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ONE HUNDRED FOURTEENTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON ENERGY AND COMMERCE

2125 RAYBURN HOUSE OFFICE BUILDING

MEMORANDUM

September 12, 2016

To: **Subcommittee on Commerce, Manufacturing, and Trade Democratic Members and Staff**

Fr: **Committee on Energy and Commerce Democratic Staff**

Re: **Hearing on "Disrupter Series: Advanced Robotics"**

On **Wednesday, September 14, 2016, at 10:30 a.m. in 2322 Rayburn House Office Building**, the Subcommittee on Commerce, Manufacturing, and Trade will hold a hearing titled "Disrupter Series: Advanced Robotics."

I. BACKGROUND

The field of robotics covers a broad range of mechanical, electrical, and computer engineering used to design, construct, operate, and use robots. What constitutes a robot varies but generally refers to a machine that collects and uses information about its environment to follow instructions to complete a human function.[1] Most robots have three main qualities: a controller (human or computer program), mechanics to make it move, and sensors to collect information about their surroundings.

Robotics has matured well beyond the realm of science fiction and have entered into mainstream use.[2] Robots are being developed and used in manufacturing, medicine, scientific research, deep-sea recovery, ecological management, gaming, the military, and a variety of

[1] *What is a Robot?*, Robotics Academy, Tufts University (ase.tufts.edu/roboticsacademy/Robotics.htm) (accessed on Sept. 8, 2016).

[2] Neil M. Richards and William D. Smart, *How Should the Law Think About Robots?* (May 10, 2013).

consumer-facing products including vacuum cleaners, alarm clocks, lawn mowers, and many others.[3]

Significant advancements have also been made in the field of artificial intelligence. Researchers are applying developments in artificial intelligence to more traditional robots, such as industrial robots that might be used on a factory line. Using recent breakthroughs in algorithms that can mimic the human brain in some ways, engineers are creating robots that are capable of learning how to perform new tasks.[4]

II. PRIVACY AND DATA SECURITY

Increased use of consumer robots has increased the attention on the privacy and data security issues involved. As part of their basic functioning, robots use sensors to detect and collect information about their environment—information that may be shared with third parties or stored in the cloud. Consumer robots in the home, such as robotic vacuum cleaners or robotic toy dogs or dinosaurs, can collect significant amount of personal and privacy information. Consumer robotics are trending toward more internet connectivity, which opens additional vulnerability points for the information collected by the devices.[5]

Privacy advocates and some academics have argued that current privacy and data protection frameworks may be ill-suited to the field of consumer robotics. Privacy issues surrounding both the Internet of Things and big data converge in the field of consumer robotics.[6]

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[3] *What is Robotics?*, University of Notre Dame College of Engineering (engineering.nd.edu/ndnrw/what-is-robotics) (accessed on Sept. 8, 2016); *Twelve Robots That Have Invaded American Homes*, Boston Globe (archive.boston.com/business/technology/gallery/consumerrobots/) (accessed on Sept. 8, 2016).

[4] *Inside the Artificial Intelligence Revolution: A Special Report, Pt. 1*, Rolling Stone (Feb. 29, 2016) (www.rollingstone.com/culture/features/inside-the-artificial-intelligence-revolution-a-special-report-pt-1-20160229).

[5] Margot E. Kaminski, *Robots In The Home: What Will We Have Agreed To?*, Idaho Law Review (2015).

[6] *Privacy in the Machine World*, IAPP (Feb. 20, 2015) (iapp.org/news/a/privacy-in-the-machine-world/); *See also* House Committee on Energy and Commerce, *Hearing on What are the Elements of Sound Data Breach Legislation?*, 114th Cong. (Jan. 23, 2015); House Committee on Energy and Commerce, *Hearing on The Internet of Things: Exploring the Next Technology Frontier*, 114th Cong. (Mar. 20, 2015); House Committee on Energy and Commerce, *Hearing on The Disrupter Series: How the Sharing Economy Creates Jobs, Benefits Consumers, and Raises Policy Questions*, 114th Cong. (Sept. 26, 2015); House Committee on Energy and Commerce, *Hearing on The Disrupter Series: The Fast-Evolving Uses and Economic Impacts of Drones*, 114th Cong. (Nov. 17, 2015); House Committee on Energy and Commerce, *Hearing on The Disrupter Series: Mobile Payments*, 114th Cong. (Nov. 29, 2015); House Committee on Energy and Commerce, *Hearing on Disrupter Series: Wearable Devices*, 114th Cong. (Mar. 1, 2016); House Committee on Energy and Commerce, *Hearing on Disrupter Series: Health Care Apps*, 114th Cong. (July 11, 2016).

For a company that wants to notify consumers about its information collection and use practices, attaining consumer consent may be difficult, if not impossible because robots rarely have a screen or interface. This raises questions about how and under what circumstances a manufacturer can effectively obtain a consumer's informed consent to its privacy policy or terms of service agreement. There are also additional questions of when a company can use a product to begin collecting new types of information, or if a company can use the information it collects in new ways without getting additional consent or allowing the consumer to opt-out.

III. SELECTED ETHICAL ISSUES

Some have argued that increased use of robots will result in a decrease in human jobs. Autonomous robots are already being used in the warehouses of online retailers to help fulfill orders.[7] One study estimates that 47 percent of U.S. jobs could be automated within the next twenty years.[8] Although the potential for job loss encompasses a wide array of industries including both office and industrial workplaces, industrial jobs are seen by many to be most at-risk.[9] At the same time, a number of economists argue that robotics will actually result in a shift in human jobs, rather than job loss.[10]

Military and law enforcement use of robots presents new challenges. So-called "killer" robots are already being used in military and law enforcement settings. The military uses remote-controlled drone aircraft for intelligence gathering and offensive roles.[11] In June of this year, Dallas police used a robot to kill a sniper during a shooting rampage.[12] Use of the robots can keep soldiers and police out of harm, but such use also raises ethical dilemmas regarding the circumstances under which arm's length killing is appropriate and how a robot chooses between two negative consequences (often referred to as the trolley problem).[13] In addition, autonomous killer robots, which are not currently in use, raise additional ethical questions, such as who is

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[7] *See* note 2.

[8] Carl Benedikt Frey and Michael A. Osborne, *The Future Of Employment: How Susceptible Are Jobs To Computerisation?* (Sept. 17, 2013).

[9] *Will You Lose Your Job to a Robot?*, Fiscal Times (July 18, 2016) (www.thefiscaltimes.com/2016/07/18/Will-You-Lose-Your-Job-Robot).

[10] *Yes, the Robots Will Steal Our Jobs. And that's Fine.* Washington Post (Feb. 17, 2016) (www.washingtonpost.com/posteverything/wp/2016/02/17/yes-the-robots-will-steal-our-jobs-and-thats-fine/).

[11] *See* note 2.

[12] *Killer Robot Used by Dallas Police Opens Ethical Debate*, Chicago Tribune (July 8, 2016) (www.chicagotribune.com/news/nationworld/ct-dallas-killer-robot-20160708-story.html).

[13] *Id.*; *Driverless Cars Are Colliding with the Creepy Trolley Problem*, Washington Post (Dec. 29, 2015) (www.washingtonpost.com/news/innovations/wp/2015/12/29/will-self-driving-cars-ever-solve-the-famous-and-creepy-trolley-problem/).

responsible if an autonomous robot kills the wrong person.[14] These ethical questions have lead human rights activists to call for a ban on use of autonomous killer robots.[15]

IV. WITNESSES

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[14] *Weighing the Good and the Bad of Autonomous Killer Robots in Battle*, NPR (Apr. 28, 2016) (www.npr.org/sections/alltechconsidered/2016/04/28/476055707/weighing-the-good-and-the-bad-of-autonomous-killer-robots-in-battle).

[15] *Id*.