

BOOK REVIEW

The Laws of Robots

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The Laws of Robots

Ugo Pagallo

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The word robot entered the mainstream vernacular with Karel Čapek's 1920 play *Rossum's Universal Robots*. Ugo Pagallo argues that, considering the impact of today's robot soldiers on traditional categories of the laws of war (e.g., when and how resort to war can be justified), more than nine decades later, the sci-fi menace of Čapek's robot soldiers has turned out to be real.

Robots were first employed in the automobile industry in 1961 in a General Motors factory in New Jersey. But a robotic revolution has flared in the industrial world since the mid-1990s, argues Pagallo. The industrial sector began using water-surface and underwater unmanned vehicles (UUVs) for remote exploration or for repair of pipelines and oil rigs. From 2003 to 2008, unmanned aerial vehicles (UAV) flights increased by 2,300%. The quantity and quality of robotic applications have "somehow spiraled out of control" in the past decade or so (p. xi).

The "astonishing exponential pace of innovation" (p. xi) beyond the automobile sector since the mid-1990s corresponds to Moore's law (1965)—that the computing power of computer chips doubles approximately every two years.

The term robotics, as coined by Isaac Asimov in his 1942 novel *Runaround*, refers to a diverse field concerned with the design, construction, and use of machines in networks, and as robot servants, robot soldiers, unmanned vehicles, and robot toys. Robotics spans several disciplines, including artificial intelligence (AI) and computer science, cybernetics, electronics, neuroscience, and the humanities. The UN World 2005 Robotics Report defines a robot as a semi or a fully autonomous reprogrammable machine employed for the well-being of humans in manufacturing or services operations.

Some robotic applications can be considered both useful and safe, for example, AI chauffeurs. But other robotic behaviour appears to be a source of risk and potential threat. Current provisions of the laws of war, including international humanitarian law and human rights agreements "do not regulate critical issues such as whether lethal force can be fully automated, or what set of parameters and conditions should regulate the use of these

machines” (p. 189). Some robotic applications, such as autonomous lethal weapons and robot soldiers, and some types of robo-traders, can act and decide beyond the direct control of humans, thus challenging basic pillars of the law, argues Pagallo. The behaviour of such robots falls within the loopholes of the legal system and provokes a new generation of legal hard cases, necessitating regulatory intervention. At issue is how lawmakers should respond to the challenges of technological innovations.

The Laws of Robots addresses this serious deficiency in the legal texts. This pioneering work practically establishes the field of the law of robots, which can be understood as a developing field concerned with the legal regulation of robots. By focusing on robots as autonomous agents, the author distinguishes his research from the related field of the laws of robotics, which is mostly concerned with how the three laws of robotics devised by sci-fi author Asimov in *Runaround* can guide the establishment of rules for the behaviour of intelligent machines through design and implementation (e.g., Anderson & Anderson, 2011; Holt, 2013; Kondo, 2003). *The Laws of Robots* introduces laypersons to the complex set of legal concepts, principles, and legal reasoning systems underlying the regulation of robotic applications. It is a necessary reference for university students and researchers interested in exploring the complex relation between robotic technology and robotic law. The book fills a gap in existing knowledge about innovative applications in robotics technology—the design, construction, and use of robotics technology—and the legal challenges they raise for lawmakers. The author critiques the traditional approach to dealing with robotics technology, which has left loopholes in the legal system in need of addressing, and then presents his approach (model), law as a meta-technology.

According to the traditional outlook on law and robotics, existing laws are sufficient for addressing new technological challenges; robotics neither creates nor modifies concepts, principles, and rules in the legal field. Pagallo argues that, to date, jurists have mostly ad-

ressed the novelty of the cases induced by robotics technology with the traditional tools of hermeneutics, through interpretation of the texts and the use of analogy. In the traditional legal view of criminal law, jurists generally consider robots as dangerous animals or as a hazardous activity, so that strict liability rules apply to all the circumstances. In the field of contracts, jurists generally consider the rights and obligations of artificial agents through the robots-as-tools approach, so that, likewise, strict liability rules govern the behaviour of robots. In tort law, jurists generally understand strict liability rules by analogy with a party's responsibility for the behaviour of animals, children, or employees. The traditional view sees robots as tools (and liability for their use falls with their owners) rather than as active agents endowed with decision-making powers, and hence, argues Pagallo, with responsibility and accountability. The condition of immunity for the use of robot soldiers today, and the no fault responsibility for the employment of industrial and service robots in the civil sector are out of step with new forms of robotic applications. Robotic applications, “such as autonomous lethal weapons or certain types of robo-traders, truly challenge basic pillars of today's legal systems” (xiii).

Pagallo builds on Floridi's (2008; 2103) methodology of the level of abstraction to articulate his model of law as a meta-technology. Analysis of a case study can begin with exploring the question “who pays?” for damages resulting from a certain robotic application, to determine whether it is a hard case under the law, in what ways does it challenge the law, and what amendments might be suitable. Pagallo proposes a twofold approach to the laws of robots, incorporating both the perspective of legal philosophers (emphasizing the three levels of responsible robots, i.e., legal persons, proper agents, and sources of responsibility for other systemic agents) and the knowledge of experts in positive law (emphasizing the three legal fields of criminal, contract, and tort laws). Thus the approach, law as meta-technology, can be represented with an interface or a level of abstraction which the author uses to describe,

examine, and argue about the laws of robots. In restricting the focus of the analysis to the conditions whereby legal agents, both human and artificial, are confronted with responsibility, the question “who pays?” is invoked in criminal, contract, and tort laws. In hard cases jurists may disagree on the meaning of the terms framing the legal question, on the ways such terms are related to each other in legal reasoning, or on the role of the principles that are at stake. Hard cases necessitate the intervention of lawmakers at the national and international levels.

Chapter 1 first presents the social problem that is the focus of the book, that is, how certain applications in robotics technology are creating loopholes in the legal system. Second, it lays out the historical and technical contexts of robotics technology. Third, it outlines the different magnitudes of complexity of robotics technology—the disciplinary overlap between normative challenges on the one hand, including those pertaining to politics, ethics, the philosophy of technology, and the law, and, on the other, the disciplinary fields and applications of the robotics of technology. Finally, the chapter introduces the analysis method and the pragmatic legal model, law as a meta-technology. Chapter 2 discusses the legal concepts and ways of legal reasoning for the laws of robots, the principles of responsibility and agency of artificial agents, and how they can be applied to the case studies by asking “who pays?” Chapter 3 explores cases of responsibility pursuant to the liability model in accomplice cases of criminal law. Chapter 4 examines cases of responsibility that depend on the voluntary agreement between private persons in civil law. Chapter

5 reviews strict liability cases hinging on the idea of dangerous activities in tort law. Chapter 6 elaborates on the application of the model law as a meta-technology to determine which cases of robotics should be given priority. The conclusion chapter summarizes how scholars address the challenges of the field of robotics.

It is perhaps ironic that the legal amendments Pagallo calls for acquire importance, in part at least, from the fact that robots in warfare do contravene with the laws of robotics, which Asimov had envisioned as rules to control semi-autonomous machines. The first law of robotics states that a robot may not injure a human being or allow a human being to be harmed through inaction. Pagallo pleads, “the regulation of robot soldiers in battle should have top priority, because of their hazardous effects on the environment and the human race” (p. 189). *The Laws of Robots* fills a gap in existing knowledge about and regulatory approaches to innovative applications in robotics technology. It is a very important, interesting, timely, and comprehensive work that will serve as a reference and guide for future research in robot laws.

REFERENCES

- Anderson, M., & Anderson, S. L. (Eds.). (2011). *Machine ethics*. Cambridge, UK: Cambridge University Press. doi:10.1017/CBO9780511978036
- Holt, J. (2013). TH3 laws of robotics. *ITNOW*, 55(4), 8–9. doi:10.1093/itnow/bwt065
- Kondo, Y. (2003). On laws of robotics. In *Formal approaches to agent-based systems* (pp. 264–265). Springer Berlin Heidelberg. doi:10.1007/978-3-540-45133-4_25

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