The Need for a Legal Standard of Care in the AI Environment

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Article	Abstract
	Artificial intelligence (AI) has risen to legal debate over legal liability involved in an incident. An intelligent machine can learn through experience and adapts its decisions accordingly. As such, if an intelligent machine's behaviour causes harm, the developer and the machine's owner may argue that the autonomous nature of AI systems has broken the causal link. The difficulty of determining who is liable for a harmful behaviour of an AI system is accentuated by the fact that tracing back the decision-making process of an AI system is not always possible. This paper aims to put forward a definition of a duty of care for developers and users of AI systems that could be the basis for the investigation of liability while seeking predictability of the allocation of legal liability in many cases involving AI incidents. The paper examines some guidelines on ethics for AI to discern essential elements of the duty of care in the AI environment. The paper argues that a uniform minimum standard of care should be adopted internationally through model laws or even an international convention. A uniform standard of care should be enforced by State control rather than self-regulation by the AI industry. A licensing or certification requirement for AI products should be implemented to verify that the elements of the duty of care have been satisfied to control AI production and import/export relations. Violation of the standard of care can be an objective ground to negate or allocate negligence, especially when verifying errors in the design of the relevant software or if explaining the AI system's behaviour is not possible. A clear standard of care would, this paper assumes, help promote AI development and use and would not create impediments to investment in AI production.

INTRODUCTION

The advent of artificial intelligence (AI) systems has triggered debate over allocating legal liability for AI-related incidents. An owner of an AI system involved in an incident may seek to

sue the system's developer in contract or tort.[1] Establishing the developer's liability will depend on proving an error or negligence in the design or a malfunction of the AI system.[2] Further, the fact that an AI system caused harm would not demonstrate that it malfunctioned. This is because an AI-based autonomous machine is trained to gather and analyse data, make decisions, and modify itself through machine learning processes.[3] A developer's negligence may depend on demonstrating that the AI system operated under normal, foreseeable circumstances that the developer should have trained the AI system to deal with. However, since an AI system would continue to adapt as it operates autonomously, it would be difficult to predict how it would respond in different situations.[4] The unpredictability of AI-driven machines will even reach an extreme if intelligent machines have a 'continuously improving system that surpasses human intelligence.'[5] Likewise, while an owner or user of an AI system may be liable to injured third parties, the autonomy of an AI system would raise challenges to the causal link between the owner/user and the harm suffered since it is usually difficult to explain why an autonomous machine acted in a particular way. In other words, the algorithms that could explain why an autonomous AI system made a certain decision are often untraceable.[6] Further, it has been noted that as the autonomy of intelligent machines increases, they could become uncontrollable even by their developers.[7] Thus, the need for predictability may militate against applying product liability rules to the developers of AI systems. In contrast, the unexplainable behaviour of AI systems could blur the allocation of fault between users and developers.[8]

Several approaches would apply under national laws to legal liability for AI incidents, e.g., the traditional system of fault-based liability, the system of strict liability,[9] and the system of fault or risk management.[10] It has even been suggested that an AI system could be recognised as a legal person.[11] Developers and users of AI systems may be domiciled in different coun-

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[1] Joseph Andrew Pepito, Brian A. Vasquez, and Rozzano C. Locsin, "Artificial Intelligence and Autonomous Machines: Influences, Consequences, and Dilemmas in Human Care," *Health* 11, no. 07 (2019): 932,936-937, https://doi.org/10.4236/health.2019.117075.

[2] Pepito, Vasquez, and Locsin. ; Xavier Frank, "Is Watson for Oncology per Se Unreasonably Dangerous?: Making A Case for How to Prove Products Liability Based on a Flawed Artificial Intelligence Design," *American Journal of Law & Medicine* 45, no. 2–3 (May 6, 2019): 273–79, https://doi.org/10.1177/0098858819871109.

[3] Pepito, Vasquez, and Locsin, "Artificial Intelligence and Autonomous Machines: Influences, Consequences, and Dilemmas in Human Care."

[4] Filippo Pesapane et al., "Artificial Intelligence as a Medical Device in Radiology: Ethical and Regulatory Issues in Europe and the United States.," *Insights into Imaging* 9, no. 5 (October 2018): 745-753,750-751, https://doi.org/10.1007/s13244-018-0645-y.

[5] Ryan Abbott, "Everything Is Obvious," *UCLA. Law Review* 66, no. 2 (2019): 2–52.

[6] Yavar Bathaee, "The Artificial Intelligence Black Box and the Failure of Intent and Causation," *Harvard Journal of Law & Technology* 31, no. 2 (2018): 889,898, https://jolt.law.harvard.edu/assets/articlePDFs/v31/The-Artificial-Intelligence-Black-Box-and-the-Failure-of-Intent-and-Causation-Yavar-Bathaee.pdf.

[7] Hannah R. Sullivan and Scott J. Schweikart, "Are Current Tort Liability Doctrines Adequate for Addressing Injury Caused by AI?," *AMA Journal of Ethics* 21, no. 2 (2019): 160–61, https://doi.org/10.1001/amajethics.2019.160.

[8] AMY L. STEIN, "Assuming the Risks of Artificial Intelligence," *Boston University Law Review* 102, no. 3 (2022): 1006–7.

[9] Samir Chopra and Laurence F. White, *A Legal Theory of Autonomous Artificial Agents* (University of Michigan Press, 2011).

[10] Gerhard Wagner, "Robot Liability," *SSRN Electronic Journal*, 2018, https://doi.org/10.2139/ssrn.3198764.

[11] Nadia Bantika, "Artificially Intelligent Persons," *Hous. L. Rev* 58, no. 3 (2021): 537.

tries, and incidents involving AI systems may be litigated in any country where the incident occurred. As such, the liability of developers and owners of AI systems may be governed by the national law of the country where the relevant incident occurred, especially in actions brought in tort.[12] It follows that different liability rules would apply depending on the place of the incident and the forum. Exposure to different legal systems of liability could be a source of concern for AI developers.

Therefore, this paper puts forward an idea of unifying the standards of the duty of care of the developers and users of AI systems. The justification for this approach is that *(i)* harmonising national laws on liability seems an ambitious solution to seek; and *(ii)* a duty of care, albeit with varying standards, would apply under national laws of tort, requiring a degree of negligence,[13] and harmonising its scope and standards for AI seems an achievable step towards a broader harmonisation.

RESEARCH METHOD

This article takes a descriptive approach to present the research problem, that is, the need for harmonising a standard of care in the AI industry to fill in the gap in the legal standards of liability in AI-related incidents. To define a standard of care, the main aspects of the duty of care conceived by professional guidelines on ethics for AI developers will be identified. Thus, ethical standards for the development and use of AI are gathered from published articles as well as codes of ethics produced by organisations, such as the OCED, besides professional organisations, namely the American Bar Association. By outlining the main principles promoted by proposed ethical standards, the authors extrapolate common elements that can constitute a minimum standard of care that should be accepted as a legal standard.

ANALYSIS AND DISCUSSION
Recent Development of liability of AI Systems

The current debate over the allocation of liability between developers of AI systems and their users as briefly outlined above attests to the unpredictability of developers' liability. Attempts to introduce legal criteria and conditions for developers' liability seek to balance the promotion of AI development with legal risks. The current state of the law needs to provide definitive answers; arguments for and against developers go different ways.[14] The present authors believe that the uncertainty about AI developers' legal rules of liability could be more conducive to promoting AI development. This is particularly because AI systems are distributed across borders, whereas incidents may occur in several countries and be tried under different laws. While legal systems may diverge on applicable legal principles, possible legal solutions pre-suppose

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[12] Mohammad Bashayreh, Fadi N. Sibai, and Amer Tabbara, "Artificial Intelligence and Legal Liability: Towards an International Approach of Proportional Liability Based on Risk Sharing," *Information & Communications Technology Law* 30, no. 2 (May 4, 2021): 169–92, 187–90, https://doi.org/10.1080/13600834.2020.1856025.

[13] See James A. Henderson, Jr. et al., *The Torts Process* (Rachel Barkow et al. eds.) (9th ed. Aspen/Wolters Kluwers, 2017).

[14] See generally the allocation of liability between developers and injured parties: Stein, "Assuming The Risks Of Artificial Intelligence.".

answering one question: whether a developer is at fault and how to establish their fault despite the unpredictability or unexplainably of AI systems' behaviour.[15]

AI products include robots and embedded AI systems, but they also take the form of software. These products may, therefore, have a manufacturing error or an error in software design. If an AI accident occurs, the following possibilities of liability arise, especially in user-trainable AI products:[16] (1) the developer may be responsible for defects in the design, insufficient product quality assurance and testing, or failure to disclose the limitations and risks of the product to the user, or (2) the user may be responsible for non-compliance with the developer's operation guidelines or allowing incompetent persons to operate the AI system in dangerous circumstances.

Determining who is liable for an AI accident may depend on explaining the AI system's behaviour.[17] However, as already mentioned, a retrospective inspection of the AI system is very difficult and may not sometimes be possible.[18] By contrast, one can look at external standards of conduct to determine whether the developer and the user have acted diligently in producing or using the AI product. Many cases would turn to evaluate the conduct of each party, at least if the AI system's behaviour cannot be explained reliably. Nevertheless, the unexplainable AI systems' behaviour raises challenges to negligence-based liability.[19]

Various guides of ethics in AI systems have been suggested and produced by Technology giants and relevant organisations.[20] However, detailed particulars of the legal duty of care in the production and use of AI systems need to be defined to ensure the legal predictability of judgments concerning negligence.

The lack of a certain standard of the duty of care of AI developers has been recognised by commentators.[21] In particular, AI developers' responsibility to identify and disclose risks associated with their AI products has been highlighted as one major aspect that their duty of care must cover. Thus, it has been suggested that "companies must carefully evaluate the foreseeable risks of the technology they are entering into the market and take steps to minimise those risks. If companies take these steps, they will not only help to minimise their eventual liability but ensure that their artificial intelligence software is ready for the human world in which we live."[22]

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[15] Stein.

[16] Bashayreh, Sibai, and Tabbara, "Artificial Intelligence and Legal Liability: Towards an International Approach of Proportional Liability Based on Risk Sharing."

[17] Xavier Frank, "Is Watson for Oncology per Se Unreasonably Dangerous?: Making a Case for How to Prove Products Liability Based on a Flawed Artificial Intelligence Design," *American Journal of Law & Medicine* 45 (2019): 273–94.

[18] R. Abeyratne, *Legal Priorities in Air Transport* (Springer, 2019).

[19] Weston Kowert, "The Foreseeability of Human-Artificial Intelligence Interactions," *Texas Law Review* 96, no. 1 (2018).; Andrew D. Selbst, "Negligence and AI's Human Users," *Boston University Law Review* 100 (2020): 1315,1360-1370.

[20] Fadi N. Sibai, *"AI Crimes: A Classification" Proc. IEEE International Conference on Cyber Security and Protection of Digital Services* (Ireland: Dublin, 2020).

[21] James Stewart, "AI Companies Have a Duty of Care," TrojAI, 2020, https://medium.com/trojai/ai-companies-have-a-duty-of-care-ac6a43fbf134.

[22] Weston Kowert, "The Foreseeability of Human-Artificial Intelligence Interactions," *Texas Law Review* 96, no. 1 (2018), https://texaslawreview.org/foreseeability-human-artificial-intelligence-interactions/.

This paper suggests that one important step towards defining the parameters of AI developers' liability is to have a uniform system to determine whether, for instance, a developer of AI systems has been negligent or not in the development process. Hence, this paper puts forward a standard of duty of care for AI developers and users of AI systems.

Developing a standard of duty of care in the AI environment is justified as AI is a rapidly growing industry, where lawmakers and judges may need guidance on professional and prudent conduct in AI production and uses - The general legal standard of a prudent person might not guide in the area of ever-developing technology. Determining the standard of the duty of care in the AI environment should be approached in various ways, evolving on a case-by-case basis. As one commentator has put it,[23]

> "With most new technologies, we gain familiarity over time, eventually creating a sense of what constitutes reasonable care or a collective intuition on which negligence law can rely as it adapts. Nevertheless, AI may be different. Unlike many technologies, AI poses challenges for negligence law that may delay the common law's ability to adapt or even prevent adaptation outright."

This paper relies on widely accepted guidelines for ethics in AI[24] to discern those elements closely related to the analysis of legal liability. Those elements concern transparency, testing requirements by AI developers, and enabling the traceability of the reasons for certain AI systems' behaviour that caused harm. Those ethics guidelines, however, generally refer to the need for allocating liability between AI developers and users. Further, the detailed elements of each ethical guideline vary from one producer of the guidelines to the other. Thus, while the headings of ethical guidelines, such as transparency, justice and fairness, and accountability are common, a global agreement on what is ethical and what it involves seems lacking.[25] Therefore, the ethics guidelines are insufficient to determine liability in a given set of facts. For instance, a report commissioned by the European Commission, while emphasising the importance of non-technical methods to ensure the reliability and trustworthiness of AI systems, acknowledged that the existing legal framework rests on liability and safety regulations.[26] It follows that no special standard of care was suggested for AI systems. This paper attempts to identify standards to assess negligence on the part of developers or users of AI systems.

Thus, we will first explain the suggested standards of a duty of care by which the conduct of the developers of AI systems and their users should be judged. Then, the question of whether the implementation of the suggested standards should be subject to industry self-regulation or governmental regulatory control will be discussed. It will be argued that government regulation should be introduced to certify AI products in the developer's country, and certificates should be required to import AI products into the user's country in international contracts. Finally, two forms of promoting unified standards of duty of care in the AI industry will be discussed based on cases of the harmonisation of national laws in other contexts.

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23 Selbst, "Negligence and AI's Human Users."
24 Mark Ryan and Bernd Carston Stahl, "Artificial Intelligence Ethics Guidelines for Developers and Users: Clarifying Their Content and Normative Implications," *Journal of Information Communication and Ethics in Society* 19, no. 1 (2021).
25 Anna Jobin, Marcello Ienca, and Effy Vayena, "The Global Landscape of AI Ethics Guidelines," *Nature Machine Intelligence* 1, no. 9 (September 2, 2019): 389–99, https://doi.org/10.1038/s42256-019-0088-2.
26 "Ethics Guidelines for Trustworthy AI," High-Level Expert Group on AI, 2018, https://www.aepd.es/sites/default/files/2019-12/ai-ethics-guidelines.pdf.

Suggested Minimum Standards of a Duty Care in the AI Industry

The following paragraphs suggest a minimum standard of care that developers and users should be required to fulfil, or else either party may be held negligent to the degree that courts would determine on a case-by-case basis.

A Minimum General Standard of Care for AI Developers

A standard of care for the developers of AI systems is manifold, covering testing requirements, software design, and transparency. Researchers and organisations have put forward ethical guidelines for AI. For example, Ryan and Stahl listed eleven categories of AI ethics for developers and users.[27] These are transparency, justice and fairness, responsibility, non-maleficence, privacy, beneficence, freedom and autonomy, trust, sustainability, dignity, and solidarity. However, those eleven categories may overlap. For instance, 'solidarity, 'non-maleficence,' and dignity' are essentially concerned with an ethical principle that AI should benefit society and not cause physical or moral harm to individuals or social relations. Therefore, one finds other classifications of AI ethics that seem fewer but converge with each other through the definition and elements of the ethical principles they advance. The OECD produced ethical guidelines that focus on: [28] (1)'Inclusive growth, sustainable development and well-being,' which speak to beneficial outcomes of AI for people and the planet. (2) 'Human-centred values and fairness,' which essentially calls for AI to be aligned to values, such as equality, fairness, the rule of law, social justice, data protection and privacy. (3) 'Transparency and explainability' concerns disclosures about how AI is developed and when it is being used. (4)'Robustness, security, and safety,' which essentially recommends traceability and enabling subsequent analysis and applying a risk management approach (5) 'Accountability', which is understood broadly to include moral and legal aspects of organisations or individuals' roles in ensuring the proper functioning of the AI systems that they develop or use.

However, not all categories of AI ethics relate directly to legal liability. Rather, some are more concerned with the general moral duty to ensure that the outcomes of AI are beneficial to society and its prosperity or to fairness and equality in the sense that access to AI and its benefits is consistent with the principle of non-discrimination. Of the relevant ethical principles of AI, the determination of legal liability for a particular incident will turn on answering the following questions: (1) Is there an error or negligence in the design or development of the AI system involved in the incident? (2) Was the incident caused by that error or negligence? (3) Has the owner or user of the AI system contributed to the incident (e.g., by deploying the AI system in an unintended environment or breach of the developer's guidelines for users)?

Answering these questions depends on how AI systems are developed and tested, the safety of the AI system, and ensuring that the way the AI system operates is traceable and explainable through subsequent inquiry. Therefore, ensuring 'transparency,' 'security,' and explainability' of AI systems constitute the elements of a duty of care of developers. The following paragraphs elaborate on these aspects.

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[27] Mark Ryan and Bernd Carsten Stahl, "Artificial Intelligence Ethics Guidelines for Developers and Users: Clarifying Their Content and Normative Implications," *Journal of Information, Communication and Ethics in Society* 19, no. 1 (March 3, 2021): 61–86, https://doi.org/10.1108/JICES-12-2019-0138.

[28] "OECD AI Principles Overview," OECD AI, 2019, https://oecd.ai/en/ai-principles.

The production of AI systems should involve a high threshold of testing requirements to ensure it considers all foreseeable situations. Software design may be subject to certain requirements. For instance, AI systems should be programmed to recognise 'normal actions' that are often experienced and give an alarm if: i. the AI system is moving to take a different manner; or ii. the intelligent machine's thinking and decision-making are about making a dangerous decision; or iii. the smart product is exposed to unsafe settings, for instance, near children.[29]

The developer's duty of care may vary depending on the severity of potential risks. For example, the risk of loss of life in a self-driving car is greater than the financial loss that may result from the decision maker or recommender system. Some AI software may be capable of facilitating fraud, e.g., through voice cloning. The greater the possible harm is, the more stringent the duty of care.

By the same token, the issue of explainability of the AI's decisions is important in fully autonomous AI systems. Developers should be required to ensure that a self-recording system is integrated into AI systems to trace how an intelligent machine adapted to the environment, thus enabling computer forensics to explain a decision taken by a certain AI system.[30]

Developers should also be transparent about the procedures followed and the scope and results of the tests conducted. Transparency should be fulfilled through a report analysing the results of testing and to what extent the AI system's behaviour is explainable. The report should identify risks and areas where the AI system may not be reliable. This is not a means to unreasonably shift risks to the user. Developers will need to balance the marketability of the product and the identification of potential risks and unsafe uses, which affects users' and users' trust.[31] Agencies, such as Underwriter Labs, can be established at national and international levels to specialise in testing AI products to meet safety and predictability requirements and issue product licensing to AI products meeting these requirements.[32]

Security of the software is also crucial. The standard for verifying any software design errors may be more stringent than other software applications. Transparency standards should require full disclosure of security-related tests and possible loopholes. Developers should make specific disclosure to users of all risks, and limitations, including the limitations on the explainability of the AI system's decision-making and all programmed values or criteria that the AI system uses in taking decisions (e.g., when facing the options of hitting a group of few children or a larger group of adults), and the factors which may restrict the predictability of the AI system's behaviour. This is significant since people have different values and ethical standards. What may be an ethical option to the programmer may not be acceptable to users in a different cultural context.

Developers should obtain and keep acknowledgements from their users confirming their consent to accepting the AI system based on that disclosure. This entails, for instance, the us-

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[29] Bashayreh, Sibai, and Tabbara, "Artificial Intelligence and Legal Liability: Towards an International Approach of Proportional Liability Based on Risk Sharing."

[30] Shane O'Sullivan et al., "Legal, Regulatory, and Ethical Frameworks for Development of Standards in Artificial Intelligence (AI) and Autonomous Robotic Surgery," *The International Journal of Medical Robotics and Computer Assisted Surgery* 15, no. 1 (February 2019): 1–12, https://doi.org/10.1002/rcs.1968.

[31] Sibai, *"AI Crimes: A Classification" Proc. IEEE International Conference on Cyber Security and Protection of Digital Services*.

[32] "Ethics Guidelines for Trustworthy AI."

er's reception of user manuals and accepting that the AI system stores logs of its experience and training as the user operates it to enable the analysis and explainability of the AI's behaviour when and if needed.

A Minimum General Standard of Care for Users

Users, too, have a duty of care in procuring and using AI systems. Since users belong to different categories, e.g., household AI applications, professionals, and workplace applications, one should consider a general duty of care that applies to all users and an additional industry-specific duty of care for producing unique AI systems and for professionals and employers utilising them.

A general duty of care links with the principles of 'transparency.' Users should request developers to provide full, documented disclosure as explained in the previous subsection. Then, operating the AI product must be in compliance with the safety manual prescribed by the developer. For instance, user manuals can require the user to train AI products in smaller safety zones until sufficient training has been performed.

Transparency is also expected from users to enable AI developers to assess the risks of AI for the intended uses and environment. Thus, users should provide information to the developer before the product delivery takes place regarding the uses for which the AI system will be deployed and the environment where it will operate. A questionnaire may be used to record the responses and information disclosed by the user. A standard of full disclosure and detailed description of the relevant environment should be adopted since users may need to be better placed to judge what information is material from an AI perspective.

Further, users must disclose to third parties that the AI system is being used to serve them or nearby.[33] Transparency towards affected parties involves that public authorities, too, disclose when and where AI is involved in law enforcement and public governance activities to protect individual rights (e.g., privacy).[34]

In addition to the general duty of care, an industry-specific standard of care should apply. For instance, varying levels of reliance on AI systems may be accepted in health services and in providing legal services, e.g., reviewing documents. For instance, the American Bar Association produced principles for AI ethics in legal services that focus on competence.[35] Thus, law firms are expected to ensure that lawyers are trained to use AI systems and are aware of their limitations and risks (duty of competence), disclose to the client the possible use of AI (duty to communicate), ensure the deployment of AI does not compromise the confidentiality, and review the outcome of AI systems and use them only where appropriate.

The next section will discuss whether the aspects of the duty of care in a particular industry should be explicated by the relevant users or by a governmental regulator.

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[33] "OECD AI Principles Overview."

[34] Gabriele Buchholtz, *Artificial Intelligence and Legal Tech: Challenges to the Rule of Law" in Thomas Wischmeyer and Timo Rade-Macher (Eds.), Regulating Artificial Intelligence*, ed. Thomas Wischmeyer and Timo Rademacher (Cham: Springer International Publishing, 2020), https://doi.org/10.1007/978-3-030-32361-5.

[35] "ABA Resolution 112 Adopted 12-13 August 2019," American Bar Association, 2019, https://www.americanbar.org/content/dam/aba/directories/policy/annual-2019/112-annual-2019.pdf.

Governmental Regulation Vs Self-Regulation

The relevant industry may develop a standard of duty of care in AI production and use through self-regulation. 'Self-regulation' takes the form of 'soft laws', which emerge through model contracts of developer-user relations and for the provision of services associated with the production of AI systems, e.g., programmers, testing agencies (if any), etc. Model contracts have proved useful in other areas, such as construction contracts.[36] Also, self-regulation takes the form of rules of conduct produced by relevant professional and industrial associations.

However, it is submitted here that more than self-regulation is needed for several reasons. First, the ubiquity of AI applications is increasing around the world. However, professional associations at the national level may adopt varying standards. Second, not all relevant industries have representative organisations in their countries, which may leave gaps in applicable standards. Thirdly, the representation of users may only be adequate in some fields of AI applications, while relevant standards should take into account all stakeholders' interests and concerns. Finally, since developers would be expected to comply with certain standards in producing AI systems, such that violating them would constitute negligence that courts, regulation of AI may sanction may be necessary to ensure compliance.[37]

In another context involving digital technology, namely: online dispute resolution in which arbitration proceedings, for instance, take place in cyberspace, it has been argued that State regulation is needed to maintain public confidence in private forms of dispute resolution.[38] The argument for State regulation is even more compelling in the AI industry since AI systems pose multifaceted challenges to privacy, safety, and life, which are at the heart of public and constitutional rights. These public rights and interests are better protected by State regulation. As one commentator has suggested, a regulatory framework is necessary to ensure the transparency and integrity of input data used in developing and training the AI system, especially because AI developers may resist transparency requirements.[39]

Governmental regulation of AI production has also been supported by specialised research institutes, such as the AI Now Institute, that called for sector-by-sector regulation.[40] At least for AI systems associated with risks to life and safety, a license should be required before releasing such AI systems. In the United States, for example, licensing of AI systems is required under the regulations of the Food and Drug Administration (FDA).[41]

It has been suggested for AI healthcare systems, rightly we think, that "[i]ncreased oversight efforts by health systems and hospitals, professional organisations like the American Col-

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[36] "FIDIC Contracts Have Been Developed over 50 Years as the International Standard for the Consulting Industry. They Are Recognised and Used Globally in Many Jurisdictions, on All Types of Projects." FIDIC, n.d., https://fidic.org/node/7089.

[37] Leon Strous, "'Should AI Be More Regulated?,'" in *Internet of Things, Information Processing in an Increasingly Connected World* (Springer, 2020).

[38] Thomas Schultz, "Does Online Dispute Resolution Need Governmental Intervention? The Case for Architectures of Control and Trust," *North Carolina Journal of Law & Technology* 6 (2004): 71–106.

[39] Frank A Pasquale, "DigitalCommons @ UM Carey Law Data-Informed Duties in AI Development" 119 (2019): 1917,1932-1625.

[40] Meredith Whittaker et al., "AI Now Report 2018," 2018, https://ainowinstitute.org/AI_Now_2018_Report.pdf.

[41] Filippo Pesapane, "Artificial Intelligence as a Medical Device in Radiology: Ethical and Regulatory Issues in Europe and the United States," *Insights into Imaging* 9 (2018): 745–53.

lege of Radiology and the American Medical Association, or insurers may be necessary to ensure quality of [AI] systems that fall outside the FDA's exercise of regulatory authority."[42]

However, soft law developed through self-regulation of the AI industry would still be part of the process of making relevant public policy and contribute to the making and updating governmental regulation. The applicable regulation should be formally adopted and enforced by governmental bodies. This can also be more conducive to harmonising the standards applicable internationally.

A Uniform International Standard of Care in AI Regulation

AI dealings cross boundaries. In an international contract involving the supply of AI products or AI incidents whose consequences affect persons and property in a number of countries, developers and users may find themselves subject to different standards concerning their duty of care. The law governing the standard of care will depend on the rules of conflict of laws of the forum where an action is brought.[43] Harmonising national laws would avoid this. The merit of harmonisation has been recognised, for example, by the European Parliament, which has called for regulating the civil liability for damages caused by robots at the Union level to ensure legal predictability for all stakeholders.[44]

However, as already suggested, while each state has its legal liability system, harmonising the applicable standard of duty of care in the AI industry is a desirable step towards harmonising national laws. Thus, while legal liability remains subject to the national law of each state, defining and harmonising the duty of care for developers and users is conducive to ensuring legal predictability of the allocation of fault. A defined duty of care helps decide whether a party is negligent or not based on the level of compliance with the regulation, especially when verifying errors in the design of software or the explainability of the AI product's behaviour is not possible or not reasonably reliable. Not only should a uniform standard of the duty of care be adopted, but compliance with it should be verified at the production and purchase phases through a license for releasing the product and through a permit procedure concerning import/export regulations.

The standard of the duty of care is an important element of any regulation concerning liabilities in the AI environment and can attract international cooperation as it concerns setting a standard of care without affecting the substantive legal rules of each state for violating that standard. Each state law could still determine when proof of a breach of the standard of care is relevant and the consequences of the breach. In other words, whether a breach of the duty of care is sufficient to trigger the liability of AI developers is left to each State law to determine. Nevertheless, uniform standards of a duty of care may be one step towards harmonising the legal solutions under national laws, which may take a long to realise.

A uniform standard of duty of care may be achieved through international conventions. This approach has been followed, for instance, regarding the compensation for the victims of

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[42] W. Nicholson Price II, "Risks and Remedies for Artificial Intelligence in Health Care" (2019), https://www.brookings.edu/research/risks-and-remedies-for-artificial-intelligence-in-health-care/.

[43] Hans-Jochem Lüer, "The Lex Loci Delicti in Single Contact Cases A Comparative Study of Continental and American Law," *Netherlands International Law Review* 12, no. 2 (1965): 124–59.

[44] European Parliament, *Resolution of February 16 2017, with recommendations to the Commission on Civil Law Rules on Robotics*, P8_TA-PROV(2017) 0051.

aviation accidents, where several conventions have been made.[45] Besides, model laws defining the duty of care of developers and users may be produced by the United Nations Committee for International Trade Law (UNCITRAL) as a source of guidance for national authorities. In contrast, UNCITRAL has succeeded in developing model laws followed by national laws, like electronic commerce and bankruptcy. An international organisation may be set up to represent the interests of AI developers and users. Such an organisation can produce standardised rules of ethics and guides to discharge the duty of care.

The compliance by AI developers and their users with the standard of care should be verified before a particular AI system is put into service. A regulatory body at a national level should be entrusted to issue a license to the AI product in the country of production based on verifying the aspects of the minimum duty of care described in the previous section. On the end of the scale, the country where the AI product may be imported would require that license to be furnished to grant the import/export license. This regulatory framework will work through the establishment of international standards and uniform legal rules for data legislation, protection of privacy,[46] and related issues. It should also be an offence to market, export, import, or otherwise set in operation an unlicensed AI product if it is capable of causing serious risk to life or safety or being used in fraud crimes.

An advanced step in international cooperation may be establishing international, specialised agencies to license the use of AI-related products after passing sufficient safety and predictability tests. The licensing procedure, whether carried out by a national or international agency, does not guarantee a risk-free AI product. It only certifies whether the production of the AI system and the relevant disclosure of the testing procedures and result analysis satisfies the duty of care, which is helpful in subsequent legal proceedings when it may be necessary to establish the negligent party and its contribution to the harm.

Finally, concerns may arise as to whether a regulation of the duty of care could impede the growth of AI development. However, the authors rake the view that a certain standard of care in the AI environment is not likely to create obstacles to AI development or inhibit developers from producing AI systems. On the contrary, a well-defined duty of care is conducive to achieving legal clarity on the parameters of liability, which may enable AI developers to manage risks and demonstrate that they have discharged their duty of care.

CONCLUSION

Determining whether the developer or the user of an AI system is liable for the damage it may cause is challenging so long as the allocation of liability depends on the analysis of the decision-making process of the relevant AI system. To facilitate the allocation of liability in such incidents, the examination of liability could focus on external and objective grounds instead of the internal processes of the relevant AI system. This paper has argued that a defined duty of care for the developers and users of AI systems can, and should, be the basis of the examination of liability. However, AI regulation has hitherto been focused on soft law principles that take

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[45] Convention for the Unification of Certain Rules Relating to International Carriage by Air, Signed at Warsaw on October 12 1929, and the Convention for the Unification of Certain Rules for International Carriage by Air, Montreal, May 28 1999.

[46] Junfeng Li, "Artificial Intelligence Governed by Laws and Regulations," in *Reconstructing Our Orders*, 2018, 73–74.

the form of ethical standards. Such standards have generally been kept from mandatory legal rules. In this paper, we addressed the standard of the duty of care of AI developers but also users' duty of care. A minimum standard of care should be conducive to determining the allocation of liability for a certain incident. Among several principles of AI ethics produced by researchers and organisations, legal liability turns on transparency about how AI systems are developed, how their security is tested, and when they are being used. Besides, owners of AI systems are expected to ensure the competence of the individuals using them. This minimum standard of care will help allocate liability since meeting that standard would enable the explainability of how an AI system operates and how an incident has unfolded. If a developer or user does not meet the standard of care, they could be presumed to be liable. Such a standard of care should be adopted as part of the law by State regulatory bodies or, at a subsequent phase of international cooperation, by a specialised international agency. AI products should be subject to certification or licensing requirements in their country of origin, and the submission of the relevant license should be required under import/export regulations.

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