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A GLIMPSE ON ROBOTICS AND ARTIFICIAL INTELLIGENCE – GLOBAL TREND AND CRIMINAL LAW[1].

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'There are two kinds of creation myths: those where life arises out of the mud, and those where life falls from the sky. In this creation myth, computers arose from the mud, and code fell from sky' -George Dyson

Abstract:
AI is defined as science and engineering of making intelligent machines, especially intelligent computer programs. The use of AI till now has been in the virtual world. Robots enable AI to transcend into the physical world which opens up unimaginable opportunities. Any major advancement in technology brings with it a wide range of opportunities and challenges. As the human interaction increases with these machines it will consequently give rise to legal issues. Such as who will be held liable for any liability arising from the actions of AI. Therefore, our legal system needs to be prepared for these upcoming challenges. The main issue is that neither national nor international law recognizes AI as a subject of law, which means that AI cannot be held personally liable for the damage it causes. In view of this, a question naturally arises, who is responsible for the damage caused by the actions of Artificial Intelligence. Attribution of legal personality to artificial intelligence can be an effective measure to check all potential challenges by the introduction of AI in our society. Based on the analysis of different models of criminal responsibility of legal persons which constituted an interesting advance in the criminal law in relation to what was hitherto traditionally accepted, we will appraise whether the necessary legal elements to have direct criminal liability of artificial entities are present. This paper discusses methodologies for provenance of legal personhood to AI. Whether by merely vesting legal personality in AI, the present legal system will be competent enough to resolve any issue arising due to the technological development in the field of AI.

Keywords: Artificial Intelligence, Robotics, Criminal Liability, Innocent Agent, Legal Personhood

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THE CONCEPT OF ARTIFICIAL INTELLIGENCE AND ROBOTICS:

AI is the intelligence of machines and the branch of computer science, which aims to create it. John Mc Carthy, who coined the term AI in 1956, defines it as "the science and engineering of making intelligent machines"[2]. AI can briefly be described as the science of making machines intelligent, to be able to perform tasks that generally require human intelligence. There are four different approaches of AI; acting humanly, thinking humanly, thinking rationally and acting rationally[3]. Humankind has for millenniums dreamt of creating an artificial being that thinks and acts humanly, in fiction as well as philosophy[4]. When thinking about artificial intelligence, most people imagine humans who just have robotic metal appearance. Most people are not willing to compromise on less than that[5]. However; people sometimes forget that artificial intelligence happens to be artificial and not human, sometimes abstract and not tangible. When artificial intelligence technology succeeds in certain test, it proves that the problem was not in the technology, but in the test itself[6]. People may accept the idea of wide usage of advanced technology, only if they feel safe from that technology[7].The combination of growing abilities of artificial intelligence technology; human curiosity and industrial needs direct the global trend to expansion of usage of artificial intelligence technologies. More and more traditional human social functions are replaced by artificial intelligence technologies[8].

[2]*Swapnil R. Kamdar & Astha Pandey, The Scope of artificial Intelligence In forensic Science July-September, 2011 Journal vol.LVIII No.3I SSN 0537-2429*

[3]*Peter Norvig and Stuart J. Russell, Artificial Intelligence: A Modern Approach, (3rd edn, Pearson Education Limited 2016) 1-8.*

[4]*Nils J Nilsson, The Quest for Artificial Intelligence (Cambridge University Press, 2010) 3-5.*

[5]*Howard Gardner, the mind's new science: a history of the cognitive revolution (1985); Marvin Minsky, the society of MIND (1986); Allen Newell And Herbert A. Simon, Human Problem Solving (1972); Winograd, Supra Note 4, At Pp. 169–171.*

[6]*Max Weber, Economy and Society: An Outline of Interpretive Sociology (1968); Winograd,* Supra Note 4, At Pp. 182–183*. Daniel C. Dennett, Evolution, Error, And Intentionality, The Foundations of Artificial Intelligence 190, 190–211 (Derek Partridge and Yorick Wilks Eds., 1990, 2006).*

[7]*Dylan Matthews, How to Punish Robots when they inevitably turn against Us? The Washington Post (March 5, 2013); Leon Neyfakh, Should We Put Robots on Trial? The bostonglobe (March 1, 2013); David Wescott, Robots Behind Bars, The Chronicle Review (March 29, 2013).*

[8]*Adam Waytz and Michael Norton, How to Make Robots Seem Less Creepy, The Wall Street Journal, June 2, 2014.*

Bellman defined it as "the automation of activities that we associate with human thinking, activities such as decision-making, problem solving, learning.[9]

Haugeland defined it as "the exciting new effort to make computers think machines with mind, in the full and literal sense[10]

Schalkoff defined it as "a field of study that seeks to explain and emulate intelligent behavior in terms of computational processes"[11].

The research in artificial intelligence mainly proceeded in two directions. The first was building physical devices on digital computers and the second was developing symbolic representations. The first direction revealed robotics and the second revealed perception, which could have been trained to classify certain types of patterns as either similar or distinct.

Robot is a physically-embodied, artificially intelligent device with sensing and actuation. It can sense. It can act. It must think, or process information, to connect sensing and action. Asimov 3 laws of Robotics (Runaround 1942)

1) A robot may not injure a human, or, through inaction, allow a human being to come to harm.
2) A robot must obey the orders by human beings except where such orders would conflict with the First Law.
3) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Robots are programmable physical machines that have sensors and actuators, and are given goals for what they should accomplish in the world. Perception algorithms route the sensor inputs, a control program decides how the robot should act given its goals and current circumstances, and commands are sent to the motors to make the robot operate in the world. Some robots are mobile, but others are rooted to a fixed location.

[9]*Richard E. Bellman, An Introduction to Artificial Intelligence: Can Computers Think? (1978).*
[10]*John Haugeland, Artificial Intelligence: The Very Idea (1985).*
[11]*Robert J. Schalkoff, Artificial Intelligence: An Engineering Approach (1990).*

The most widely-used robots today are industrial robot arms. Looking at the present world trends in the use of robots for security and surveillance, there is no doubt that the use of robots will expand and evolve as far as technologically possible if permitted to do so. It is clear that the projected technological development of robots will make crime fighting considerably more efficient in the future. It may be that with advanced technological crimes, more dangerous armed criminal gangs, massively increased terrorist and some future dreadfulness that we cannot foresee, society will be prepared to forfeit much of its current liberty and privacy.

APPLICABILITY OF CRIMINAL LIABILITY UPON NON-HUMAN ENTITY

In human society's daily life, the main social tool is the criminal law. In any legal system around the world, the criminal law is considered the most efficient social measure for education of individuals against anti-social behaviour and for curbing the individual behaviour. In order to impose criminal liability upon a person, two main elements must exist. The first is the external element— criminal conduct (*actus reus*) and the other is the internal element— knowledge or mental intent (*mens rea*). If one element is missing, no criminal liability can be imposed.

The basic question of criminal law is the question of criminal liability; i.e., whether the specific entity (human or corporation) bears criminal liability for a specific offense committed at a specific point in time and space[12]. The first step in order to evaluate the efficiency of criminal law towards machines is to examine the applicability of the criminal law for them. That raises the acute question in this context, whether machines may be subject to criminal law due to the modern concepts of criminal liability. The question of applicability of penal liability upon non-human entity is combined out of two secondary questions. The first is whether criminal liability is applicable upon non-human entities, and the second is whether criminal punishments are applicable upon non-human entities. The reason is that such technology imitates human mind, and human mind is already subject to current criminal law. All human offenders, corporations and artificial intelligence technology may be used as mere instruments for the commission of the offence, regardless their legal personhood.

[12]*See Clark & Marshall, Supra Note 16, At 23*

ARTIFICIAL INTELLIGENCE: WHETHER A SEPARATE ENTITY OR AS AN INNOCENT AGENT

In the context of artificial intelligence technology liability, the question arises whether the artificial intelligence technology is used as mere instrument by another offender. Perpetration-through-another is a late development of vicarious liability into a law of complicity. Vicarious liability has been recognized both in criminal and civil law since ancient times, and it is based on an ancient concept of slavery[13].As the master's subjects were considered to be his property, he was liable for the harms committed by them both under criminal and civil law. The party that lost the ability to commit an aware and willed offense was considered an "innocent agent" who functions as a mere instrument in the hands of the other party. The innocent agent was not criminally liable. The offense was considered "perpetration-through-another," and another party had full criminal liability for the actions of the innocent agent[14].

The perpetrator's liability is determined on the basis of the "instrument's" conduct[15]. The legal basis for this criminal liability is the instrumental use of the artificial intelligence technology as an innocent agent. No mental attribute, required for the imposition of criminal liability, is attributed to the artificial intelligence technology[16].When programmers or users use an artificial intelligence technology instrumentally, the commission of an offence by the artificial intelligence technology is attributed to them. The mental element required in the specific offence already exists in their minds. The programmer had criminal intent when he ordered the commission of an offence, and the user had criminal intent when he ordered the commission of the assault, even though these offences were physically committed through a robot, an artificial intelligence technology. The legal result of applying this liability is that the programmer and the user are criminally

[13]*Francis Bowes Sayre, Criminal Responsibility for The Acts of Another, 43 Harv. L. Rev.689, 689–690 (1930)*

[14]*Glanville Williams, Innocent Agency and Causation, 3 Crim. L. F. 289 (1992); Peter Aldridge Doctrine of Innocent Agency, 2 Crim. L. F. 45 (1990)*

[15]*Dusenbery V. Commonwealth, 772 263 S.E.2d 392 (Va. 1980). And His Mental State.United States V. Tobon-Builes, 706 F.2d 1092, 1101 (11th Cir. 1983); United States V. Ruffin, 613 F.2d 408, 411 (2d Cir. 1979).*

[16]*The artificial intelligence technology is used as an instrument and not as a participant, although it uses its features of processing information. See, e.g., George R. Cross & Cary G. Debessonet, An Artificial Intelligence Application in the Law: CCLIPS, A Computer Program that Processes Legal Information, 1 HIGH TECH. L.J. 329 (1986)*

liable for the specific offence committed, while the artificial intelligence technology has no criminal liability whatsoever[17].This is not significantly different than relating the artificial intelligence personhood as mere property, even though with sophisticated skills and capabilities.

LEGAL PERSONHOOD OF AI ENTITY- GLOBAL TREND

Legal personhood is invariably linked to individual autonomy, but has however not been granted exclusively to human beings. The law has extended this status to non-human entities as well, whether they are corporations, ships, and other artificial legal persons[18].

Artificial intelligence entities must be treated as legal personalities so as to make them accountable under the law just like corporations. This will enable the existing legal system to have enough potential to tackle upcoming challenges by artificial intelligence. Like in corporations if a person is found to take unfair advantage of the legal personality of the corporation, then the courts pierce through the corporate shield and hold such person accountable. This process of lifting of corporate veil can be adopted in case if any person uses artificial intelligence as a means to satisfy his own selfish motives or to save himself from any criminal liability. In the absence of direct legal regulation of AI, we can apply article 12 of United Nations Convention on the Use of Electronic Communications in International Contracts, which states 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. Such an interpretation complies with a general rule that the principal of a tool is responsible for the results obtained by the use of that tool since the tool has no independent existence of its own. So the concept of AI-as-Tool arises in the context of AI liability issues, which means that in some cases vicarious and strict liability is applicable for AI actions. In 2012, the European Commission initiated a Robo Law Project with the main objective of investigating the ways in which emerging technologies in the field of bio-robotics (including AI) bear on the national and European legal systems, challenging traditional legal categories and qualifications, posing risks to fundamental rights and freedoms that have to be considered, and more generally

[17]*People v. Monks, 133 Cal. App. 440, 446 (Cal. Dist. Ct. App. 1933)*.
[18]*MigleLaukyte, 'Artificial and Autonomous: A Person?' (2012) Social Computing, Social Cognition, Social Networks and Multiagent Systems Social Turn, available at http://events.cs.bham.ac.uk/turing12/proceedings/11.pdf*.

demanding a legal framework on which they can be developed and eventually launched. The most important outcome of the Robo Law Project appeared on the 22 September, 2014. It consists of a final report containing "Guidelines on Regulating Robotics", addressed to the European Commission, in order to establish a solid legal framework for the development of robotic technologies in Europe.

PUNISHMENT ASPECTS

In modern society, normally following punishments are imposed as a corrective measure: death penalty, imprisonment, suspended sentencing, community service and fines.

Death penalty has been considered as most severe punishment for humans. It has been considered as most effective method of incapacitating offenders. The life of the AI entity is of an independent existence as an entity. By deletion of software from AI entity incapacitating of the offender may be achieved. Once deletion is carried out, the offender (AI entity) becomes incapable of committing offences further. The deletion eradicates the independent existence of the AI entity and is equivalent to the death penalty.

Another significant punishment is imprisonment. Imprisonment in case of human being means deprivation of human liberty. The 'liberty' or 'freedom' of an AI entity includes the freedom to act as an AI entity in relevant area like – an AI entity in medical service has freedom to participate in surgeries, an AI entity in factory has freedom to manufacture. Considering the nature of a sentence of imprisonment, the practical action that may achieve the same effect as imprisonment, when AI entity is to put out of use for a determined period. During that period, no action relating to the AI entity's freedom is allowed, and thus its freedom and liberty is curtailed.

In most legal system, community service is a substitute for a short sentence of actual imprisonment. In the same legal system, community service is imposed couple with probation so that the offender pays a price for damage, he has caused by committing specific offence[19].

[19] *Austin, James, and Krisberg, Barry, The Unmet Promise of Alternatives, 28 Journal of Research in Crime and Delinquency 374 (1982); Umbriet, Mark S., Community Service Sentencing: Jail Alternatives or Added Sanction? 45 Federal Probation 3 (1981).*

The imposition of fine is another way of imposing punishment. Thus, most common punishment is applicable to AI entities.

RISKS POSED BY AI: FACTORS THAT INFLUENCE THE OCCURRENCE OF DAMAGE

If AI would be fully autonomous, then they must be aware of their actions. If they are aware of their actions, they must be liable for their actions. Liability without fault is based on the theory of risk. The theory is based on the fact that a person carries out activities that he or she cannot fully control; therefore, a requirement to comply with the safety regulations would not be reasonable, because even if the person acted safely, the actual risk of damage would still remain[20].

Though the role of robots is limited in today's health care sector, current research and developments in robotics indicate its likely to be increased use in near future. With rampant technological advancements, robot administered healthcare (from diagnosis to recover/rehabilitation) will soon be a reality. The robots engaged in healthcare can cause severe bodily harm, sometimes resulting in death of patient in certain situation like program malfunction. Unfortunately, modern day legislations, particularly in countries like India, are not clear on the point of liability in such cases. Hence, in criminal cases, the courts have to apply same logic which is applied in cases of corporate frauds, and in civil cases, one which is applied in doctrine of strict product liability and vicarious liability[21].

ARTIFICIAL INTELLIGENCE AND LEGAL LIABILITY

It seems that the question whether AI systems can be held legally liable depends on at least three factors:

- The limitations of AI systems, and whether these are known and communicated to the purchaser. Since AI systems have both general and specific limitations, legal cases on such issues may well be based on the specific wording of any warnings about such limitations.

[20] *Liability in Robotics: An International Perspective on Robots as Animals Richard Kelley, Enrique Schaerer, Micaela Gomez, and Monica Nicolescu*

[21] *Dr. Vikrant Yadav Ajeenkya, Robotics in Health Care: Who is Liable? D. Y. Patil University, Pune*

- Whether an AI system is a product or a service; if an AI system is held liable, the question arises of whether it should be held liable as an innocent agent, an accomplice, or an abettor.

- Whether the offence requires a *mens rea* or is a strict liability offence. If a criminal offence is considered, what *mens rea* is required. It seems unlikely that AI programs will contravene laws that require knowledge that a criminal act was being committed; but it is very possible they might contravene laws for which a prudent man would have known that a course of action could lead to an offence, and it is almost certain that they could contravene strict liability offences.

LIMITATIONS OF AI SYSTEMS

There is also the question of who should be held liable. It will depend on which of Halley's three models apply (perpetrator-by-another; natural-probable-consequence; or direct liability):

- In a perpetrator-by-another offence, the person who instructs the AI system – either the user or the programmer – is likely to be found liable.

- In a natural-or-probable-consequence offence, liability could fall on anyone who might have foreseen the product being used in the way it was; the programmer, the vendor (of a product), or the service provider. The user is less likely to be blamed unless the instructions that came with the product/service spell out the limitations of the system and the possible consequences of misuse in unusual detail.

- AI programs may also be held liable for strict liability offences, in which case the programmer is likely to be found at fault.

However, in all cases where the programmer is deemed liable, there may be further debates whether the fault lies with the programmer; the program designer; the expert who provided the knowledge; or the manager who appointed the inadequate expert, program designer or programmer.

EXISTING LEGAL FRAMEWORK IN INDIA: STATUS **OF AI UNDER INDIAN LAW**

The Constitution of India is the basic legal framework which allocates rights and obligations to persons or citizens. Unfortunately, Courts are yet to adjudicate upon the legal status of AI machines, the determination of which would clear up the existing debate of the applicability of existing laws to AI machines. However, the Ministry of Industry and

Commerce in India, whilst recognizing the relevance of AI to the nation as a whole and to highlight and address the challenges and concerns AI based technologies and systems and with the intention to facilitate growth and development of such systems in India, the Ministry of Industry and Commerce had constituted an 18 member task force, comprising of experts, academicians, researchers and industry leaders, along with the active participation of governmental bodies to explore possibilities to leverage AI for development across various fields. The task force has recently published its report[22], wherein it has provided detailed recommendations along with next steps, to the Ministry of Commerce with regard to the formulation of a detailed policy on AI in India.

The key take aways from the report are,

- The report has identified ten specific domains in the report that are relevant to India from the perspective of development of AI based technologies, namely (i)Manufacturing; (ii) Fin-tech; (iii) Health (iv) Agriculture; (v) Technology for the differently-abled; (vi) National Security;(vii) Environment; (viii) Public utility services; (ix) Retail and customer relationships; and (x) Education.
- The report has identified the following major challenges in deploying AI systems on a large scale basis in India, (i) Encouraging data collection, archiving and availability with adequate safeguards, possibly via data marketplaces / exchanges; (ii) Ensuring data security, protection, privacy and ethical via regulatory and technological frameworks;(iii) Digitization of systems and processes with IOT systems whilst providing adequate protection from cyber-attacks; and (iv)Deployment of autonomous products whilst ensuring that the impact on employment and safety is mitigated.

CONCLUSION

In fact, experts predict that robots will replace humans in one-third of today's traditional professions by 2025.[23] Very recently, Russia has developed a humanoid military robot called 'Ivan' which is intended to replace the soldier in battle or in emergency areas where there is a risk of explosion, fire, high background radiation, or other conditions that are

[22] *http://dipp.nic.in/sites/default/files/Report_of_Task_Force_ on_ArtificialIntelligence_20March2018_2.pdf, last accessed on March 23, 2018.*

[23] *Christoffer O. Hernces, Artificial Intelligence, Legal Responsibility and Civil Rights, available at https://techcrunch.com/2015/08/22/artificial-intelligence-legal-responsibilityand*-civil-rights

harmful to humans.[24]. The operator can remain miles away from danger as Ivan enters instead. He can then perform tasks such as driving vehicles or searching areas without ever having to enter the battlefield.

No law currently in force in India recognizes artificially intelligent entities to be legal persons. The question of whether legal personhood can be conferred on an artificially intelligent entity boils down to whether the entity can and should be made the subject of legal rights and duties. The essence of legal personhood lies in whether such entity has the right to own property and the capacity to sue and be sued[25]. There are a few arguments against granting AI's legal personhood. That is the responsibility objection and the judgment objection[26].If all of its specific requirements are met, criminal liability may be imposed upon any entity—human, corporate, or AI entity. Modern times warrant modern legal measures in order to resolve today's legal problems. The rapid development of Artificial Intelligence technology requires current legal solutions in order to protect society from possible dangers inherent in technologies not subject to the law, especially criminal law[27].It was only in 1635 that an English court dared to impose criminal liability on a corporation[28]. It was inevitable. Corporations participate fully in human life, and it was outrageous not to subject them to human laws, since offences are committed by corporations or through them. But corporations have neither body nor soul. Legal solutions were developed so that in relation to criminal liability, they would be deemed capable of fulfilling all requirements of criminal liability, including external elements and internal elements. AI entities are taking larger and larger parts in human activities, as do

[24]*https://news.vice.com/article/ivan-the-terminator-russia-isshowing-off-its-new-robot-soldier*

[25]*L. B. Solum. Legal Personhood for Artificial Intelligences North Carolina Law Review, 70: 1231–1287 (1992).*

[26]*L. B. Solum. Legal Personhood for Artificial Intelligences. North Carolina Law Review, 70: 1231–1287 (1992)*

[27]*Andrew Weissmann& David Newman, Rethinking Criminal Corporate Liability, 82 IND. L.J. 411, 419 (2007); Coffee, supra note 20, at 386. 210. William Searle Holdsworth, English Corporation Law in the 16th and 17th Centuries, 31 Yale l.j. 382 (1922); William Robert Scott, the constitution and finance of English, Scottish and irish joint-stock companies to 1720 462 (1912); bishop Carleton hunt, the development of the business corporation in England 1800-1867 6 (1963).*

[28]*Langforth Bridge, (1635) Cro. Car. 365, 79 E.R. 919; See in addition Clifton (Inhabitants), (1794) 5 T.R. 498, 101 E.R. 280; Great Broughton (Inhabitants), (1771) 5 Burr. 270098 E.R. 418; Stratford-upon-Avon Corporation, (1811) 14 East 348, 104 E.R. 636; Liverpool (Mayor), (1802) 3 East 82, 102 E.R. 529; Saintiff, (1705) 6 Mod. 255, 87 E.R. 1002;. Weissman &Newman, supra note 211, at 419.*

corporations[29].Offenses have already been committed by AI entities or through them. Thus, there is no substantive legal difference between the idea of criminal liability imposed on corporations and on AI entities. It would be outrageous not to subordinate them to human laws, as corporations have been. Models of criminal liability exist as general paths to impose punishment.

However, when focusing on the criminal law, current criminal law is adequate to deal with artificial intelligence technology. Moreover, if technology would significantly advance towards the creation of virtual offender, that would make the current criminal law much relevant to deal with the artificial intelligence technology.

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[29]*Weng, Chen & Sun, supra note 1, at 267; Boucq, supra note 5*