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BOOK REVIEW

The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction

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Introduction

The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction, edited by Woodrow Barfield, Yueh-Hsuan Weng, and Ugo Pagallo, offers a multidisciplinary and cross-cultural exploration of the legal, policy, and regulatory challenges posed by the anthropomorphism of robots and their growing integration into society. This book was published by Cambridge University Press in 2024 and spans 888 pages. The book provides an analysis of the legal and ethical challenges that jurisdictions across the globe are facing in relation to human-robot interactions.

The Handbook arrives at a crucial moment, as advances in robotics and artificial intelligence challenge traditional legal frameworks and demand innovative regulatory approaches. Its multidisciplinary scope makes it a valuable resource for technologists, policymakers, and legislators navigating the complexities of robotic design, law, and regulation. This review evaluates the book's contribution by situating it within the broader discourse of technology governance, particularly in the European context.

Summary of the book

The Handbook is divided into four sections, each addressing key aspects of human-robot interactions (HRI). The introductory chapters set the stage by outlining the extent and nature of human-robot interactions and the implication of anthropomorphism on the interactions. It also discusses the crucial issue of trust in this technology and how the legal frameworks will need to adapt should they wish to keep up in the field of AI and Robotics. Part II of the book provides a thematic analysis of the issues and concerns relating to HRI. A particularly interesting discussion that emerges from this section, is the discussion on 'legal personhood' and the implications of establishing personhood for a robot.

Part III provides an extensive exploration of ethics, culture, and values impacted by human-robot interactions. In this section, we are introduced to Ubuntu Robot,[1] SanTO,[2]

[1] Mark Coeckleberg, "The Ubuntu Robot :Toward a Relational Conceptual Framework for Intercultural Robotics" in Woodrow Barfield, Yueh-Hsuan Weng and Ugo Pagallo (eds), *The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction* (United Kingdom, Cambridge University Press 2024) pp 408–420 at 414. Ubuntu is an African Philosophy that discusses relational par excellence, that humans can only be human through others. The contributor in this chapter presents it as an ideology suitable for adoption for informational ethics for Africa as people always want a sense of cultural ownership to have a sense of identity, belonging, and representation.

[2] Gabriele Trovato and Yueh-Hsuan Weng, "Ethical, Legal, and Social Concerns in the Application of Social Robots in Religious Settings: A Case Study of the Catholic Robot SanTO" in Woodrow Barfield, Yueh-Hsuan Weng

and Care Robots,[3] and the ethical and value-based considerations associated with the use of them. This coupled with a cross-cultural analysis made this section an especially interesting read. The final section of the book delved into the legal challenges, taking a balanced approach by including discussions on aspects of civil and criminal law. The discussion on finding 'intention' under criminal law for robots was specifically interesting as it proposes an alternative to humanism which has been at the heart of this discussion for generations. The final chapter of this section offers concluding thoughts on future directions, along with a scoping review of the possible legal approaches that may be adopted for the regulation of HRI.

Overall, the editors of the book have curated contributions from leading experts across disciplines, ensuring diverse perspectives on issues ranging from the regulation of increasingly intelligent AI agents embedded in robot systems to the societal impact of humanoid anthropomorphic robots.

Analysis

Strengths

The editors succeed in highlighting the complexities of regulating robotic and AI technologies as they evolve rapidly and operate in unpredictable ways.

One of the book's key strengths lies in the interdisciplinary approach, bringing together insights from law, policy, computer science, interaction design, sociology, and philosophy. For example, Chapter 9: Building a Smart Legal Ecosystems for Industry 5.0 by Pompeu Casanovas, discusses concepts such as compliance through design and design-driven trust in AI-enabled technologies and robots. This chapter offers a nuanced analysis of Smart Legal Ecosystems (SLE), providing both theoretical and practical insights. This chapter is of particular relevance to European legislators considering or developing regulations for a variety of different emergent technologies such as Extended Reality(XR) technologies, AI-enabled XR, and AI-enabled Internet of Things, for example.[4]

The handbook excels in addressing the social and ethical dimensions of HRI, particularly through chapters that explore the implications of humanoid and social robots. The inclusion of ethical frameworks and decision-making models is a highlight, offering readers practical tools for evaluating regulatory options for scenarios with critical ethical implications. Chapter 24: Ethical Design and Standardization for Robot Governance by Yueh-Hsuan Weng, further elaborates on the standardisation of ethical compliance requirements. It presents the idea of Value-Sensitive Design (VSD), as an approach for incorporating human values into the design process. Such a design facilitates the governance of robotic technologies by creating a framework for ethical design from a stakeholder's perspective and with consideration of crucial Ethical, Legal and Social Implication (ELSI) risks inherent to daily Human-Robot Interactions. Chapter 11: Legal

and Ugo Pagallo (eds), *The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction* (United Kingdom, Cambridge University Press 2024) pp 421–433 at 421. SanTo is a 2 degress of freedom Catholic Robot. This robot was created with the aim of exploring the theoretical basis for the application of robot technology in the religious space. SanTo is well versed in the teachings of the Bible and was designed especially for elderly worshipers.

[3] Chih-hsiung Chen, "Helpers for Helpers: Ethical and Legal Considerations for Long-term Care Robots" in Woodrow Barfield, Yueh-Hsuan Weng and Ugo Pagallo (eds), *The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction* (United Kingdom, Cambridge University Press 2024) pp 434–446. Care robots first become popular during the Covid-19 pandemic. Many care robots are designed to assist the elderly operating with deficiencies affect their autonomy.

[4] XR is an umbrella term for any technology that augments reality by adding digital elements to the physical world, most often with the help of a headset. XR includes, but is not limited to, Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). AI can now be used to advance the uses of this technology.

Being: Going Beyond the Debate of Legal Personhood for "Intelligent" Nonhumans by Tasuhiko Inatani, discusses the key issue at the heart of complex legal issues arising from scientific and technological advancements in society, that is 'legal being'. The chapter proposes a legal system, where legal liability may be attributed in complex HRIs where it is implausible to presuppose humanism. The system they propose moves away from the ideation of humanism and towards finding a 'legal being' for distributing criminal liability among the relevant legal beings. Chapter 5: Robots, Regulation, and the Changing Nature of Public Space by Kristen Thomasen discusses how with robots becoming increasingly common in public spaces, the nature of these spaces is changing. With a focus on the Canadian legal system, the chapter proposes that special considerations need to be applied to robots allowed to operate in a public space. The discussion on the definition of public space under section 5.3 (pp 90–96) is particularly intriguing as it categorically breaks down the public space for legal review. This focus on actionable insights sets the handbook apart, making it not just a useful resource for academics but also a practical guide for policymakers and regulators.

Another commendable feature is the inclusion of diverse case studies, such as 'Ethics, Robots, and Discrimination' (section 20.2.1, p 396), 'Manipulation' (section 19.2.1, p 365), and 'Vendor Lock-In Becomes Amplified' (section 18.7.1, p 354), which illustrate the societal implications of the technology and offer practical examples of regulatory choices. The authors provide concrete examples of how regulatory frameworks intersect with technological innovation, ensuring that the discussion remains grounded and applicable. The discussions on Tort Law, Criminal Law and Tax Law with an international perspective in Part IV of the book are of particular relevance to European regulators as guides to designing digital regulations that are future-proof.

Further, the handbook is forward-looking in that it dedicates space for discussion on emerging trends in robotics and AI, and the future uses of such technologies (For example, Chapter 12: *Robot Romance* by Margaret Ryznar pp 207–231). These forward-thinking perspectives make the handbook an invaluable resource for those tasked with developing anticipatory governance strategies and managing future risks associated with emerging technologies.

Limitations

Despite its many strengths, the handbook is not without its shortcomings. While the book takes a global perspective, there remains an unequal distribution of discussions on regulatory developments, with greater emphasis on Western contexts from the EU and the USA. However, it is apparent that this distribution is not intentional, it follows from the fact that certain parts of Asia, Africa and South America seem to be lagging in adopting and regulating robotics.

Another limitation of the handbook is the accessibility of certain chapters. Some chapters have been pitched at a level that assumes familiarity with legal and technical jargon, which may make the book less accessible to readers outside the field. For instance, several chapters have referred to Asimov's three laws of robotics as a starting point for discussion on the various facets of HRI and the legal and regulatory implications of the same. However the contributors have not discussed in-depth what the three laws are, and why they are integral to the discussion. A more consistent approach to defining key terms and concepts would enhance the book's accessibility and usability for a broader audience.

Another limitation of the handbook is that there is some overlap in the concepts discussed across the 45 Chapters. For example, Sophie the robot being a legal citizen of the UAE was referred to quite a few times. In some instances, this overlap helps to reinforce knowledge and understanding, while in others it feels repetitive.

Finally, the handbook occasionally falls short in addressing the practicalities of implementing the regulatory frameworks it proposes. While the theoretical foundations and the case studies are robust, the lack of a detailed discussion on enforcement mechanisms or the political feasibility of some of the recommendations may leave policymakers with some significant unanswered questions.

Conclusion

The Cambridge Handbook of the Law, Policy, and Regulation for Human-Robot Interaction is a timely and important contribution to the field of robotic law and regulation. The handbook is a must-read for anyone interested in understanding the regulatory challenges and opportunities posed by the integration of humanoid or anthropomorphic robots into society. While the handbook has some limitations, the strengths far outweigh them. The handbook's multidisciplinary approach and comprehensive coverage make it an invaluable resource for academics, industry professionals, policymakers and regulators. In conclusion, the handbook is of particular relevance to the readers of the European Journal of Risk Regulation as the handbook critically evaluates the risks associated with the integration of robotics into society and offers practical mitigation strategies in the context of European regulatory debates and practices.