parts of itself or physical processes, sense and manipulate their environment, and exhibit intelligent behaviour, having computers mimic the behaviour of people or animals.

There are many types of robots: mobile robots, industrial robots (manipulators), service robots, educational robots, modular robots, and collaborative robots.

Robots can generally be distinguished by their appearance (humanoids, animaloids), by application (industrial, domestic, military, medical, entertainment), by shape, size and locomotion (legged/wheeled, nanorobots) or by operating environment (UAV/drones, space robots, underwater robots) (Ballas & Konstantakopoulos, 2017, pp. 133-166)

Artificial intelligence (AI) is harder to define. Generally speaking it refers to the intelligence exhibited by machines. But considering that it is only one, per se, and it is accessed by humans and machines, the question is: are the human intelligence and machine intelligence the same?

Alan Turing, in his famous paper *Computing machinery and Intelligence* suggested that the question should be whether a machine can convince a human that it can think, rather than to ask or to try to determine if it can think or not. This is why the Turing test consists in a communication between a human and a machine, the human being not aware that is communicating with a machine (Turing, 1950). Despite some other similar tests, the Turing test remains a mark in the AI existence assessing.

The Artificial Intelligence development nowadays is very related with the machine learning concept and its new age of “deep learning”, in which computers learn from experience and improve their performance over time using algorithms that have the ability to “learn” (Surden, 2014). Active learning algorithms access the desired outputs (training labels) for a limited set of inputs based on a budget, and optimize the choice of inputs for which it will acquire training labels. It is considered that unsupervised learning is the true artificial intelligence “where the learning algorithm is let loose on the data with no restrictions and permitted to draw whichever connections it wishes (Zimmerman, 2015, p. 43). Given unlimited information resources currently available and combined with constantly computing power we can predict that machines using unsupervised learning will develop skills of comprehension that will revolutionize the way decision are made (Zimmerman, 2015)

Instead of a definition of Artificial Intelligence (literature hold multiple definitions) we prefer to provide examples of traits associated with the concept of AI: language processing, learning, perception, planning, reasoning, manipulation of objects, motion, social intelligence, solving problems (Kurzweil, 1999). Not all of these traits should exist in each agent, just enough in order to justify a human intelligence comparison.

The Reactive machines have no memory, no ability of using past experience, hence it behaves in the same way every time they encounter the same situation. For example, the Google’s Alpha Go, IBM’s Deep Blue chess-playing supercomputer, which beat international grandmaster Garry Kasparov in the late 1990s are reactive machines which means that they cannot function beyond the specific tasks they were programmed.

Machines with limited memory have the ability of looking into the past by identifying certain objects and monitoring them over time. For example, self-driving cars are able to observe other cars’ speed and direction and use this information to decide when to change lanes, in order to avoid cutting off another driver or being hit by a nearby car. Personal assistant is another example.

The Theory of mind machines understand that people, creatures and objects in the world can have thoughts and emotions that affect their own behaviour. They understand how humans formed societies and have social interactions. C-3PO and R2-D2 from the *Star Wars Saga*, for example, were able to form representations about the world, adjusting their behaviour according to their understanding

of others’ feelings, expectations, motivations and intentions (Alexandre, 2017).

Self-awareness describe the ultimate stage of artificially intelligence: systems able to form representation about themselves, conscious, sentient and able to understand others’ feelings, not only knowing what they want, but also understanding that they want and why they want it. Eve from *Ex Machina* it’s a good example and all the hosts from HBO’s TV series *Westworld* which makes the beautiful distinction between theory of mind and self-aware agents.

3. Conceiving an Electronic Person

The European Parliament in its Civil Law Rules on Robotics (draft report) introduced a request for “creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations, including that of making good any damage they may cause, and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties independently” (Parliament, 2016).

The concept of legal personality itself was not an immutable reality throughout history. The origins of the concept of legal personality date back to the 13th Century and are attributed to Pope Innocent IV, who founded the *persona ficta* doctrine, allowing monasteries to have a legal existence apart from monks (Rosen, et al., 2017). The term electronic person was first coined in a 1967 article for LIFE magazine.

The concept of legal personality itself was not an immutable reality throughout history. As years went by and legal doctrine progressed, several other realities would end up being considered as separate legal entities from its owners or users. In the international legal system, this is the case of sovereign states and of various international and intergovernmental organizations, such as the United Nations or the European Union. In national jurisdictions, virtually every country applies this reasoning to companies and other forms of business associations. Specific jurisdictions even extend it to much more farfetched cases. In India, courts have attributed legal personality to Hindu idols, considering them capable of having rights and duties (namely, owning property and paying taxes) and, in New Zealand, the Whanganui River was granted legal personality in March 2017 because the Whanganui M ori tribe regard the river as their ancestor. It is also common for ships to be considered separate legal entities under Maritime Law and for animals to have their own legal status under various national jurisdictions (Alexandre, 2017).

The legal status of persons, animals, objects and other realities (such as rivers and companies) varies from jurisdiction to jurisdiction and, over the course of time, even within the same jurisdiction and regarding the same reality. This observation enables us to conclude that a separate legal status or a legal personality does not derive

from the quality of natural person, but it is the result of legislative options, which are based on moral considerations that attempt to reflect social realities in the legal framework or that simply were made out of legal convenience. Hence, since no principle dictates when the legal system must recognize an entity as a legal person, or when it must deny legal personality, and no guidance derives from the study of the history of the institute, it is then relevant to ascertain whether artificially intelligent agents are morally entitled to be considered separate legal entities, whether doing so would it reflect a social reality or whether it would be a convenient option from a legal point of view.

The question whether artificially intelligent agents are morally entitled to be considered separate legal entities needs to be preceded by the following interrogations: which realities are morally entitled to it and what characteristic or characteristics do they possess that supports such consideration? In our view, those realities are natural persons and animals and those characteristics are the capacities to act autonomously and to have subjective experiences. As for artificially intelligent agents, the same rationale may apply: they would be morally entitled to a separate legal status provided they possess the capacities to act autonomously and to have subjective experiences (Alexandre, 2017).

The artificially intelligent agents should be held liable for damages they cause? Is it even possible to hold these agents liable? How to achieve such possibility? The Draft Report with Recommendations to the Commission on Civil Law Rules on Robotics of the European Parliament's Committee on Legal Affairs goes even further and suggests that "the insurance system should be supplemented by a fund in order to ensure that damages can be compensated for in cases where no insurance cover exists" to which all parties (designers, owners and users) would "contribute in varying proportions".

The eventual use of public services or infrastructures by an artificially intelligent agent does not translate into a benefit for the agent, but for the user or designer who instructed him to take the action that implied the use of such service or infrastructure. In fact, since artificially intelligent agents are designed to directly or indirectly contribute to the welfare of humans, a human will always be the ultimate beneficiary of the public services or infrastructures that the agent uses while carrying out its purpose. Hence, it does not seem correct to say that it would be fair for artificially intelligent agents to be taxed because they benefit from public investment. Taxes, however, may also be justified by necessity. This is the case of taxes that aim at modifying patterns of consumption or employment within the economy, by making some classes of transaction more or less attractive.

Artificial intelligence has an unprecedented potential to disrupt the labour markets, as machines will be able to replace workers in a variety of cognitive and creative tasks and in tasks that employ manual labour but could not have been automated so far due to technologic constraints (such as driving). Even if, so far, markets have balanced

themselves by moving a slice of labour towards more cognitive-oriented tasks, the fact that artificial intelligence will be able to replace jobs in virtually every tier of the pyramid is generating concerns that jobs will be eliminated faster than new ones can be created. Furthermore, even in the event that artificial intelligence results in net job creation, it is unlikely that current methods of workforce retraining are able to accompany its pace. Some authors even claim that machine learning may empower artificially intelligent agents to take on the new jobs created as a consequence of their own development. Under any of these scenarios, such events will directly result in loss of revenue for governments due to a reduction in tax collections since capital income is taxed at much lower rates than labour income. In addition to this, the replacement of human labour by automated labour may translate into major growths of social security expenses since social security systems are designed to provide unemployment insurance to workers who lose their jobs. These increased expenses, combined with the loss of fiscal revenue, are generating concerns as to the sustainability of current social security systems.

4. The ePerson's liability

As humans, we are already sharing the society with the artificial intelligence and it is presumed that in the near future more and more AI agents will be prepared to interact with us. But, as we know, the society is based on rules and the legal field makes social relations possible. Is the legal framework prepared to contain this reality or should we make some adjustments?

For example (Allgrove, 2004) if a person (Andy) is negotiating a supply contract for his business using an intelligent software system who can measure the stock levels, compare terms of different suppliers and place orders, and the acceptant (Emma) is doing the process also using an AI system, who are the authors of the contract, knowing that the agreement and even the delivery was made before humans in charge with the contracting process were aware of its existence (maybe during night sleep)? Does the contract respect the present legal framework, as we know it?

One possible answer is that the contract is considered signed by humans. A conservative approach will probably say that the machines cannot be parties to an agreement, hence, the contract would not exist. However, we may consider that, in the same evening, after noticing that his stock was running low, Andy logged in to his computer and noticed that the system had placed an order which had been received and accepted by a supplier (Emma). Feeling assured, Andy went home and had an unconcerned night of sleep. Andy ignores whether Emma is using a system to manage her orders or not. Does Andy have a reasonable expectation to be supplied with the goods?

If Andy had placed the order himself, would Emma be excused from performance because the order was accepted

by her system instead of herself manually? On the contrary, Emma had accepted the order manually, would she be excused from performance because the order was placed by Andy's system? Or is it reasonable to excuse Emma from performance because both parties in the communications were the systems, despite the fact that Andy ignores the existence of Emma's system? In every case, even for the most conservative minds, the answer seems to be negative. But then, how to frame this contract in the light of the current legal framework?

One possible approach is to consider the system as a mere tool for contracting or communicating. Under this approach, the contract directly be celebrated between Andy and Emma. This approach offers the advantage of being easily introduced in the legal framework without the need for any major changes, (Allen & Widdison, 1996) either by legislation, case law or doctrinal consideration. On the one hand, it relies on the fiction that anything issuing from the computer really issues directly from its human controller, completely ignoring any autonomy that the system may have. Furthermore, by presuming a consensus among parties which might not even be aware that the contract was celebrated or that the other party exists, this approach deprives the formation of the contract of its single most important element: the meeting of wills.

Another approach for this case is to consider the conduct of the system the conduct of a person (employee). Under this approach, the contract would be celebrated between one of Andy's legal agents and one of Emma's legal agents. In the party's eyes, what difference does it make if there is an employee operating the counter-party's computer or if it is operating itself? The advantage of this approach is that it does not rely on any presumption or bend the contract formation principles. Furthermore, it enables Andy and Emma to resort to any defences they might have in case one of their employees did, indeed, celebrating the contract rather than considering them direct parties to the agreement. However, this approach implies choosing a legislative option in favour of considering Andy and Emma's systems as separate legal entities from their owners and users.

The change of liability paradigm from the operator of the vehicle to the manufacturer started with the imposition of liability for damages arising from an autonomous car and it was associated with a lot of cases involving autonomous technology that causes harm or injury such as elevators, airplane autopilot, sea vessel autopilot and autonomous trains. Artificially intelligent agents should they be held liable for the damages they cause? It is even possible to hold these agents liable? Two important observation should be achieved: when the liability is allocated to the artificially intelligent agent or to the designer and the second one is that these questions are only relevant when these agents make autonomous decisions.

A distinction should be made between cases where there is a deficiency in the code and ones where there is not. In the first case, the artificially intelligent agent was not programmed to take the action that gave rise to liability, but it was actually capable of making the autonomous

decision that led to it because of a defect in its programming. In the second case, we are dealing with accountability for actions that autonomous robots take, not related to coding deficiencies, but to their evolving conduct. If Jon's dog bites Jane, even if against his command, John will be held liable for that action. Applying the same treatment to the case where John's robot attacks Jane against his commands ignores any previous coding flaws that the robot might have had due to designer malpractice.

We aimed at demonstrating that, with the proliferation of artificial intelligence, questions will rise and the legal framework will inevitably need to adapt. We believe that "the more autonomous robots are, the less they can be considered simple tools in the hands of other actors" (Parliament, 2016).

5. Taking risks

The risk of losing control over AI agents are not only related to damages, but also to the protection of personal data and public safety. This can happen due to malfunctions, security breaches, the superior response time of computers compared to humans, unsafe explorations, hacking and so on. It is unrealistic to attempt to prevent every loss of control, but it is possible to limit the impact of such events, through implementing human-friendly goals in an AI agent's code (motivational control) or prevent the AI agents from being capable of causing harm even if they want to (capability control). Until the moment when artificially intelligent agents are able to detect what they are doing wrong and self-apply control mechanism, their application is dependent on human intervention, which might not always be possible and immediate. It is imperative for designers to perform extensive testing, in order to identify an unintended and unanticipated behaviours, and monitor customer feedback.

In order to ensure that designers may be held accountable it is important that artificially intelligent agents are embedded with mechanisms that allow for the maintenance of a clear line of accountability. Regardless of artificially intelligent agents being considered separate legal entities and having their own legal status, designer malpractice should not be excused when the autonomous decision behind the action that gives rise to liability is enabled by coding deficiencies simply because the agent was not directly programmed to take that action. The legal status of persons, animals, objects and other realities (such as rivers and companies) varies from jurisdiction to jurisdiction and, over the course of time, even within the same jurisdiction and regarding the same reality.

This observation enables us to conclude that a separate legal status or a legal personality does not derive from the quality of natural person, but it is the result of legislative options, which are based on moral considerations, that attempt to reflect social realities in the legal framework or that simply were made out of legal convenience. Hence,

The Japanese Ministry of Economy, trade and Industry also reported that Next Generation Robots will generate up to 7.2 trillion yen (approx. 64.8 billion USD) of economic activity by 2025, with 4.8 trillion going to production and sales and 2.4 trillion to applications and support. Generating economic prosperity via robotic application is not just that, the Japanese persistency in progressive development of robotic technology is understandable to overcome the problem of the declining birth rate and the growing number of the elderly people, hence inviting robots as an alternative to human labour. The rigid principles of law are perhaps becoming insignificant to constrain the evolving intelligent robots' behaviour, as they opted to extend the legal rights to robots.

The Japanese government believes on the embedded ethical robot behaviour within the robot system that will ensure correct performance of robots. They are now on the move to determine the set of embedded ethics to warrant friendly robotic behaviour with human safety centric regulation. In this perspective, Japanese government is consistent with the extensive efforts conceded by the Korean Robot Ethics Charter that has shifted the human safety centric regulation to balancing rights between human and robots. To the contrary of Japan's prediction for the future co-existence between human and robot, The United States of America has long held tight to the sole purpose of robots derived from the first definition of robot: labour tool designed to assist human.

Although the discussion on moral machines, embedded ethics or even robot rights under the constitution is evident, the USA government is persistent in adhering to the existing legislation or analysing possible doctrinal expansion relating to robotic governance.

Making machines that are more and more autonomous, it might be difficult for humans to ensure that such machines do not become too autonomous. Losses of control may occur due to malfunctions, security breaches, the superior response time of computers compared to the one of humans or conscious or unconscious flawed programming, namely a fragile distributional shifting, unsafe exploration, unscalable oversight, negative side effects.

Designing robots that could impact the safety or wellbeing of humans, is not enough to simply presume that it works. We believe that if designers cannot achieve justified confidence that an agent is safe and controllable, so that deploying it does not create an unacceptable risk of negative consequences, then the agent cannot and should not be deployed. Nevertheless, we also believe that artificial intelligence has the potential to place mankind on the path to prosperity and ultimately free Men from the burden of labour, giving us the opportunity to focus on tasks where creativity and passion play bigger roles. As Stephen Hawking once put it, with current and near- future technology "everyone can enjoy a life of luxurious leisure if the machine-produced wealth is shared, or most people can end up miserably poor if the machine-owners successfully lobby what they have prescribed, or any others which are recommended or adopted, shall, at every

moment, be susceptible to adjustment in order to strike a balance between guaranteeing the wellbeing of our species and the freedom towards innovation. Artificial intelligence is not something to be afraid of, but rather to embrace. And, by proactively discussing the challenges this technology may comport, we are a few steps closer to prevent any potential downside while still fully reaping its benefits."

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