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Paper 2
INSERT **1 hour 30 minutes**

READ THESE INSTRUCTIONS FIRST

This insert contains the passage for Paper 2.

This document consists of **3** printed pages.

Illah Nourbakhsh writes about the coming robot dystopia.

1 The term ‘robotics revolution’ evokes images of the future: a not-too-distant future, perhaps, but an era surely distinct from the present. In fact, that revolution is already well under way. Today, military robots appear on battlefields, drones fill the skies, driverless cars take to the roads, and ‘telepresence robots’ allow people to manifest themselves halfway around the world from their actual location. But the exciting, even seductive appeal of these technological advances has overshadowed deep, sometimes uncomfortable questions about what increasing human-robot interaction will mean for society.

2 Robotic technologies that collect, interpret and respond to massive amounts of real-world data on behalf of governments, corporations and ordinary people will unquestionably advance human life. But they also have the potential to produce dystopian outcomes. We are hardly on the brink of the nightmarish futures conjured by Hollywood movies such as *The Matrix* or *The Terminator*, in which intelligent machines attempt to enslave or exterminate humans. But those dark fantasies contain a seed of truth: the robotic future will involve dramatic trade-offs, some so significant that they could lead to a collective identity crisis over what it means to be human.

3 Robots now share the formerly human-only commons, and humans will increasingly interact socially with a diverse ecosystem of robots. The trouble is that the rich traditions of moral thought that guide human relationships have no equivalent when it comes to robot-to-human interactions. Of course, robots themselves have no innate drive to avoid ethical transgressions regarding privacy or the protection of human life. How robots interact with people depends to a great deal on how much their creators know or care about such issues, and robot creators tend to be engineers, programmers, and designers with little training in ethics, human rights, privacy or security.

4 One might hope that political and legal institutions would fill that gap by steering and constraining the development of robots with the goal of reducing their potential for harm. Ideally, the rapid expansion of robots' roles in society would be matched by equally impressive advances in regulation and in liability law, so that societies could deal with the issues of accountability and responsibility that will inevitably crop up in the coming years. But the pace of change in robotics is far outstripping the ability of regulators and lawmakers to keep up, especially as large corporations pour massive investments into secretive robotics projects that are nearly invisible to government regulators.

5 There is every reason to believe that this gap between robot capability and robot regulation will widen every year, posing all kinds of quandaries for law and government. Imagine an adaptive robot that lives with and learns from its human owner. Its behaviour over time will be a function of its original programming mixed with the influence of its environment and ‘upbringing’. It would be difficult for existing liability laws to apportion responsibility if such a machine caused injury, since its actions would be determined not merely by computer code but also by a deep neural-like network that it would have learned from various sources. Who would be to blame? The robot? Its owner? Its creator?

6 We face a future in which robots will test the boundaries of our ethical and legal frameworks with increasing audacity. There will be no easy solutions to this challenge – but there are some steps we can take to prepare for it. Research institutes, universities and the authorities that regulate them must help ensure that people trained to design and build intelligent machines also receive a rigorous education in ethics. Those already on the frontlines of innovation need to concentrate on investing robots with true agency. Human efforts to determine accountability almost always depend on our ability to discover and analyse intention. If we are going to live in a world with machines which act more and more like people and which make ever more ‘personal’ choices, then we should insist that robots also be able to communicate with us about what they know, how they know it and what they want.

7 ‘Transhumanism’ refers to a post-evolutionary transformation that will replace humans with a hybrid of man and machine. To date, hybrid performance has mostly fallen short of conventional human prowess, but it is merely a matter of time before human-robot couplings greatly outperform purely biological systems. The ability to perform complex mathematical calculations, produce top-quality language translation, and even deliver virtuosic musical performances might one day depend not solely on innate skill and practice but also on having access to the best brain-computer hybrid architecture.

8 Such advantages, however, would run headlong into a set of ethical problems: just as a fine line separates genetic engineering from eugenics, so, too, is there no clear distinction between robotics that would lift a human's capabilities to their organic limit and those that would vault a person beyond all known boundaries. Such technologies have the potential to vastly magnify the already-significant gaps in opportunity and achievement that exist between people of different economic means. In the robotic future, today's intense debates about social and economic inequality will seem almost quaint.

9 A fundamental shift has begun to take place in the relationship between automation technologies and human behaviour. Conventional interactions between consumers and firms are based on direct economic exchanges; consumers pay for goods and services, and firms provide them. In the digital economy, however, consumers benefit more and more from seemingly free service, while firms profit not by directly charging consumers but by collecting and then monetising information about consumers' behaviour, often without their knowledge or acquiescence. This kind of basic data mining has become commonplace: think, for example, of how Google analyses users' search histories and e-mail messages in order to determine what products they might be interested in buying and then uses that information to sell targeted advertising space to other firms. As more automation technologies begin to appear in the physical world, such processes will become even more invasive.

10 Today, nearly all our social interactions take place with other humans, but we are on the cusp of an era in which machines will become our usual interlocutors. Every day, we will encounter robots, from hovering drones to delivery machines to taxis that will operate seamlessly with and without human remote control; daily life will involve constantly interacting with machines without knowing just how much another person might be involved in the machine's response. There will be no room in such infinitely adjustable human-robot systems for us to treat robots one way and humans another; each style of interaction will infect the other, and the result will be an erosion of our sense of identity.

11 But the result need not be a robot dystopia. A clear set of decisions about robot design and regulation stand between today's world of human agency and tomorrow's world of robot autonomy. Inventors must begin to combine technological ingenuity with sociological awareness, and governments need to design institutions and processes that will help integrate new, artificial agents into society. Knowledge and transparency, the most valuable goods promised by the dawn of the information age in the last century, will take on even greater importance in the age of automation. Educators and regulators must help robot inventors acquire knowledge, and the inventors, in turn, must pledge to create more transparent artificial beings.

Adapted from "The Coming Robot Dystopia: All too inhuman," by Illah Nourbakhsh, Foreign Affairs July-Aug 2015