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48 Robots

Abstract: The use of smart robots raises questions about their societal roles, human interaction, regulation, and impact on our understanding of crime and control. This chapter introduces three key issues related to digital criminology: bad robots, anthropomorphic robots, and crimes against robots. First, it addresses the use of robots in law enforcement, highlighting concerns about excessive or lethal force. Second, it explores the balance between caregiving roles and unethical surveillance by anthropomorphic robots. Third, it addresses violence against robots and the potential need for their protection. These issues necessitate reevaluating the frameworks governing the use and treatment of robots.

Keywords: android, anthropomorphism, humanoid, human–robot interaction, killer robot

Introduction

This entry explores so-called embodied smart robots, focusing on how the interface of software and hardware produces robots as physical objects acting upon the world with some degree of autonomy. The digital transformation of crime, the evolving capabilities of artificial intelligence, contentions around automation (see Automation by Mann), experimentation and prediction, and surveillance practices are central topics in digital criminology. The embodied robot is where all these tools, innovations, and practices meet and act upon the world. So far, robots have been the subject of limited critical attention from criminologists. To that end, the chapter provides a contextual description of robot attributes and capabilities before articulating a set of problematizations of interest for future criminological research.

What is a robot?

The standardization organization Institute of Electrical and Electronics Engineers (IEEE, 2023) classifies 18 different types of robots: Aerospace robots (e. g., the Mars rovers), aquatic robots, autonomous vehicles, consumer robots (e. g., robotic vacuum cleaners and pet robots), delivery robots, disaster response robots, drones, educational robots (e. g., robot kits to assemble and program), entertainment robots, exoskeletons (i. e. wearable robotic suits that help move the user's body), humanoid robots, industrial robots, medical robots (e. g., surgical robots), military and security robots, research robots, service robots, social robots (e. g., Paro a robotic seal), and telepresence robots (e. g., robots enabling remote presence). The classifications are overlapping; for example, a consumer robot may also be a social robot or a humanoid robot.

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Although robots are the topic of research and regulatory debates, there is no comprehensive legal definition of robots. Neither is there a common definition of robots in technical standards. The International Organization for Standardization (ISO, 2021, para 3.1) defines a robot as a "programmed actuated mechanism with a degree of autonomy to perform locomotion, manipulation or positioning." Hence, robots require a degree of autonomy, defined as "the ability to perform intended tasks based on current state and sensing, without human intervention" (ISO, 2021, para 3.2). The description offered by *The Encyclopaedia Britannica* (2023) sums up the vagueness of what a robot is: "any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner." In short: robots come in many different shapes, and many do not look like robots from popular culture—and we may fail to recognize them as robots.

How do robots interact with the world?

To be able to interact and adapt to their environment and human behavior, smart robots need to observe their surroundings via various sensors such as visual cameras, thermal cameras, audio, radar, Lidar (light detection and ranging), Wi-Fi detection, and more. To enhance human–robot interaction (HRI), robots are often fitted with facial-, voice-, and emotion recognition technologies. Robots collect massive amounts of data which AI further processes for them to learn and adapt. For example, the consumer robot dog 'Aibo' will adapt its behavior to its user based on the information it gathers through interaction and will develop a 'personality' based on these data. Thus, robots have enormous surveillance capacities which combined with their presence in our daily life give them access to both public and private spaces. Importantly, as noted by Calo and colleagues, "robotics combines, for the first time, the promiscuity of data with the capacity to do physical harm" (Calo et al., 2016). The combination of their physical presence and complex data processing capabilities raises intriguing questions about what role robots should have in society, how they can and should interact with humans, how they should be regulated, and how they shape our understanding of crime and crime control. Caveating the issue of drones, this chapter offers a brief inventory of these issues and sets out an agenda for further research.

Robots as socio-technical imaginaries: (popular) culture

From a perspective of digital criminology, fundamental questions pertain to the usages of robots for criminal actions; the thresholds for when design problems and malfunction become the source of criminal responsibility; and, in the future, whether sentient robots may one day have the capacity to hold criminal responsibility. Underpinning all

these questions, while embodied robots are tangible, physical objects, they are also produced through problem framings and sociotechnical imaginaries. Sociotechnical imaginaries are collectively held, institutionally stabilized, and publicly performed visions of how technology can produce a desirable future (Jasanoff, 2015). These visions are premised on the notion that technology can produce truth and bring order and progressive social change. This way, socio-technical imaginaries are also "performances of power" (Shelby, 2021).

Where do robots come from?

The understanding of what a robot is, what it looks like, and what it can do is defined by mostly popular culture. The etymology of the word 'robot' is from the Czech word 'robota,' meaning servitude or forced labor. It first appeared in Karel Capek's play *R.U.R., Rosumovi Univerzální Roboti* (Rossum's Universal Robots) from 1921. Yet, the concept of robots began much before with *automata* in ancient Greek, many made as mechanical humans or animals. Today, the word 'robot' suggests hostile robots from movies such as *Terminator* and *RoboCop*, but also friendly ones like R2D2 and Wall-E. In popular culture, robots are often cast as a menace to humans, or gaining human-like consciousness such as in *Blade Runner* and *Westworld* thereby raising the question of what it means to be human. However, since the imaginaries of robots are influenced by popular culture, this also differs across cultures. Perceptions of and approaches to robots vary cross-culturally with significant variations in acceptance. In turn, this acceptance shapes the degree to which robots are seen as solutions to political problems. For example, in Japan with its advanced robotics industry, robots are often featured in animations (manga and anime) as part of the household and co-existing with humans (e.g., the robot boy Tetzuwan Atom (Astro Boy) and the robot cat Doraemon which travels back in time to be a companion to a boy and stays with his family), or forming a bio-mechanical symbiosis with humans (e.g., the fighting robots Mobile Suit Gundam and Neon Evangelion which are piloted by teenagers to protect civilization). Robots are cast as the solution to the Japanese demographic crisis with an aging and decreasing Japanese population, supporting the traditional household, instead of more human resources by immigration (Robertson, 2014).

What does it mean to regulate robots? From bans to liability

Attempts to imagine and control moral transgressions by robots are central to the socio-technical imaginary. For digital criminology, this imaginary is central to evolving ideas about robots as perpetrators, victims, and vehicles for crimes. Science fiction au-

thor Asimov sought to create an ethical system for human–robot interaction and formulated three laws of robotics in the short story 'Runaround' (1942):

- A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- A robot must obey orders given to it by human beings except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.
- Asimov later added the zeroth law: A robot may not harm humanity, or, by inaction, allow humanity to come to harm.

His laws have had tremendous normative and policy influence on the robotics field, even if the purpose of many robots is to harm people (e. g., military robots). It is important to understand that the regulation of robots goes beyond the law to include design and architecture, market forces, and social norms. Robot regulation poses the challenge of keeping up with technological advances; striking a balance between stimulating innovation and the protection of fundamental rights and values; deciding whether to affirm prevalent social norms or nudge social norms in a different direction; and finally, how to balance effectiveness versus legitimacy in techno-regulation (Leenes et al., 2017).

With respect to the criminalization of specific types of robots, the perhaps globally most well-known robot regulation initiative is the so-called Stop Killer Robots campaign, which started in 2012. Citing the need to fight against digital dehumanization and ensure human control in the use of force, the campaign calls for a ban on lethal autonomous weapons (https://www.stopkillerrobots.org/). The most widespread criminalization of robots concerns child sex robots, in the form of robots embodying realistic and anatomically correct representations of children produced for sexual exploitation. In many jurisdictions, such robots are now banned (Darling, 2021). Some countries, such as Norway and the UK have decided that childlike sex dolls can be classified as child pornographic material and thus fall under existing criminal law. In contrast, others, like Australia, Germany, and Denmark have adopted new laws criminalizing childlike sex dolls (Loibl et al., 2023).

Nevertheless, today, most regulations of robotics are safety regulations for industrial robots that are used for specific purposes in enclosed areas, often with no human interaction, for example, robots used in car manufacturing plants. There is no specific regulation of other robots or human–robot interaction. The regulation is fragmented and requires applying a variety of rules on privacy, data protection (see Privacy and Data Protection by Bygrave), AI, product safety, consumer protection, liability, etc. Some robots fall under the requirements of, e. g., electronic products and must comply with safety standards. However, these regulations do not address other adverse effects that may occur in human–robot interaction and do not address concerns about the use of, e. g., facial recognition and emotion recognition technologies or how robots affect

the physical and psychological well-being of persons who are using or interacting with robots.

A central aspect of the imagination of robots concerns the role of robots: some see robots as tools or slaves, while others point to the dystopia of robots as overlords of humans. A common concern, as reflected in Asimov's laws, is the potential violence from robots. Embodied robots are heavy and mechanical and have the potential to physically harm humans. This can be accidental because of malfunction, but also caused by hacking where third parties overtake the functionality of the robots. There are numerous incidents with autonomous vehicles (which may be labeled as a type of robot) that have been hacked or that cause accidents due to their AI system's inability to detect and predict pedestrian behavior. At the same time, the existence of deeply problematic artifacts such as child-sex robots complicates the relationship between robots and harm and how we understand violence against robots. In the next section, we delineate three issues in need of further attention.

Emergent issues: bad robots, anthropomorphic robots, and crimes against robots

The first issue concerns *bad* robots. Function creeps create new questions with respect to what constitutes legal and illegal robot use. Some robots can be classified within several use categories. Robots from one field also spill into other fields where they are used to deploy violence. This includes technological transfers from industry to the police and from the military to the police. For example, robots can be useful to inspect suspicious packages or to diffuse explosives. However, the marketing of robots may intentionally go beyond their intended purpose. A robot developed for inspection purposes in industrial environments—'Spot' (see Ethics by Markham)—is also being marketed as a tool for public safety and to "de-escalate hostage scenarios" (Boston Dynamics, 2023a). Police forces in some US states have already started using Spot in, for example, house searches, prompting criticism from civil rights organizations and raising ethical concerns (Yunus and Doore, 2021). Since the robot has limited functionality, the purpose of use seems to be to intimidate and scare people rather than the robot appeasing the situation. Other police forces are discussing using military-purpose robots or equipping robots with lethal force. Some of the leading manufacturers of general-purpose robots have called out against efforts to weaponize commercially available robots (Boston Dynamics, 2023b). The case of so-called 'killer robots' in warfare is already problematic, and extending their use to law enforcement will raise further issues on autonomy, human control, and the use of force (Sandvik et al., 2014). This includes how law enforcement robots should be permitted to react to hostile situations, including the use of lethal force. Law enforcement is allowed to use force to protect life, including threats to their own life. A robot can be permanently damaged, but it is not alive. If a robot is allowed to react, based on data and AI, in the same way as human police of-

ficers its use of force may be excessive. Thus, the deployment of robots in law enforcement may warrant other rules of action than for the human police force.

A second type of issue concerns the *balance* between using robots to offer care and when it veers over into illegal and unethical surveillance, and what human likeness means for this balance. Robots are given work that is dull, dirty, and dangerous. Robots may be designed as mechanical shapes, i. e., delivery robots that are boxes with wheels, but many robots have anthropomorphic or zoomorphic designs such as androids or pets or cute designs. When robots are developed to be companions to humans—for example, as a substitute for pets—this raises questions about human autonomy, personhood, privacy, and agency (see Agency by Krasmann). The ethical concern is that anthropomorphic robots may lead to deception of the user and emotional dependency on a mechanical being. From a privacy perspective, a friendly robot can lead the user to disclose more personal information and private behavior than mechanical robots. However, research also shows how people bond with mechanical robots such as vacuum cleaners, e. g., naming and personalizing the robots, and military robots, e. g., soldiers performing memorial services for robots (Carpenter, 2013). Replicating human posture and gait in robotics is difficult, and most robots are made without legs as these tend to topple over due to their weight and lack of balance. However, robots are often portrayed as having human-like features, not only in science fiction but in research and industrial projects. For example, Tesla has presented a faceless robot with a human-like body and Boston Dynamics promotes their robots with videos of robots doing acrobatics and parkour. The latter is a promotional clip with careful scenography and editing, exaggerating the current abilities of the robots, and propagating a sociotechnical imaginary of robots as a type of super-human (Moses and Ford, 2021).

The third point concerns crimes *against* robots. There is not only concern about violent robots, but violence against robots. When robots are 'in the wild,' several experiments show that people, especially children, act aggressively against them. Research suggests that children engaging in the abuse of robots did so because they were curious about the robot's reactions or enjoyed abusing it and considered it human-like. Although a robot may be human-like or pet-like, violence against a robot will be like damaging a property: you may be held liable if you damage someone else's property, but you are free to damage your own property. If a robot should be treated differently from property it would be based on the notion that a robot is a sentient being or that it has its own rights. Various strategies for protecting robots beyond the property justification have been proposed (Mamak, 2023): a highly contested proposition involves giving robots legal personhood and moral rights (Coeckelbergh, 2010). A different approach involves criminalizing public violence against robots as a violation of public morality (Mamak, 2022). As noted above, the most difficult current issue concerns child sex robots, involving multilayered forms of violence. The existence of such robots is considered morally repugnant and exploitative. The abuse of such robots and the possible impact on real children adds further dimensions.

Conclusion

This chapter has offered a contextual description of robots and the challenges of regulating robots. Focus has been given to the global diversity of robots as sociotechnical imaginaries in a rapidly moving regulatory field, and to identify some issues of specific relevance for digital criminology. The chapter has focused on the use of robots for violence and control, issues of surveillance and autonomy arising from the design and deployment of robots as care objects, but also the more generalized anthropomorphic ascription of mechanical robots and finally the emergent class of robots as victims of crimes and violence.

Pointers for further research

To contribute to the field of digital criminology—or perhaps even a subfield of 'robot criminology'—more qualitative use cases are needed across the array of areas discussed in this chapter, including developments in 'robot crimes,' criminal law and policing practice, and with a view to analyze R & D processes and uptake of new robots in law enforcement. Important questions also arise around our future with robots, how human–robot interactions may engender new crimes, and one day, whether fully, autonomous sentient robots will acquire the capacity to be held criminally responsible for their actions and inactions.

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