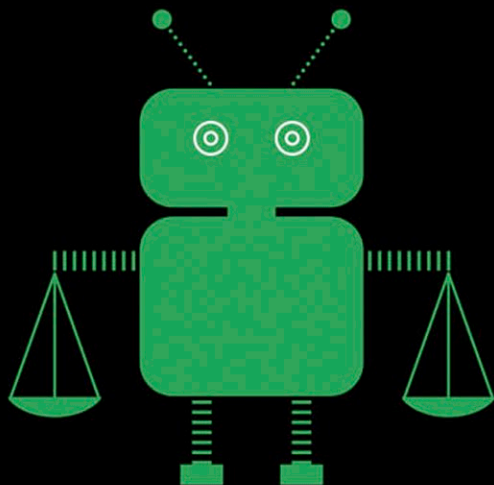


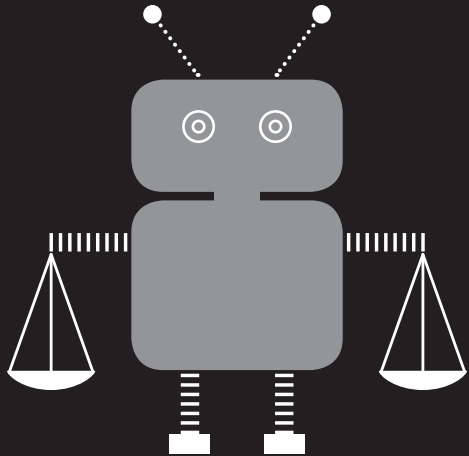
ROBOT ETHICS

MARK COECKELBERGH



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MARK COECKELBERGH

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SERIES FOREWORD

The MIT Press Essential Knowledge series offers accessible, concise, beautifully produced pocket-size books on topics of current interest. Written by leading thinkers, the books in this series deliver expert overviews of subjects that range from the cultural and the historical to the scientific and the technical.

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INTRODUCTION: WHAT IS ROBOT ETHICS ABOUT?

In the 2004 US science-fiction film *I, Robot*, humanoid robots serve humanity. Yet not all is going well. After an accident, a man is rescued from the sinking car by a robot, but a twelve-year-old girl is not saved. The robot calculated that the man had a higher chance of survival; humans may have made another choice. Later in the film, robots try to take over power from humans. The robots are controlled by an artificial intelligence (AI), VIKI, which decided that restraining human behavior and killing some humans will ensure the survival of humanity. The film illustrates the fear that humanoid robots and AI are taking over the world. It also points to hypothetical ethical dilemmas should robots and AI reach general intelligence. But is this what robot ethics is and should be about?

Are the Robots Coming or Are They Already Here?

Usually when people think about robots, the first image that comes to mind is a highly intelligent, humanlike robot. Often that image is derived from science fiction, where we find robots that look and behave more or less like humans. Many narratives warn about robots that take over; the fear is that they are no longer our servants but instead make us into *their* slaves. The very term “robot” means “forced labor” in Czech and appears in Karel Čapek’s play *R.U.R.*, staged in Prague in 1921—just over a hundred years ago. The play stands in a long history of stories about humanlike rebelling machines, from Mary Shelley’s *Frankenstein* to films such as *2001: A Space Odyssey*, *Terminator*, *Blade Runner*, and *I, Robot*. In the public imagination, robots are frequently the object of fear and fascination at the same time. We are afraid that they will take over, but at the same time it is exciting to think about creating an artificial being that is like us. Part of our romantic heritage, robots are projections of our dreams and nightmares about creating an artificial other.¹

First these robots are mainly scary; they are monsters and uncanny. But at the beginning of the twenty-first century, a different image of robots emerges in the West: the robot as companion, friend, and perhaps even partner. The idea is now that robots should not be confined to industrial factories or remote planets in space. In the

contemporary imagination, they are liberated from their dirty slave work, and enter the home as pleasant, helpful, and sometimes sexy social partners you can talk to. In some films, they still ultimately rebel—think about *Ex Machina*, for example—but generally they become what robot designers call “social robots.” They are designed for “natural” human-robot interaction—that is, interaction in the way that we are used to interacting with other humans or pets. They are designed to be not scary or monstrous but instead cute, helpful, entertaining, funny, and seductive.

This brings us to real life. The robots are not coming; they are already here. But they are not quite like the robots we meet in science fiction. They are not like Frankenstein’s monster or the Terminator. They are industrial robots and, sometimes, “social robots.” The latter are not as intelligent as humans or their science-fiction kin, though, and often do not have a human shape. Even sex robots are not as smart or conversationally capable as the robot depicted in *Ex Machina*. In spite of recent developments in AI, most robots are not humanlike in any sense. That said, robots are here, and they are here to stay. They are more intelligent and more capable of autonomous functioning than before. And there are more real-world applications. Robots are not only used in industry but also health care, transportation, and home assistance.

Often this makes the lives of humans easier. Yet there are problems too. Some robots may be dangerous

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indeed—not because they will try to kill or seduce you (although “killer drones” and sex robots are also on the menu of robot ethics), but usually for more mundane reasons such as because they may take your job, may deceive you into thinking that they are a person, and can cause accidents when you use them as a taxi. Such fears are not science fiction; they concern the near future. More generally, since the impact of nuclear, digital, and other technologies on our lives and planet, there is a growing awareness and recognition that technologies are making fundamental changes to our lives, societies, and environment, and therefore we better think more, and more critically, about their use and development. There is a sense of urgency: we better understand and evaluate technologies now, before it is too late—that is, before they have impacts nobody wants. This argument can also be made for the development and use of robotics: let us consider the ethical issues raised by robots and their use at the stage of development rather than after the fact. Let me say more about the aims and scope of this book.

Aims of This Book: Ethical Issues and Philosophical Reflection

To the extent that robotics and automation technologies leave the realm of science fiction and increasingly enter

our daily lives, it is important not only to see the potential benefits and opportunities but also discuss the ethical and societal questions they raise, now and in the near future. Consider, for instance industrial robots that get increasingly intelligent and work with humans in factories, robots used by vulnerable users such as children, the self-driving cars that are being developed by nearly all major car manufacturers, robots used for surgery in hospitals, and lethal drones that are used in warfare. This book responds to these issues by offering an overview of some key ethical and societal problems along with a range of conceptual tools from robot ethics to think about these problems. It gives examples of practical robotics applications, identifies ethical and societal issues with these applications, and offers conceptual tools to deal with these issues. The idea behind this practical angle is that in this way, robot ethics can help in rendering the development and governance of robotics more ethically responsible.

In addition, the book aims to offer philosophical reflection on what robots are and what thinking about robotics means for thinking about the human. For example, it makes us reflect on how we humans think about moral status. This provides a broader perspective that is much needed in debates that are frequently limited to a more immediate ethical concern, and helps to explain the deeper fascination with robots and machines in the general public. Soon I will say more about the philosophical

significance of robot ethics. But let me first ask a simple question: What is meant by robot ethics?

What Are Robots Anyway? What Is Ethics? And What Is Meant by “Robot Ethics”?

If we want to discuss robot ethics in this book, what do we mean? What is “robot,” and what is “ethics”? This already gets us into definition problems, a typical concern of philosophers.

First, what is meant by the term “robot”? I already mentioned the etymological meaning, related to servants and slaves. When it comes to dealing with robots in practice, however, this is only one meaning among many. The meaning of the term is controversial. Neither roboticists nor philosophers agree on the definition of robot. For example, the international Institute of Electrical and Electronics Engineers defines robots as follows: “A robot is an autonomous machine capable of sensing its environment, carrying out computations to make decisions, and performing actions in the real world.”² But does that make a thermostat a robot? A dishwasher? And what about cruise control? Should robots be able to move? How separate should they be from other hardware? Is an autonomous car a robot? How material need it be? Robots have hardware components and software (code). If an artificial

agent only consists of software, it is called a “bot”; it is not seen as a robot. Patrick Lin and colleagues have argued that in contrast to computers or nonembodied AI, a robot “can directly exert influence on the world.”³ Still, why is the influence of a bot less direct? And what if software is connected to hardware, without having the humanlike or animallike shape we usually associate with “robot”? Finally, how autonomous and intelligent should a robot be? For instance, sometimes robots are combined with AI, but this is not necessarily so. And given the growing importance of robots interacting with humans, a frequently used term is “human-robot interaction”; the emphasis is then not on the robot as a material artifact but rather on the interaction between humans and robots. There are broad and narrow definitions of robots. In this book, I will focus on those robots that have hardware, and often highlight ethical issues raised by robots that have a high degree of intelligence, autonomy, and interactivity, but I will include other kinds of robots too.

Yet technical definitions are not enough. The controversy about the future of robotics and science-fiction images point to the context of the robot as well as the human, social, and cultural dimensions of robotics. What a robot “is” cannot and should not be reduced to the material artifact “robot” but instead must be connected to its use, and its social and cultural contexts. What a robot “is” is always shaped by human use, (inter)action, subjectivity, and

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culture. For example, if particular humans use a particular robot in a way that treats it as a pet, then the meaning of that robot in that context and situation is not exhaustively described by calling it a thing or machine. And the narratives about robots mentioned in the beginning of this chapter are not irrelevant to thinking about robots; we better pay attention since they influence not only the public perception of robotics but also its development. Engineers and designers are not immune to science fiction; it influences *them* as well. Some may dream about building a humanlike machine, or, like users of the robot, project all kinds of anthropomorphic (humanlike) meanings onto the robot. Some evoke such meanings on purpose to render their robot more “social” and acceptable. And to take up the previous illustration again, giving robots a personal name (the name of a human or animal) is not an exception; it is common practice. Technical definitions of robots therefore are necessary but not sufficient in robot ethics. Robots are not just machines; they are always at the same time human, social, and cultural. Their meaning cannot be reduced to technical definitions.

Robots share this multifaceted meaning with other technologies. Just as technology in general, the term “robot” can refer to a range of phenomena. Technology is not only about material artifacts. It is also about the knowledge needed to develop and use these artifacts as well as the related science; frequently the immaterial computer

programs; activities such as use, design, and maintenance; and the human and social actors involved in the development and use of technologies. Its deployment takes place within a particular socioeconomic framework (e.g., capitalism) and particular culture, its use and development involves assumptions about the human and technology (e.g., that robots are just tools, that they are logical and rational, etc.), and technology is—as Martin Heidegger has shown in his famous essay on technology—about our attitude toward and view of the world.⁴ “Robots,” then, evoke all of these meanings and contexts of technology. They are artifacts, but their development and use also requires particular kinds of knowledge and skills. Moreover, there is the science of robotics. The hardware of the robot is material, but robots have an immaterial component (code) too. They are linked to many activities humans do, such as the design of robots as well as the use and interaction with robots. Their development involves social actors such as corporations and the state. They are developed and used in capitalist societies such as the United States, but also in others. They can be part of Western culture, or their development can have other cultural roots. Their development usually assumes a model of the human (e.g., the human as machine) or particular humans (e.g., elderly people as infantilized). And they are often connected to a particular view of the world, such as the view that nature is there to be exploited or that consumers are a kind of data cattle in

a data economy. As these examples show, to define what robots already are involves particular views, including *normative* ones, and is already *doing* robot ethics and “robot philosophy”: it is all about understanding and evaluating robots along with (their relation to) humans. And more generally, the language we use to talk about robots—as developers, users, or indeed philosophers—is not neutral either. What a robot “is” depends on how we talk *to* and *about* the robot.⁵

Second, what is “ethics”? Ethics is itself a contested term that can have many meanings too. Philosophers tend to agree that it has to do with normative questions, particularly with what we *should* do and how we *should* live. Ethics can refer to moral principles and values, but also the branch of academic philosophy called “ethics,” which discusses ethical principles, theories, and concepts. Some philosophers (e.g., pragmatists) put more emphasis on ethical practice and moral experience than on ethical principles. And depending on the moral theory used, ethics can focus on moral obligations, moral consequences, moral character, or other elements. Moreover, “ethics” can be understood as a question about limits (in order to avoid immoral behavior), but more positively, it can be formulated as a question about the good life. This can be about what is good for individuals as well as what is good for society. The term “ethics” usually refers to ethics concerning humans, yet it can also refer to ethics concerning nonhu-

mans such as animals and indeed robots. Ethics can mean an ethics *toward* humans, animals, and so on (they are the object of ethics), or it can mean an ethics *of or for* humans and other entities (they are then the subject of ethics).

The term “robot ethics,” then, third, can refer to the ethics of how *humans* should use, interact with, and develop robots in a way that leads to good for humans or other entities, such as animals or perhaps even robots (humans are the ethical subjects; robots are then the means to reach the ends of human ethics), or it can refer to an ethics *for robots*. Here the term “machine ethics” is often used, meaning the ethics that robots may have; robots are then seen as (potential) ethical subjects. It is important not to confuse these different meanings. Robot ethics is *not* necessarily about “giving ethics to robots” or “robots having an ethics.” For instance, Peter Asaro distinguishes between three meanings of robot ethics: “the ethical systems built into robots, the ethics of people who design and use robots, and the ethics of how people treat robots.”⁶ The first meaning concerns the ethics of robots as ethical subjects, such as when it is said that self-driving cars should have a built-in ethics. The second and third meanings concern the ethics of humans as ethical subjects, like when it is argued that people who design robots should be co-responsible for their use (e.g., for commercial purposes or in a war) or it is claimed that robots should not be “tortured.”

Descriptively speaking, ethics tends to at least partly differ between cultures and societies, and even within societies. People may have different ethical views on particular issues. Not everyone agrees on how to govern behavior or lead one's life, and what is best for society. Ethics in this descriptive sense has varied historically. For example, many of us now tend to think that animals have some rights and, more generally, a higher moral status than things. This cultural and historical variation is also relevant for robot ethics: the ethical attitudes toward and beliefs about robots tend to differ between cultures, and may vary in time. Japan is often given as an illustration of how cultural attitudes about robots differ; it is frequently said that people in Japan have a more positive attitude toward robots because of their specific popular cultural history (with robots depicted as helpers of humans) and the continuing influence of traditional worldviews in which non-humans can have a spiritual status.⁷ And some people contend that in the future, we will or should give rights to robots.

Note that in this book, I will use the terms “ethics” and “morality” interchangeably. Anyone thinking about robot ethics, however, is free to distinguish between these terms if it is shown that there is something to be gained from such a distinction. Note also that in terms of academic position, the field of robot ethics can be seen as a branch of (applied) ethics and practical philosophy, but it

can be linked to the field of philosophy of technology too. It is then seen as one of the technologies that concepts and theory from the philosophy of technology can be applied to.

In this book, I will use “ethics” and “robot ethics” in many different senses; in each chapter or argument, I will make explicit what kind of “ethics” is being discussed. For example, the book will include discussions about whether robots can be moral agents (ethical subjects) and moral patients (ethical objects). And it will not only be about ethics as being concerned with doing the right thing but also ethics of the good life and good society. These choices and my treatment of these matters unavoidably reflect my view of how to do ethics. In contrast to many textbooks on ethics, for instance, a focus on individual ethics is not the default; the next chapter asks questions concerning the impact on society rather than just individuals. Furthermore, in contrast to many applied ethics books, its project is not centered on the application of normative moral theory. The reader will not find chapters with names such as “deontology,” “consequentialism,” or “virtue ethics.” Instead, the book touches on a number of ethical issues, such as responsibility, human dignity, and the question concerning moral status. These discussions will then involve further concepts and theories, including, for example, the theory about responsibility as well as normative moral theory such as consequentialism (chapter 5) and virtue ethics

(chapter 6). But the *starting point* is not theory as such; it is the ethical issues that arise from technological use and practice.

Not all robot ethicists will agree with this approach and the definitions provided. My presentation of what we mean by robots, ethics, and robot ethics can—like all definitions of philosophical concepts—be contested. Others may put more emphasis on individual ethics or moral theories. For instance, another treatment can be found in the work of Keith Abney, who answers the question of what robot ethics is by discussing not only what morality and ethics are but also what we mean by moral rights and duties, what the major contemporary moral theories are and how they bear on robot ethics, and what a person is.⁸

Let me say more about the approach of my book.

Approach, Structure, and Scope of the Book

While this book is focused on introducing philosophical concepts and theory in the field of robot ethics, it aims to do so in a way that shows robot ethics' relevance to real-world issues. For this purpose, it links specific robotic applications to philosophical discussions. For example, it connects self-driving cars to questions regarding moral responsibility. This introduces readers to the first and best-known aim as well as definition of robot ethics:

to contribute—by means of philosophical concepts and deliberation—to understanding and addressing *ethical issues with robots in the real world*. This is an important aim, which can, and has to, be further pursued by means of interdisciplinary and transdisciplinary research, involving dialogues with, for instance, practitioners in the fields of engineering, policy, and law. A growing number of people, inside and outside academia, are drawn to this exciting project.

This focus on real-world ethical issues with current and near-future robots means that there is less attention to topics such as superintelligence (here: machines with a hypothetical intelligence that far exceeds human intelligence) or machines that have artificial general intelligence (the hypothetical intelligence of a machine that can understand and learn any intellectual tasks humans can do). In my view, debates about these topics often distract from dealing with real-world current and near-future issues in robot ethics. That being said, I fully acknowledge that such discussions may contribute to the philosophical aim(s) of robot ethics (see below). Therefore in the last chapter, I will introduce the topic of superintelligence in the context of transhumanist approaches to robot ethics.

Moreover, my focus on the ethics of robotics in the real world, rather than the robots in science fiction, does not mean that I believe that science fiction is entirely irrelevant to robot ethics. As I already suggested, it is relevant

to study how robots are and have been imagined in science fiction, how this imagination and these narratives influence how robots are perceived and used today, and what the normative implications are. I have contributed to this kind of work with my book *New Romantic Cyborgs*. Science fiction can also offer interesting thought experiments to philosophers. I use some of them in this book, especially in my chapter introductions, which each frequently refer to science-fiction films. And sometimes ethical and political lessons can be drawn from science fiction. For example, as Eileen Hunt Botting has shown, *Frankenstein* can be a resource to think about responsibility and rights.⁹ In the context of our topic, this could mean that the story helps us to ask questions about the responsibility for making robots. Is it acceptable that people who make and sell robots “abandon” their creations, and leave the ethical challenges they raise to users and their society, or should they take responsibility for their creations? For many contemporary robot ethicists, this is a rhetorical question; they believe that designers and developers of the technology, among others, should be responsible for the technology (see also the look at responsible research and innovation in chapter 4). For those involved in robotics who have not yet taken robot ethics seriously or people from the humanities who did not yet make the link to contemporary technology, by contrast, thinking about the responsibility of engineers in light of *Frankenstein* may offer a good starting point for

reflection and thus contribute to robot ethics' main aim of addressing the ethical issues of robotics in the real world.

In my view, however, robot ethics should have a second (but not secondary) aim, which receives less attention, but perhaps gives us a deeper explanation of why the wider public is so interested in the field: to contribute to *philosophy*, and not only to thinking about technology but, for example, to thinking about the human too. Thinking about robots is not only about robots but also touches on many issues that have a much wider philosophical relevance. This is why throughout the book, the ethics of robotics is connected to questions from other subfields of philosophy. For instance, it shows that inquiry into the ethics of robotics leads to ontological (see the previous section on what a robot is), epistemological (e.g., what is expertise, and what kind of knowledge do we have about the ontological and moral status of other entities), and philosophical-anthropological (what are humans and what does it mean to be human) questions. The book demonstrates that asking about robots is also always asking about humans along with their morality, practices, and institutions; it shows this in every chapter, and ends with a reflection on the relation between robots and humans. Of course, thinking about robots helps us to better understand and evaluate (a particular) technology. As such, it is part of the philosophy of technology and ethics of technology. But it is about humans as well. A common theme running through this

book is that robots function as tools to better understand ourselves—tools used by scientists to test and improve their models about humans and other natural beings, but in addition, tools used by *philosophers* to reflect on what it is to be human. Hence the initial title of this book was *Robotic Mirrors*; we use robots as mirrors to think about the human and ethics, among other aims. Robots are mirrors that show us the often-beautiful yet also darker sides of humans as well as their moral thinking and doings.

Robot ethics is thus part of (applied) ethics and the philosophy of technology, but it can also be framed as part of a wider “robot philosophy” that has both practical and theoretical dimensions, and includes subjects such as epistemology, metaphysics, and political philosophy, and in the end and at its best, it is philosophy tout court, such as when it makes us think about the nature of the world or offers us ways to reflect on what it means to be human. This in turn means that there is no “neutral” way of doing or presenting robot ethics; how it is done and presented always depends on one’s conceptual framework and philosophical approach. In the course of the book, I will sometimes indicate such directions and backgrounds.

Finally, the ethical issues and philosophical problems discussed in this book are a selection, and are often treated in more detail elsewhere or are awaiting more work in the field. For example, although I refer to non-Western contexts and cultures in chapters 3–4 and 7–8 (e.g., robots

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in Japan), more could be said about robot ethics in light of cultural differences and challenges for a global robot ethics. And the issue of environmental problems raised by robots mentioned earlier figures in several chapters, but more work needs to be done in this area. I have also chosen to limit the scope of this book to the ethics of robotics in a way that includes references to AI and *some* of the ethical issues it raises, but does not offer an extensive and comprehensive exploration; book-length treatments of that topic can be found elsewhere.¹⁰ Furthermore, while laws and regulation are one way to respond to the ethical issues raised here, I do not fully describe the legal aspects of robotics or introduce regulatory discussions; the reader will find interesting angles on this elsewhere.¹¹ The book is also not meant to be an introduction to ethics or how robots work. And especially for colleagues in the field, it is good to keep in mind that this book is an *introduction*. References are provided for readers who want to go deeper into one of the issues, and more work is being published on an ongoing basis. The same goes for teachers who use this as a textbook and wish to expand on the material provided here. Although the book reads as a self-contained work, I recommend using it in combination with some of the most important literature cited. For example, each chapter can be combined with one or more key articles or book chapters that figure in the chapter. There are also excellent collections of papers and relevant conference proceedings, such

as from the Robophilosophy conferences.¹² And teachers are invited to add lectures or extra sessions based on their own work or specific interests in the field. The topic also lends itself perfectly to additional use of media other than text, such as film, (images of) artworks, and—why not—robots!

Let me give a brief overview of the chapters and the topics they address.

Chapter 2 raises issues concerning industrial and service robots that become more intelligent, and take over tasks from humans. What are the consequences for our economies? What are the implications for human beings? Will this lead to massive unemployment and new forms of exploitation? What is the meaning of work? Is it acceptable that consumers increasingly have to deal with machines instead of humans? Will human-to-human interaction only be available to the rich? How will robotics and automation transform our societies?

Chapter 3 asks what happens if robots are not only used in production and services in what is traditionally regarded as the “economic” sphere but also enter our homes, such as in the form of home companions, assistants that help elderly people, or robot nannies that monitor children. Such “social” robots raise concerns about privacy and surveillance. What data are gathered, and what is done with them? And is it acceptable to exploit or deceive vulnerable users? Do such robots respect human dignity

and difference? What gender issues may be raised by personal robots? Can robots be racist?

Chapter 4 questions the use of robots in health care—for example, as robot nurses or robotic surgeons. This leads to discussions about the quality of care and expertise needed in professional health care. What is good care? What kinds of knowledge and experience does a surgeon working with a robot have? Are patients or care workers treated as things? What is the quality of care anyway in modern care institutions?

Chapter 5 asks questions concerning moral agency and moral responsibility when robotics and related automation technologies enable us to delegate tasks to machines. Can machines have moral agency? Can they have morality? Can and should machines have morality built in? What (kind of) morality? What moral theory should be used? Consequentialism? Can robots be responsible? And if not, which humans are responsible, given that many people and many things are involved in technological action? How can society deal with this problem of responsibility attribution? How does it deal with this in the case of children or nonhumans such as animals?

Chapter 6 turns from the question of moral agency to the question of moral “patency”: what, if anything, is due to robots? What questions are raised by robots that look like humans (androids)? Should humanlike intelligent robots be given rights or should they be slaves? What is

their moral status? Are people who empathize with robots simply mistaken, or is there a sense in which robots can have moral status? How do we find out the moral status of nonhumans? How do we know that a particular human being has moral standing? These questions lead to issues concerning the foundation and procedures of how we ascribe moral status.

Chapter 7 continues this questioning of human morality and its philosophical basis. After describing some uses of robots in the military, it shows how lethal autonomous weapons, in particular so-called killer drones, raise a number of ethical questions about just war; killing, empathy, and distance; what makes it easy to start a war; the definition of targeted killing; fairness and military virtue; and in the end, whether machines should be allowed to make decisions about life and death, given that they are not themselves alive and lack the experience of (human) existence.

In the concluding chapter (chapter 8), it is argued that the ethics of robotics, if discussed from a wider or deeper philosophical angle, is not just about robots but crucially and importantly about humans too—about the present and future of their morality, societies, and existence. In this sense, robots function as *mirrors* for reflecting on the human. Responding to posthumanism and environmental ethics, the chapter ends with an exploration of what it would mean to do robot ethics in a way that goes beyond

the human. Should the mirrors become open windows, and if so, how?

With this last chapter, the book does more than provide an introduction to and summary of the field; it offers a view of its scope and a vision concerning its future direction. First, *as a concluding chapter*, it concludes that since (as the book shows) robot ethics is also about humans, its scope and significance of field extends beyond the boundaries assumed by most philosophers. Inviting us to ask, and engaging with, fundamental philosophical questions about the human and human ethics, robot ethics is and should be more than applied ethics, more than ethics concerned with a specific domain. It can be a way of *doing philosophy* as well—full stop. The chapter thus further articulates the view I already expressed in this introduction and will illustrate throughout the book. Second, *standing as an essay on its own*, the concluding chapter looks at directions that take us beyond the human and makes an original contribution to robot ethics by exploring the idea of conceiving of robot ethics itself as an *environmental ethics*, and asking what kind of artificial creatures and societal transformations we need, if any, given our current environmental and political predicament.

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