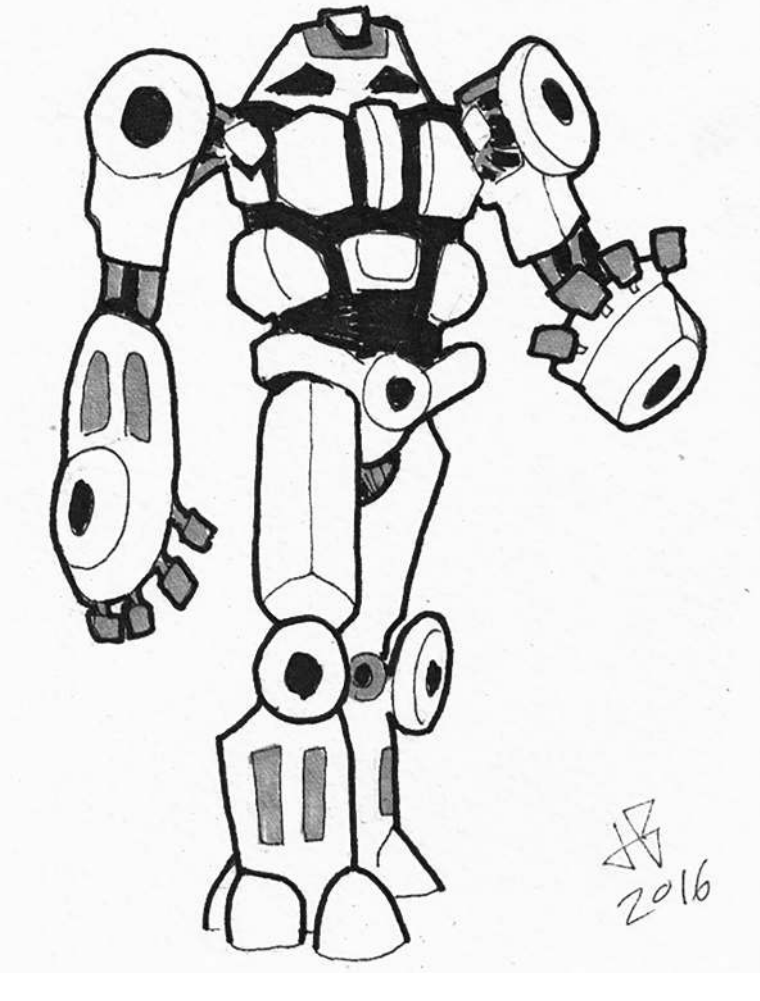
PART I

An Introduction to the Law, Policy, and Regulation for Human–Robot Interaction



1

Introduction to the Law, Policy, and Regulation for Human–Robot Interaction

Woodrow Barfield, Yueh-Hsuan Weng, and Ugo Pagallo

This chapter introduces issues of law, policy, and regulations for human interaction with robots that are AI enabled, expressive, humanoid in appearance, and that are anthropomorphized by users. These features are leading to a class of robots that are beginning to pose unique challenges to courts, legislators, and the robotics industry as they consider how the behavior of robots operating with sophisticated social skills and increasing levels of intelligence should be regulated. In this chapter we introduce basic terms, definitions, and concepts which relate to human interaction with AI-enabled and social robots and we review some of the regulations, statutes, and case law which apply to such robots and we do so specifically in the context of human–robot interaction. Our goal in this chapter is to provide a conceptual framework for the chapters which follow focusing on human interaction with robots that are becoming more like us in form and behavior.

1.1 INTRODUCTION

It comes as no surprise that robots are entering society in ever increasing numbers, in fact, according to the International Federation of Robotics (IFR), there are more than 3,000,000 industrial robots operating in factories around the world.[1] Robot density, a metric used by the IFR, measures the number of robots per 10,000 workers in an industry. From 2015 to 2020, robot density nearly doubled worldwide, increasing from 66 units in 2015 to 126 units in 2020. In addition, recent reports have indicated that 88 percent of companies plan to invest in adding robots to their organizations and roughly 400,000 new robots are predicted to enter the market yearly.[2] When discussing how law, policy, and regulations apply to robots, it is important to realize that not only are industrial robots becoming more prevalent within society but so too are robots that are becoming more human-like in appearance and behavior and that function in semi- or fully autonomous modes. Such robots, which include health-care robots, service and security robots, entertainment robots, companion robots, and others are raising unique challenges for law, policy, and regulations which apply to human–robot interaction (HRI). Such robots are the focus of this *Cambridge Handbook*, which takes an interdisciplinary approach to the topic.

[1] Brianna Wessling, 10 most automated countries worldwide, *The Robot Report*, December 15, 2021, www.therobotreport.com/10-most-automated-countries-wordlwide-in-2020/

[2] Zippia, 25 Revolutionary Robotics Industry Statistics [2023]: Market Size, Growth, and Biggest Companies, *Zippia.com*, March 7, 2023, www.zippia.com/advice/robotics-industry-statistics/

One reason for the rapid spread of humanoid, expressive, and AI-enabled robots throughout society is the increasing number of tasks they perform, their ability to display human-like social skills, and the wide range of motions they display. For example, considering mobility, in the United States, Boston Dynamics developed a bipedal humanoid robot whose range of motion and dexterity allows it to participate in extreme sports, such as parkour, and even perform backflips. And considering the social abilities of robots, the humanoid robot Sophia designed by Hong Kong based Hanson Robotics was granted citizenship in Saudi Arabia, based in part due to its human-like appearance and expressive interactions with humans.[3] Additionally, nations view investments in robotics that are intelligent, humanoid, and social as essential for their economic well-being. For example, in Japan, the goal of the Moonshot R&D Program, is, by 2050, to overcome many of the current challenges in the design of human-like robots that display sophisticated social skills.[4] On this point, Moonshot's ambitious Goal 3 is to develop AI-enabled robots that autonomously learn, adapt to their environment, evolve in intelligence, and act alongside humans in social contexts.

Along with technological advances in the design of humanoid, expressive, AI-enabled, and anthropomorphic robots have come a pressing need to determine how to regulate the behavior of this emerging class of robots given their particular set of skills. On this point, we note that nations such as Japan, China, South Korea, and the United States, along with the EU, are just beginning the process of determining how to regulate AI-enabled robots that are becoming more like us in social skills, form, and behavior. However, the increasing intelligence and human-likeness of social robots points to a future in which determining the appropriate law, policy, and regulations for the design and use of smart robotic technologies will be challenging – among others, the challenges will range from the law of contracts, criminal and commercial law, to constitutional and human rights law. But it's not just the law that will be challenged by AI-enabled, expressive, humanoid, and anthropomorphized robots; so too will issues of public policy be important to consider and so too will ethical issues be impacted by our personal interactions with social robots.

To discuss the areas of law, policy, and regulations which apply to human interaction with AI-enabled and social robots, we invited an international group of scholars to contribute chapters to this handbook. The chapters in this volume discuss how law, policy, and regulations apply to AI-equipped robots that are becoming increasingly human in appearance and have the ability to detect human emotions and to express emotions themselves, and that are often perceived by users as having a personality, race, or gender. To focus on this emerging class of robots, we organized this book around four topic areas: (1) An Introduction to Law, Policy, and Regulations for Human–Robot Interaction; (2) Issues and Concerns for Human–Robot Interaction; (3) Ethics, Culture, and Values Impacted by Human–Robot Interaction; and (4) Legal Challenges for Human–Robot Interaction. Taken together, the parts provide a comprehensive discussion of law, policy, and regulations that relate to our interactions with robots that are becoming more like us in form and behavior. However, because the development of law and policy for HRI is an emerging area of scholarship and legislative concern, the current volume is designed primarily to provide a conceptual framework for the field and to spur further discussion and research on how law, policy, and regulations can be used to guide our future interaction with highly intelligent and increasingly social robots.

[3] What citizenship means for Sophia in Saudi Arabia and the extent to which granting the robot citizenship was a practical decision versus one done for public relations remains to be seen.

[4] Moonshot Research and Development Program, Cabinet Office of Japan, www8.cao.go.jp/cstp/english/moonshot/top.html

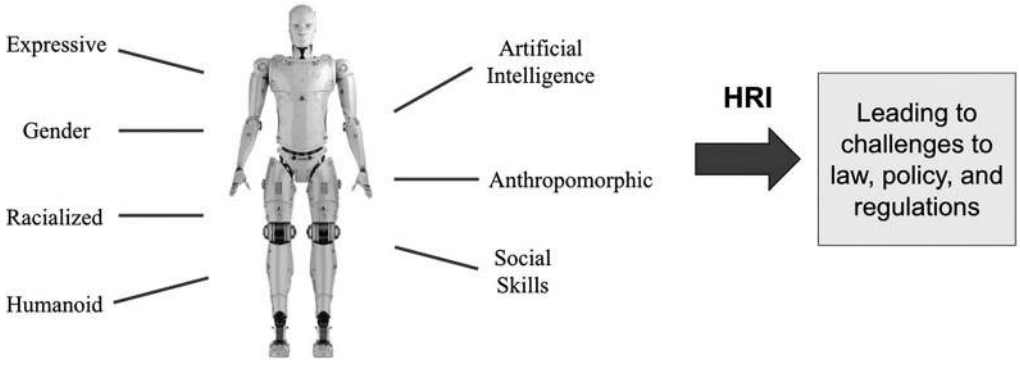


FIGURE 1.1 An example of an anthropomorphic robot with a set of skills and abilities offering challenges to law, policy, and regulations for human–robot interaction (the image is in the public domain)

Given the focus of the handbook, it is necessary to define a few terms early in the chapter. Generally, the term "law" refers to a rule of conduct or action that a nation or a group of people agree to follow, whereas a "regulation" is broadly defined as the imposition of rules by government, typically backed by penalties that are intended specifically to modify the (economic) behavior of individuals and firms in the private sector. And "policy" most commonly refers to a rule or plan of action, especially an official one adopted and followed by a group, organization, or government. Additionally, we operationally define "humanoid robots" as those robots that have a human-like appearance in terms of form and behavior. And when we use the term "anthropomorphic robot," we mean robots that are thought by individuals to behave as if they had human-like characteristics. Finally, by "smart" or "intelligent" we mean robots that are equipped with different AI abilities often allowing sophisticated social interactions to occur with humans. Figure 1.1 shows a drawing of a robot with the set of abilities that form the focus of this handbook.

The combination of smart, humanoid, and anthropomorphic robots that elicit reactions from individuals as if the robot were in some way human, represents a unique class of robots which are leading to interesting challenges to current law, policy, and regulations directed at the behavior of emerging smart robotic technology. On this point, Gadzhiev and Voinikanis commented that in the digital age, the development of AI-enabled robotics technology has not only reached a new scale but also raised both socioeconomic and legal problems that we think are exacerbated by the class of robots discussed in this chapter and throughout this handbook.[5] Of particular interest for humanoid, expressive, and smart robots is the issue of whether such robots should be awarded rights associated with legal persons. As the resolution of the 2017 European Parliament on Civil Law Rules on Robotics revealed,[6] the issue of legal personhood for robots has not only scientific but also practical or applied significance in the context of law. However, according to current laws and statutes, robots cannot be recognized as legal persons even though they are quickly becoming more autonomous and human-like in appearance and

[5] Gadzhiev, G. A. and Voinikanis, E. A., Could Robot Be a Legal Subject? (In Search of Legal Forms for Digital Economy Regulation), *Pravo-Zhurnal Vysshei Shkoly Ekonomiki* (4), 24–48, 2018.

[6] European Parliamentary (2017) European Parliament P8_TA(2017)0051 Civil Law Rules on Robotics European Parliament Resolution of 16 February 2017 with Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)). www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.pdf

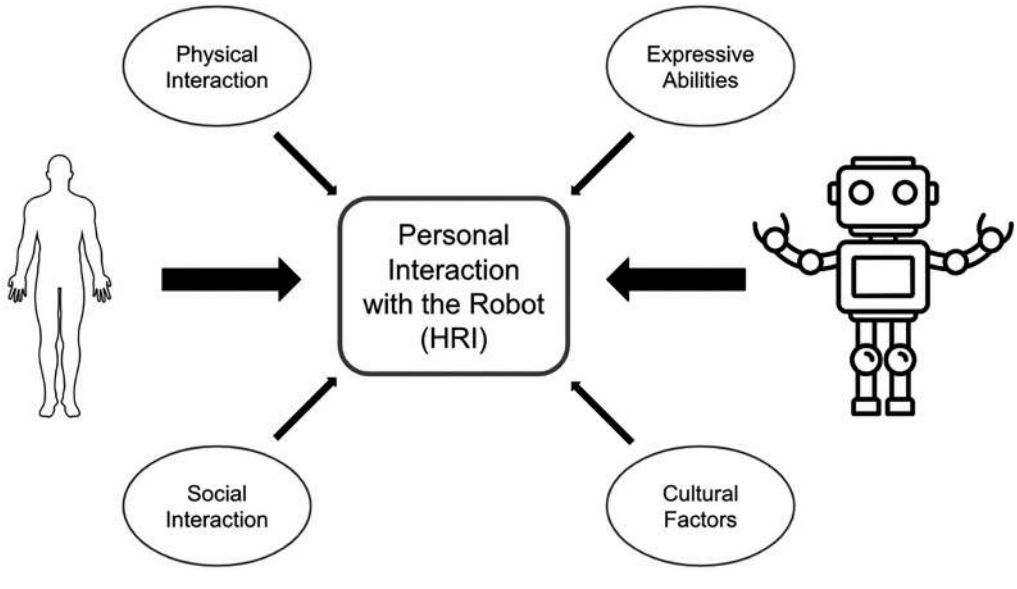


FIGURE 1.2 Human–robot interaction with robots emphasizing interpersonal interactions (images are in the public domain)

social abilities. For this and other reasons discussed within this handbook, there is a current gap in the law, policy, and regulations that apply to human interaction with robots.

In this handbook, we focus on the interdisciplinary study of law and robotics from a unique perspective in that we emphasize human interactions with robots at an interpersonal level. So, while robotics often focuses on the physical design of intelligent agents that operate in the real world, the study of HRI focuses specifically on the social interactions that occur between humans and robots.[7] It is at the level of HRI that humans share information and data with robots, form bonds with robots, work together with robots, and socialize with robots. And at the level of HRI, so too do many of the interactions between humans and robots raise public policy concerns and have ethical and legal consequences. Figure 1.2 emphasizes that the focus of the handbook is on interactions with robots at an interpersonal level and the various factors involved. The four topics connected by arrows to the larger box representing HRI are representative of issues that are addressed in this handbook and that are creating a class of robots with skills that challenge current law, policy, and regulations.

1.1.1 *Human–Robot Interaction Impacts the Law in Many Areas*

Given robots becoming more like us in form and behavior, a regulatory challenge for HRI will be based on the level of robot anthropomorphism a robot receives from individuals, which will be determined in part by the cultural, political, and normative differences existing among populations interacting with robots. From this, in an age of increasingly smart, expressive, and humanoid robots, an important issue will be to determine how to implement an international standard of laws and policies designed to regulate HRI, given the diversity of users expected to interact with robots. As an example, anthropomorphic robots can be created based on the appearance of

[7] Christoph, B., Belpaeme, T., Eyssel, F., Kanda, T., Keijsers, M., and Sabanovic, S., *Human-Robot Interaction: An Introduction*, Cambridge University Press, 2020.

historic figures, celebrities, or other people, but the use of such images for the design of humanoid robots may receive different treatment in different legal jurisdictions (e.g., in the United States, they may violate the Right of Publicity). On this point, consider that in China, a robotics company created a robot with the appearance of the former Japanese Prime Minister Shinzo Abe and made the robot bow and apologize to people in China at a robotics exhibition in Shanghai.[8] The controversial use of the Abe-bot raises interesting questions of law and policy reflecting different national approaches to the use of robots, not the least of which is to determine which cause of action applies to the disparaging use of the Abe-bot, which court would hear the dispute, and which parties have standing to initiate a legal action. It could even be the case that fundamental issues reflecting an individual's rights such as freedom of speech and expression could be involved.

Another emerging challenge to law, policy, and regulations from the use of humanoid, AI-enabled, and expressive robots is the proliferation and use of sex robots. The application of sex robots ranges from their use as interactive toys to engage a user's fetishism to intimate companions for people with disabilities who are unable to have a sexual relationship with another natural person. Considering robotics, one concern brought forth by the use of robots is the displacement of human labor from factory jobs; we note the same concern has been raised from the use of sex robots to replace human sex workers. For example, in China, there has been an attempt to establish a sex-doll brothel in the high-tech city of Shenzhen;[9] this has created controversy for several reasons. For example, as the use of sex robots proliferate, one concern is a challenge to societal norms; another is determining the regulatory requirements for sex robots from a health perspective. In either case, without changes, regulations of the robot sex industry will be dependent on existing laws, religious beliefs, political systems, and ideology operating within a particular nation or local community. On this point, in Muslim nations having sexual relations with a robot would be considered a criminal act based on the application of Islamic law.[10] However, for a country that supports individual rights, from a social democracy framework, an issue for law would be whether there was informed consent to engage in sexual relations with a robot.[11] From the previous examples, it is evident that cultural, religious, and political considerations will need to be taken into account as laws, policy, and regulations are created for AI-enabled, expressive, humanoid, and anthropomorphic robots.

As a broad statement, we note that current discussions of a law of robots often focus on solving several well-discussed and important issues that are based on the use of machine learning algorithms to direct a robot's behavior as it interacts with humans in social contexts. For example, assigning liability for damages resulting from the performance of autonomous or semiautonomous robotic systems has been a topic of discussion and legal scholarship for some time now. While this is an important issue of law that we have contributed to in our own research,[12] our view is that past scholarship on regulating AI has often overlooked what we describe as a "regulatory gap" between law and AI; this gap has emerged from the use of AI-enabled and

[8] Mudgha Variyar, China: Shinzo Abe-Lookalike Robot "Apologies" to Chinese at Shanghai Robot Show, Irks Japanese, *International Business Times*, 2015, www.ibtimes.co.in/china-shinzo-abe-lookalike-robot-apologises-chinese-shanghai-robot-show-irks-japanese-639412

[9] John Fang, Police Shutter China's First Sex Doll Brothel, but Owner Says Clients "Need" It, *Newsweek*, 2021, www.newsweek.com/police-shutter-chinas-first-sex-doll-brothel-owner-says-clients-need-it-1578302

[10] Amuda, Y. J. and Tijani, I. B., Ethical and Legal Implications of Sex Robot: An Islamic Perspective, *OIDA International Journal of Sustainable Development* 3(6), 19–28, 2012.

[11] Frank, L. and Nyholm, S., Robot Sex and Consent: Is Consent to Sex between a Robot and a Human Conceivable, Possible, and Desirable? *Artificial Intelligence and Law* 3(25), 305–323, 2017.

[12] Barfield, W., Liability for Autonomous and Artificially Intelligent Robots, *Paladyn, Journal of Behavioral Robotics* 9(1), 193–203, 2018.

anthropomorphic robots that have the ability to detect human emotion, to be expressive themselves, and to interact with people at an interpersonal level. More specifically, current, as well as proposed, regulations for robots interacting with people are not focused on the anthropomorphic and expressive abilities of robots, even though designing such robots are major initiatives among robotics experts and are beginning to challenge different areas of law.

As is discussed within this handbook, there are many other areas of law which will be challenged by robots that are anthropomorphized, expressive, and interact with people in social contexts. For example, in the area of criminal law, Vuletic and Petrasevic asked whether EU legislators should develop a framework of criminal law rules designed to regulate the behavior of AI-enabled robots and, if so, what behavior would the rules address.[13] They also commented that there needs to be ethical and legal guidelines developed to ensure that AI-enabled robots are trustworthy, a user's privacy is protected, the issue of liability for robots is considered, and user rights are protected. Additionally, they also observed that a user's acceptance of robots within society and their potential psychological dependence on robotics devices were ethical issues that should be addressed in an age of increasingly sophisticated robots.[14] We expect that these rights and ethical issues will more and more be challenged by the rise of AI-enabled robots interacting with people at an interpersonal level.

However, even with the different approaches discussed earlier for the regulation of robotic technology (more approaches will be discussed later), given the increasing level of intelligence for robots, according to Baranov and colleagues, various problems and contradictions will occur in efforts to develop legal rules for smart robots.[15] Specifically, they argue that there is an lack of preparedness in modern legal science to conceptualize and design the legal and technical regulatory acts necessary for robots. Further, they point out that we are especially unprepared to define the responsibility and appropriate protection modes for different interests, rights, and freedoms impacted by robots. Baranov and colleagues did, however, propose that there are two consecutive stages in the regulation of robots. The first includes the development and introduction of necessary changes in existing branches of law to account for advances in robotics; the second includes the conceptual-legal and doctrinal-legal formulation of key priorities which will lead to the creation of a new integrated branch of law – robotics law, which, they argue, will be an independent subject and method of legal regulation. Similarly, in our chapters, we propose that there should be a legal framework developed for robots entering society and argue that the focus of such a legal framework should be at the level of the social interactions between humans and robots.[16]

Another emerging topic for the law to consider is the ability of robots to be deceptive. For example, an AI-enabled robot may engage in "anthropomorphic deception" in which an individual could be deceived into thinking that he or she is interacting with a human rather than a robot; essentially that individual is being deceived into thinking that the robot possesses human abilities beyond those of the robot's programming. We argue that such robots raise a host of important and timely issues for the law to address but which have not been discussed in depth among legal scholars. Thus, the issue of "robot deception" (along with other challenges to the law) motivates the necessity to regulate the expressive aspects of autonomous

[13] Vuletic, I. and Petrasevic, T., Is It Time to Consider EU Criminal Law Rules on Robotics? *Croatian Yearbook of European Law and Policy* 16, 225–244, 2020.
[14] Villaronga, F., Legal and Regulatory Challenges for Physical Assistant Robots, eChallenges e-2015 Conference Proceedings, 2015.
[15] Baranov, P. P., Mamychev, A. Y., et al. Problems of Legal Regulation of Robotics and Artificial Intelligence from the Psychological Perspective, *Propositos Y Representaciones* 8(2), 1–9, 2020.
[16] Pagallo, U., *The Laws of Robots: Crimes, Contracts, and Torts*, Dordrecht: Springer, 2013.

and anthropomorphic robots when such robots interact with people. For this reason, a "law of HRI" seems appropriate and timely as it is the interaction between robots and people at the interpersonal level that raises interesting and unique issues for the law to address. Returning to the previous example, we should note here that there have been some initial efforts to regulate robot deception, at least in the context of internet bots. For example, California passed an "internet bot law" in which (under some specific circumstances) the bot must identify itself as an artificial agent. As an extension, we argue that a similar law should also be considered for anthropomorphic and embodied robots interacting with users in the real world.

> The California Bot law reads in part … (a) It shall be unlawful for any person to use a bot to communicate or interact with another person in California online, with the intent to mislead the other person about its artificial identity for the purpose of knowingly deceiving the person about the content of the communication in order to incentivize a purchase.[17]

Also discussing bots, Schellekens commented that search engines may provide data collected by bots that are freely available to anybody visiting an internet site.[18] Extending this observation to robots we ask – how should the law regulate disputes involving robots that are anthropomorphized, intelligent, and humanoid in appearance and that collect information that is shared with third parties without a user's consent? Broadly speaking, from the perspective of law, we need to ask which regulatory approach should be used to protect an individual's privacy as anthropomorphic and expressive robots interact with people in social contexts and collect personal data during the interaction. On this point, according to Wong, regulatory systems have often attempted to keep pace with new technologies by recalibrating and adapting current regulatory frameworks to account for new opportunities and risks, to confer rights and duties where appropriate, to offer safety and liability frameworks, and to ensure legal certainty for businesses.[19] But these approaches are often reactive and sometimes piecemeal and can result in what seems to be an artificial delineation of rights and responsibilities. In addition, complicating the effort to regulate AI-enabled robots is that previous robotic technologies have been considered tools to support human activities, but as machine autonomy and the self-learning capabilities of robots increase, robots are being experienced less and less like machines and tools and more like social entities that are more human-like in appearance and behavior. In fact, we think that humanity is approaching a critical point in our interaction with robots, one from which there is no going back because robots with machine learning algorithms can now "learn," adapt their performances, and "make decisions" from data and "life experiences" such that they are becoming more autonomous and human-like in behavior. These abilities will create anthropomorphic robots whose behavior will challenge current law, policy, and regulations and will require new approaches for the regulation of robots.

Discussing regulatory schemes being considered for robotics, Villaronga and Heldeweg commented that a dynamic regulatory instrument that coevolves with advances in robot technology is necessary; that is, as advances in smart humanoid robots continue to occur, a regulatory scheme with the ability to adopt to this development is crucial. But based on past efforts to regulate technology, this will be difficult. In response, one suggested approach to regulate robots

[17] California's Bot Disclosure Law (California Business and Professions Code § 17940).
[18] Schellekens, M. H. M., Are Internet Robots Adequately Regulated? *Computer and Law & Security Review* 29(6), 666–675, 2013.
[19] Wong, A., Ethics and Regulation of Artificial Intelligence, 8th IFIP WG 12.6 International Workshop on Artificial Intelligence for Knowledge Management (AI4KM), 614, 1–18, 2021.

that are becoming more human-like in skills and behavior is to employ a regulatory impact assessment procedure and evaluation based on simulation methods and the use of "living labs" which could be used to empirically study and evaluate robots. Such a procedure would provide roboticists with a practical tool to determine what regulations may be needed during the life cycle of a robot and would also be useful in helping to fill the existing regulatory gaps caused by the speed of the technological progress occurring within robotics and especially for robots that interact with people in social contexts.[20] Discussing this approach, Weng and his colleagues reviewed the "Tokku" Special Zone for Robotics Empirical Testing and Development program that is located in Japan.[21] Also discussing the regulation of robots, Salvini and colleagues reviewed the administrative, criminal, and civil aspects of Italian law in order to determine whether and how current legal regulations in Italy impact robot deployment in urban environments.[22] They noted that under Italian law, there is currently a lack of legal authorizations for autonomous mobile robots operating on public roads; similarly, there is a lack of regulations for interpersonal interactions occurring between humans and robots, even though human interaction with increasingly smart robots affects the full array of rights awarded people, such as the right to privacy, the protection of people's bodies, spaces, properties, and communications, and the protection of people's self-development in their intellectual, decisional, associational, and behavioral dimensions.[23]

Given human interaction with AI-enabled robots, the issue of privacy, as mentioned earlier, has also become an important problem to consider for HRI. Robots that are AI enabled are interacting with people in their homes and work environments, and within public spaces, and thus often result in challenges to traditional doctrines of law such as the "reasonable expectation of privacy" in US constitutional law, or the principle of informed consent in most data protection jurisdictions.[24] Within the EU, under the principle of "data minimization," a data controller is required to limit the collection of personal information to what is directly relevant and necessary to accomplish a specified purpose. While an interesting approach for the Internet, this may be difficult to apply to interpersonal interactions between humans and mobile robots.[25] For data privacy in HRI, by embedding legal safeguards and constraints into the design of robotic technology, the goal is to address limits of current regulations and to guarantee the transparency of data processing and the control of data and information. Here we argue that privacy by design should make transparent what data the robot processes, thus letting users or masters of the robot have control over the robot, while excluding third parties from access to data.

[20] Villaronga, E. F. and Heldeweg, M. A., HRI and the Future of Law, 12th *Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 117–118, 2017.

[21] Weng, Y. H., Sugahara, Y., Hashimoto, K., and Takanishi, A., Intersection of "Tokku" Special Zone, Robots, and the Law: A Case Study on Legal Impacts to Humanoid Robots, *International Journal of Social Robots* 7(5), 841–857, 2015.

[22] Salvini, P., et al., An Investigation on Legal Regulations for Robot Deployment in Urban Areas: A Focus on Italian Law, *Advanced Robotics* 24(13), 1901–1917, 2010. (Please see Citation No. 7.)

[23] See Koops, B.-J., et al., A Typology of Privacy, *University of Pennsylvania Journal of International Law* 38(2), 483–575, 2017.

[24] Article 5(1)(b) of the GDPR states that personal data shall be "collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes." Once personal data is lawfully collected and processed, it should nonetheless be "adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed" (Art. 5(1)(c)).

[25] Barfield, W. and Pagallo, U., *Advanced Introduction to the Law and Artificial Intelligence*, Camberley, UK: Elgar Publisher, 2020.

1.1.2 *The Law, AI, and the Impact on Human–Robot Interaction*

We discussed earlier how the law is necessary to govern the impact of increasingly anthropomorphic and smart robots experienced in social contexts. It is also the case that the application of the law to human interaction with robots may depend on matters of trust, social acceptability, and cohesion between humans and robots, which as we discussed previously largely depend on the norms and culture within which the HRI takes place. Several chapters of this handbook are devoted to these issues given different legal systems and cultures experiencing robots. However, we do not mean to say that international law, or models of legal governance play no role in this context, rather, we should be attentive to different approaches of national and quasi-federal legislators (e.g., EU law) and their crucial role in the regulation of anthropomorphic and AI-enabled robots.

In addition to domain-specific regulations of AI-enabled robots in the fields of medical devices, civil aviation, finance, and so on, legislators may opt for an all-embracing "horizontal approach" to the challenges of AI-enabled technologies. To some extent, this has been the approach of the EU institutions. For example, in the EU, the Parliament, the Council, and the Commission have time and again argued in their reports and resolutions that the "European values" enshrined in the Charter of Fundamental Rights (CFRs) from 2000 should be protected against misuses and overuses by AI systems. In 2021, the European Commission presented a first draft of the *Artificial Intelligence Act*, or "AIA," which is particularly relevant for robotics and HRI as it aims to regulate all high-risk uses of AI systems, except when AI systems are "developed or used exclusively for military purposes" (Art. 2(3) of the first draft of the AIA). Although it is likely that several parts of the AIA will be reformulated through the institutional process of amendments at the European Parliament and European Council levels, the overall architecture of the regulation is clear in its application to emerging robots. Interestingly, within the EU several applications of anthropomorphic robots under discussion within this handbook already fall under the provisions and binding rules of the AIA and thus we discuss them here.

The aims of the AIA can be summed up with five points. First, the intent of the AIA is to ban a set of unacceptable uses of AI that trigger a clear threat to the safety, life, and other rights of individuals. According to Art. 5 of (the first draft of) the AIA, AI practices that are prohibited include the deployment of "subliminal techniques beyond a person's consciousness" (Art. 1(1) lett. a); the abuse of people's "vulnerabilities" due to their age, physical or mental disability (lett. b); certain uses and services of social scoring by public authorities (lett. c); and, the use of real-time biometric identification systems, which admits, however, certain exceptions (lett. d). With the above in mind, we note here the ability of robots to scan an individual's face for facial recognition[26] and to detect an individual's emotions.[27]

Second, the AIA rests on the difference between high-risk AI systems and AI systems that do not raise high risk. That which should be considered a "high-risk AI system" is determined by an annex of the normative act, that is, Annex III of the AIA on the uses of technology. High-risk AI systems are subject to strict obligations and mandatory requirements before they can be placed into the market (Art. 9-15). This is one of the parts of the AIA that has ignited controversies. Annex III of (the first draft of) the Act determines when an AI system is high-risk pursuant to Article 6(2), according to the uses of the AI system. An AI system can be considered high risk

[26] Smith, M. and Miller, S., The Ethical Application of Biometric Facial Recognition Technology, *AI & Soc* 37, 167–175, 2022.

[27] Pal, S., Mukhopadhyay, S., and Suryadeyara, N., Development and Progress in Sensors and Technologies for Human Emotion Recognition, *Sensors* 21(16), 5554, 2021.