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Rethinking the Fourth Amendment in the Age of Supercomputers, Artificial Intelligence, and Robots

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RETHINKING THE FOURTH AMENDMENT IN THE AGE OF SUPERCOMPUTERS, ARTIFICIAL INTELLIGENCE, AND ROBOTS

*by Melanie Reid**

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RETHINKING THE FOURTH AMENDMENT

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On the ground and in the air,
 Robots, robots everywhere!
 Up in space,
 Beneath the seas,
 Robots make discoveries.
 Tractor robots plant and plow.
 Robots even milk a cow!
 Under couches, over rugs,
 Vacuum robots have no plugs.
 Robot dogs roll over, bark.
 Can we take them to the park?
 Robots spin and race and run.
 Robots, robots—I want one!
 Robots weld and paint and blast.
 Robots build cars really fast!
 Working robots drill and grind.
 Rescue robots seek and find.
 Robots pump and load and lift,
 Mix and measure, sort and sift.
 Robots beep and robots talk.
 Wind them up and robots walk!
 Robots made like you and me.
 Robot playmates? Wait and see. . . .
 Robots here and robots there,
 Good night, robots everywhere!¹

I. INTRODUCTION

Yes, indeed, robots are everywhere—even in police departments. The Knightscope K5 security robot roams malls and corporate campuses in the Silicon Valley area gathering data to predict where and when criminal activity will occur.² The K5 can capture audio and video, test the air for chemicals,³ gather thermal imaging, read license plates, recognize faces, and is learning to

¹ SUE FLIESS, *ROBOTS, ROBOTS EVERYWHERE!* (Little Golden Book 2013).

² Shan Li, *Robots Are Becoming Security Guards. 'Once It Gets Arms, It'll Replace All of Us'*, L.A. TIMES, (Sept. 2, 2016, 3:00 AM), <http://www.latimes.com/business/la-fi-robots-retail-20160823-snap-story.html>.

³ *Microsoft Hires Robot Security Guards*, TRIBUNE INTERNATIONAL (Nov. 25, 2014), <http://tribune-intl.com/microsoft-hires-robot-security-guards/>.

distinguish suspicious activities from normal activities.⁴ The K5 then evaluates the data and alerts the authorities to what it perceives as “trouble.”⁵

China’s Anbot makes video and audio recordings of all it encounters and interacts with the public through a touchscreen when it responds to a crime scene.⁶ The Anbot autonomously navigates, can run 12 miles per hour to chase potential suspects or respond to emergencies,⁷ and is equipped with electrical stun guns and tear gas canisters. Its battery lasts up to eight hours and can be recharged without human intervention.⁸

South Korea has the world’s first robot prison guard that can read emotions and identify abnormal prisoner behavior and alert human authorities to possible concerns.⁹ The robot uses 3D cameras and software to study human behavior, make predictions, and then uses its wireless communication system to allow human guards to speak to prisoners.¹⁰

Other less independent robots remain attached to a remote human operator. The Telebot, designed at the Florida International University Discovery Lab, patrols the streets and hands out parking tickets. Its swiveling head and dexterous fingers are controlled remotely by a police officer wearing a vest, arm bands, and gloves, who also acts as Telebot’s voice.¹¹

Robots such as the Remotec Andros Mark V-A1, which was used in Dallas to kill a sniper targeting police officers, have been used for decades.¹²

⁴ *Id.*

⁵ *Id.*

⁶ Elizabeth E. Joh, *Policing Police Robots*, 64 UCLA L. REV. DISCOURSE 516 (2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2817185.

⁷ *Id.*

⁸ *Id.*; Jeffrey Lin & P.W. Singer, *China Debuts Anbot, the Police Robot: Stop or this Robot Will Tase!*, POPULAR SCIENCE (Apr. 27, 2016), <http://www.popsoci.com/china-debuts-anbot-police-robot>.

⁹ “*Robo-Guard*” on Patrol in South Korean Prison, REUTERS (Apr. 12, 2012), <http://www.reuters.com/video/2012/04/12/robo-guard-on-patrol-in-south-korean-pri?videoId=233213268>.

¹⁰ *Id.*

¹¹ Mangai Prabakar & Jong-Hoon Kim, *Telebot: Design Concept of Telepresence Robot for Law Enforcement*, The 2013 World Congress on Advances in Nano, Biomechanics, Robotics, and Energy Research (Aug. 25–28, 2013), http://www.i-asem.org/publication_conf/anbre13/M3C.1.RR619_769F.pdf?; Joe Bush, *Next Stop ‘Robocop’?* ELECTRONIC SPECIFIER (Aug. 3, 2016), <http://automotive.electronicspecifier.com/aerospace-defense-1/next-stop-robocop>; Dylan Love, *Students are Building a Robot For Disabled Cops Using the Oculus Rift Virtual Reality Headset*, BUS. INSIDER (Feb. 27, 2014), <http://www.businessinsider.com/oculus-rift-robot-for-law-enforcement-2014-2>.

¹² Brian Fung, *Meet the Remotec Andros Mark V-A1, the Robot That Killed the Dallas Shooter*, WASHINGTON POST (July 11, 2016), https://www.washingtonpost.com/news/the-switch/wp/2016/07/11/meet-the-remotec-andros-mark-v-a1-the-robot-that-killed-the-dallas-shooter/?utm_term=.857c2f43ab07.

These robots hold live weapons.¹³ Some detonate and disable bombs.¹⁴ Others are fitted with arms that can breach doors during dangerous search warrant executions.¹⁵ Two police robots in Colorado were sent into a home to subdue a suspect who was thought to be intoxicated and armed with a high-powered rifle.¹⁶ Once the robots entered and gave the police video of inside the home, the police could enter and arrest the suspect.¹⁷

The federal government has supported many artificial intelligence (“AI”) projects, most significantly those of the Defense Advanced Research Projects Agency (“DARPA”).¹⁸ DARPA conducts research in which AI assists the military in “decision-making tasks in stressful, time-sensitive situations” and reduce the time it typically takes “to retrieve information from large, dynamically changing databases.”¹⁹ The intelligent systems are learning how to process knowledge, reason, and understand human language (both oral and written) and images.²⁰

As the children’s book *Robots, Robots Everywhere* suggests, robots have become part of everyday life.²¹ We have robotic pets, robots that care for the elderly, humanoid imitation robots, vacuum robots, the iRobot Ava 500 (which allows you to have a physical presence from a remote location²²), self-driving cars, and even a robot for medical consults.²³ Today’s children will be more accepting of robots as office workers, aids around the house, friends, teachers, and perhaps even bosses.²⁴ The question becomes how courts and society at large should handle the use of robots in the law enforcement context. If walking,

¹³ Michael Liedtke, *Police Use of Bomb-Carrying Robot Raises Ethical Questions; Dallas Officials Defend Strategy as the Right Call*, THE BOSTON GLOBE, A9, 3 (Jul. 10, 2016).

¹⁴ *Id.*

¹⁵ *See supra* note 12.

¹⁶ Lewis Page, *Police Robot Duo Storm Colorado House, End Four-Day Siege*, THE REGISTER, (June 22, 2015), http://www.theregister.co.uk/2015/06/22/robot_cop_duo_storm_colorado_house_end_fourday_siege/.

¹⁷ *Id.*

¹⁸ COMPUTER SCI. & TELECOMMS. BD., NAT’L RESEARCH COUNCIL, FUNDING A REVOLUTION: GOVERNMENT SUPPORT FOR COMPUTING RESEARCH 199 (1999).

¹⁹ *Id.* at 219.

²⁰ *Id.*

²¹ FLEISS, *supra* note 1.

²² *iRobot Ava 500 Data Sheet*, IROBOT CORPORATION, <http://www.irobot.com/~media/Files/Robots/Commercial%20Applications/Ava%20500/iRobot-Ava-500-Data-Sheet.pdf?la=en%E2%80%8B> (last visited Feb. 19, 2017).

²³ *See generally*, F. Patrick Hubbard, “Sophisticated Robots”: *Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803 (2014); Hans Moravec, *Rise of the Robots—The Future of Artificial Intelligence*, SCI. AM. (Mar. 23, 2009), <https://www.scientificamerican.com/article/rise-of-the-robots/>.

²⁴ My two-year-old just received his first “dancing” robot, along with the *Robots, Robots Everywhere* Golden Book. *See* FLEISS, *supra* note 1.

talking, interactive robots are in our future, it is imperative to identify how free-thinking robo-cops would change policing as we know it. Not only does the impact of robo-cops in the field need to be discussed, it would be helpful for designers and engineers working on artificial intelligence projects to hear from the legal field when creating our future law enforcement officers.

This article identifies eight significant issues the courts and the public at large will face if robo-cops are placed side-by-side with human officers:

1. Robots will be smarter, faster, and more efficient than human officers.²⁵
2. Robots will intrude on citizens' right to privacy more often than human officers as they will have access to more third party data in a shorter period of time.
3. Robot capabilities will require a complete rethinking of Fourth Amendment doctrine based upon the amount of information they will access on a daily basis.
4. Free-thinking robots will require human intervention and supervision.
5. Robots and human officers may follow the same laws but use different standards to arrest people, i.e., inflexible programming versus discretion.
6. Robots will have less people skills and common sense than human officers, and it is unclear how they will handle tense situations.
7. The community will perceive robo-cops differently than human officers.
8. Robots should be treated identical to their human counterparts when it comes to law enforcement and the Fourth Amendment, e.g., motions to suppress evidence filed on the basis of a robot's action (or omission), or suspects filing abuse of civil rights claims against a robo-cop while in performance of its duties.

²⁵ There are two significant reasons for using a robot: (1) to improve officer safety and (2) to increase efficiency and decrease human error by substituting a robot for a human. This Article will focus only on the second reason for using a robot—increasing efficiency and decreasing human error. As to the first reason, robots could potentially save officers' lives in dangerous situations and assist police departments that lack the resources to maintain an adequate police presence. Whether robots should be armed, when they should be used, and whether they should be controlled via a human operator to protect police from liability is a completely separate issue and needs to be thoroughly explored. *See Joh, supra* note 6; *see also* Rebecca Crootof, *The Killer Robots Are Here: Legal and Policy Implications*, 36 *CARDOZO L. REV.* 1837 (2015); George R. Lucas, Jr., *Legal and Ethical Precepts Governing Emerging Military Technologies: Research and Use*, 2013 *UTAH L. REV.* 1271 (2013); Peter B. Postma, Note, *Regulating Lethal Autonomous Robots in Unconventional Warfare*, 11 *U. ST. THOMAS L.J.* 300 (2014). *See generally*, Dan Terzian, *The Right to Bear (Robotic) Arms*, 117 *PENN. ST. L. REV.* 755 (2013);

This Article will evaluate these eight items, but with an acknowledgement that such a limited discussion merely scratches the surface. The introduction of robo-cops will change multiple facets of our society in ways we can only imagine. Are we ready to embrace the concept of robo-cops? What does that actually mean? Will law enforcement robots be held to the same standard as their human counterparts when evaluating a Fourth or Fifth Amendment suppression issue? A future robo-cop could be just around the corner and these legal concerns need to be discussed and new laws written. The courts, police departments, and society as a whole should not wait until robots actually show up for their assigned duties and begin policing the neighborhood before these issues are addressed.

Part II of this article will describe law enforcement's futuristic ideal robot, Officer Joe Roboto, and explore its potential capabilities and possible advantages. Officer Joe Roboto's capabilities will be restricted to what is already known, i.e., proven theory and science. Any benefit Officer Joe might offer to a modern police department must be balanced against the Fourth Amendment concerns of ordinary citizens. Part III will address the likely concerns of utilizing an Officer Joe as part of the police force. Is it possible to use such robots in law enforcement without significantly impinging on the rights of everyday citizens? Part IV will examine the specific benefits an autonomous robot might bring to law enforcement if a robot's computer-generated logic is shown to be superior to inherently-flawed human discretion. Would such a substitution simply replace one weakness, human error, with another weakness, robotic logic without feeling or empathy? Lastly, Part V will explore human acceptance or disapproval of robots, specifically robots with artificial intelligence capable of autonomous behavior. Would an Officer Joe Roboto ever be fully accepted by our society? Humans tend to anthropomorphize robots and attach human qualities to these machines despite the fact robots lack human emotions such as compassion, empathy, and love. In conclusion, more research and analysis is required to understand the implications of robo-cops before they are fully integrated into law enforcement. This article will outline the various issues raised by robo-cops and the imperative to address known and unforeseen consequences before these robo-cops are allowed to police our society.

II. MEET OFFICER "JOE ROBOTO"

It takes little imagination to foresee what may very well become the most advanced law enforcement investigative tool: an artificial intelligence law enforcement robot, powered by Watson software, which could become possibly the smartest, most experienced police officer on the planet.²⁶ IBM's Watson is

²⁶ For simplicity's sake, I am naming this imaginary, future law enforcement officer robot, Officer Joe Roboto.

currently used in several fields.²⁷ Watson suggests medical diagnoses and treatment in the healthcare industry by working with patients and their doctors.²⁸ Watson assists the finance industry in improving investment decisions and customer satisfaction by keeping track of industry trends and accessing a wide range of internet data on client preferences.²⁹ Another Watson robot, “Connie,” acts as a concierge at the Hilton McLean hotel and can answer guests’ questions about the hotel, restaurant picks, and nearby tourist sites.³⁰ A Watson-powered robot does not simply assimilate and analyze an array of databases, it answers specific questions, speaks and understands multiple languages, and learns and extrapolates from a large set of unstructured knowledge.³¹ Watson can deduce what medical treatments are needed from a picture,³² make insights into your personality while interacting with you,³³ and deduce one’s opinion by running through a series of Twitter feeds.³⁴ In 2011, Watson used its offline database of past experiences (it was not connected to the internet), statistical analysis, and natural language processing to find and understand the clues in questions on the TV quiz show Jeopardy.³⁵ Watson won against its human competitors.³⁶

IBM and similar companies already offer to law enforcement predictive analytics and cognitive computing programs for real-time intelligence and

²⁷ *Go Beyond Artificial Intelligence with Watson*, IBM, <https://www.ibm.com/watson/index.html> (last visited Feb. 25, 2017) [hereinafter *Go beyond*].

²⁸ *IBM Watson Health*, IBM, <http://www.ibm.com/watson/health/> (last visited Feb. 18, 2017).

²⁹ *Watson is Going to Work*, IBM, http://www-05.ibm.com/innovation/uk/watson/watson_in_finance.shtml (last visited Feb. 18, 2017).

³⁰ Nick Statt, *Hilton and IBM Built a Watson-Powered Concierge Robot*, THE VERGE (Mar. 9, 2016, 1:30 AM), <http://www.theverge.com/2016/3/9/11180418/hilton-ibm-connie-robot-watson-hotel-concierge>.

³¹ Joab Jackson, *IBM’s Watson Now Answers Your Questions Before You Ask*, COMPUTERWORLD (Aug. 27, 2014, 7:29 PM), <http://www.computerworld.com/article/2599411/software-web/ibms-watson-now-answers-your-questions-before-you-ask.html>.

³² Mike Orcutt, *Why IBM Just Bought Billions of Medical Images for Watson to Look at*, MIT Technology Review (Aug. 11, 2015), <https://www.technologyreview.com/s/540141/why-ibm-just-bought-billions-of-medical-images-for-watson-to-look-at/>.

³³ *Personality Insights*, IBM, <https://www.ibm.com/watson/developercloud/personality-insights.html> (last visited Feb. 19, 2017).

³⁴ Stefania Kaczmarczyk, *Share Personality Insights with a Cognitive Twitter Bot*, IBM DEVELOPERWORKS (Oct. 27, 2015), <http://www.ibm.com/developerworks/library/cc-twitter-bot-personality-insights-nodered-bluemix-trs/index.html>.

³⁵ John Markoff, *Computer Wins on “Jeopardy!”: Trivial, It’s Not*, N.Y. TIMES (Feb. 16, 2011), http://www.nytimes.com/2011/02/17/science/17jeopardy-watson.html?pagewanted=all&_r=0; Dean Narciso, *Elementary*, THE COLUMBUS DISPATCH, May 25, 2014.

³⁶ *Id.*

investigative purposes.³⁷ Threat analysis tools are being used to rapidly analyze online content for language patterns characteristic of known offenders and credible threats.³⁸ These predictive analytics are being used more and more heavily by law enforcement in two different ways: (1) to identify particular high-risk areas (such as high-crime areas, concentrated areas of potential DUI arrests, or areas with a high likelihood of robberies or drug violence); and (2) to identify suspects for proactive and reactive purposes (to predict who might commit the next terrorist activity or who already committed a particular violent crime).³⁹ These big data analytics are more effective than traditional investigative tools in many ways and save law enforcement a significant amount of financial and personnel resources. As IBM explains, AI technology can “hold, analyze, and disseminate” all the information maintained by police and “maximize its value in reducing crime and responding to crisis situations.”⁴⁰

It is not farfetched to think law enforcement’s use of cognitive computing will soon extend to real-time field robots. Computers such as Watson are only stymied by their physical limitations. While human intelligence might be easy to replicate and even improve upon, human anatomy and physical movements are much more difficult to master. But Honda’s robot, ASIMO, which can walk, run backwards and forwards, and hop on one or two legs continuously indicates that even this difficulty will soon be overcome.⁴¹ ASIMO can respond to the movement of people and surrounding obstacles to avoid collisions, and its visual and auditory sensors allow it to simultaneously recognize faces and voices from multiple people.⁴² DARPA’s humanoid robot, ATLAS, can dodge obstacles and stay upright after being hit by a twenty pound ball.⁴³

A. *Issue #1: Officer Joe Roboto will be smarter, faster, and more efficient*

³⁷ Jean Francois Puget, *IT Best Kept Secret is Optimization: How Does Cognitive Computing Relate to Analytics?*, IBM DEVELOPERWORKS (Jul, 30, 2015), https://www.ibm.com/developerworks/community/blogs/jfp/entry/Cognitive_Computing_vs_Analytics?lang=en; *Law Enforcement*, IBM, <https://www.ibm.com/analytics/us/en/industry/government/law-enforcement/> (last visited Feb. 19, 2017).

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Evolution of ASIMO 2011: Advancements of Physical Capabilities*, HONDA WORLDWIDE, <http://world.honda.com/ASIMO/technology/2011/physical/index.html> (last visited Feb. 18, 2017).

⁴² *Id.*

⁴³ Tim Hornyak, *Be Afraid: DARPA Unveils Terminator-like Atlas Robots*, C-NET, (Oct. 13, 2016), <https://www.cnet.com/news/be-afraid-darpa-unveils-terminator-like-atlas-robot/>; *see also* DARPA tv, *Meet ATLAS!*, YOUTUBE (July 11, 2013), <https://youtu.be/zkBnFPBV3f0>.

than its human counterparts.

Once AI technology is combined with a fully humanoid robot capable of walking, running, jumping, and communicating with humans, the possibilities of it as a law enforcement tool is endless. A robot with instant GPS capabilities could obtain immediate geolocation data to identify an electronic device's physical location. It could access public surveillance camera footage in real-time. It could scan for concealed weapons. It could use thermal imaging, license plate reading, and facial recognition software to identify potential suspects.

Officer Joe Roboto would be incredibly efficient—likely obtaining information in a matter of seconds or minutes rather than hours, days, or weeks. The savings in personnel time alone would be significant: Digging through police files, accessing multiple police databases, or waiting for weeks for a cell phone company to respond to an administrative subpoena would be a thing of the past. As Officer Joe can be equipped with many investigative technique capabilities, law enforcement teams may now have a larger pool of investigative tools at their fingertips than they might have had otherwise due to limited manpower or financial resources. Law enforcement will now have the potential to solve more crimes and even prevent future crimes through predictive analytics. Unfortunately for would-be criminals, Officer Joe might be ten times more efficient and more likely to identify and act upon suspicious behavior than its human counterpart.

Officer Joe's ability to record everything for further review will also prove incredibly helpful to law enforcement.⁴⁴ When the robot executes a search warrant, everything in the home will be recorded. Officer Joe will generate a comprehensive digital record of when a search warrant is obtained, when a particular investigative tool is used, what evidence is collected, and what is described in the search warrant return. That digital trail will make it easier to catch mistakes and correct errors in the system. And without an ego, Officer Joe might be more willing to admit to mistakes and learn from them.

B. Issue #2: Officer Joe Roboto signifies a greater intrusion into our private lives.

“Our machines should be nothing more than tools for extending the powers of the human beings who use them.”

⁴⁴ “You can pinpoint the record of who has access to information, you have a solid history of what's going on, so if someone is using the system for ill you have an audit trail,” said Mark Cleverly who heads the IBM unit for predictive crime analytics. Agence France-Presse, *Police Using 'Predictive Analytics' to Prevent Crimes Before They Happen*, RAWSTORY (Jul. 29, 2012), <http://www.rawstory.com/2012/07/police-using-predictive-analytics-to-prevents-crimes-before-they-happen/>.

– Thomas Watson Jr.⁴⁵

Before the Fourth Amendment was drafted, both British citizens and revolutionists alike in America were concerned about randomly having their cabinets and bureaus “thrown open” and searched by a government agent with unfettered discretion “whomsoever and wheresoever the Secretary of State thinks fit.”⁴⁶ The general warrants and writs of assistance at the time contained no particularized suspicion nor designated a specific person or place as targets of the search. 250 years later, citizens of the United States and other nations throughout the world are still asking whether government agents should be permitted to indiscriminately search their modern-day digital cabinets and bureaus (their social media postings, the data they store in the “cloud,” their blogs, their email accounts, etc.) for purposes of criminal investigation, national security, or some other compelling government interest. The frustrations and fears that led to the Fourth Amendment are still with us today; however, technology has complicated the debate. The information age has exponentially multiplied the amount of personal data being produced and collected annually. Social and mobile media technology has practically tripled the amount of existing data in just two years. Thanks to the availability of such a large amount of information, law enforcement’s investigative tools have grown in sophistication and can conduct much more intrusive searches into the average citizen’s “papers and effects.”⁴⁷

The amount of data captured on the internet on a daily basis is unfathomable. Some estimates indicate data will grow by 800 percent in the next five years, with at least 90 percent of that data being less than two years old.⁴⁸ Law enforcement wants to take advantage of that data to connect the dots in an investigation and to prevent and predict crime.⁴⁹ Several police departments and federal agencies are already using technology to conduct predictive and content analytics and manage police databases.⁵⁰

Would our interactions with Officer Joe trigger the same Fourth Amendment concerns and protections as those when dealing with a flesh-and-blood police officer? Are we more afraid of a “robotic” Joe, its capabilities and lack of feeling and biases, than a human law enforcement officer rummaging

⁴⁵ Go Beyond, *supra* at note 27.

⁴⁶ Entick v. Carrington, 95 Eng. Rep. 807, 818 (C.P. 1765).

⁴⁷ U.S. CONST. amend. IV.

⁴⁸ Tom Gorenfeldt, *Big Data—Big Money Says it is a Paradigm Buster*, FORBES (Jan. 6, 2012, 12:22 PM), <http://www.forbes.com/sites/tomgroenfeldt/2012/01/06/big-data-big-money-says-it-is-a-paradigm-buster/#187df4067c53>; *90% of Today’s Data Created in Two Years*, FACTIVA, Dec. 22, 2016.

⁴⁹ IBM, GOVERNMENT SOLUTIONS, <http://www.ibm.com/analytics/us/en/industry/government/> (last visited Feb. 25, 2017).

⁵⁰ Agence France-Presse, *supra* note 44.

through those same files? What sort of limitations should we place on such technology?

C. *Issue #3: Officer Joe Roboto's easy access to an endless database requires a complete rethinking of current Fourth Amendment doctrine.*

It is important to first review what data Officer Joe would be collecting for its predictive analytics. To identify high crime areas, concentrated areas of potential DUI arrests, or areas with a high likelihood of robberies or drug violence, the robot would need to access historical crime data, criminal records, police files, and relevant open source data on the internet.⁵¹ If Officer Joe is asked to identify suspects for proactive purposes, such as to predict who might commit the next terrorist activity or commit a violent crime, it may need to access Facebook pages, Twitter feeds, blogs, Google groups, forums and newsgroups, wikis, activist and hate group sites, etc. This type of usage may trigger a subpoena or warrant requirement under the Fourth Amendment. If Officer Joe is asked to identify suspects for reactive purposes, such as to determine who committed a particular violent crime or theft, it may access a variety of the data already described. If a witness remembers the perpetrator had a distinctive tattoo on his left cheek, the robot might access old police case files and the criminal history database to search for a similar suspect with the distinctive tattoo.

A series of problems might arise with the collection of such a vast amount of data. The first is a recurring critique of AI algorithms, particularly predictive big data analytics, which is not free of biases. Rather, the human beings that created the algorithm embed their own value-based judgments into the black box algorithm itself.⁵² The second problem is that if Officer Joe has all this information, presumably the entire police department has access to all this information. When should this information be purged? Who should have access to this information? Should Joe be programmed in such a way no human may access this information unless he or she is also part of the investigation team?

⁵¹ There are a variety of predictive police companies that currently utilize such data. CompState identifies hot spot policies in New York City. Hunch Lab looks at areas with the highest risk of crime by taking local business, churches and the weather into consideration when making determinations. PredPol uses data on crime locations, times, and types to examine the cause of crime and determine resources for patrolling. Maurice Chammah, *Policing the Future: In the Aftermath of Ferguson, St. Louis Cops Embrace Crime-Predicting Software*, THE VERGE, (last visited Feb. 25, 2017), <http://www.theverge.com/2016/2/3/10895804/st-louis-police-hunchlab-predictive-policing-marshall-project>; Jessica Mendoza, *'Predictive Policing' Isn't in Science Fiction, It's in Sacramento*, CSM MONITOR, (Aug. 2, 2016), <http://www.csmonitor.com/USA/Justice/2016/0802/Predictive-policing-isn-t-in-science-fiction-it-s-in-Sacramento>.

⁵² Julia Angwin et al., *Machine Bias*, PRO PUBLICA (May 23, 2016), <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>.

Officer Joe and the investigative team's access to specific information should be restricted to situations which comply with existing pertinent legal and normative rules. Officer Joe and flesh-and-blood law enforcement officers must both be held to the same standards. Abuse of the Fourth Amendment is triggered only if the person whose data was accessed had a reasonable expectation of privacy relating to that data.⁵³ Presumably, each database accessed must be evaluated under the legal scope of a *Katz* reasonable expectation of privacy⁵⁴ or *Jones*' trespass analysis⁵⁵ to determine whether a warrant is required. In the case of predictive analysis being used to identify "hot spots" in a particular community by accessing historical crime data, criminal records, and police files, etc., this activity might not necessarily trigger the Fourth Amendment's warrant requirement. However, when predictive analysis is used to produce a list of suspects in a cold case or an ongoing investigation, to generate leads, or predict future criminal or terrorist activity by accessing Facebook pages, Twitter feeds, blogs, Google groups, forums and newsgroups, wikis, activist and hate group sites, etc., this usage may trigger the subpoena or warrant requirement.

Officer Joe could certainly make the human officer's job easier by assisting in drafting the warrant's affidavit and completing the paperwork to be electronically sent to the judge. One of the main reasons the Fourth Amendment's warrant requirement is effective as a check on police is that it requires the officer to temporarily stop the investigation, write a synopsis for the judge to review, and drive over to the magistrate's office to have the warrant reviewed and signed. Officer Joe will presumably streamline this process and make it more efficient, especially if the warrant application can be electronically sent to the magistrate's office and electronically signed by the magistrate.⁵⁶ It is highly likely more warrants will be issued if Officer Joe is involved in the process. Will warrants serve the same integrity check on police if they are easier to draft, send to a judge, and approved electronically?

III. A TYPICAL DAY IN THE LIFE OF OFFICER JOE ROBOTO

Officer Joe and his human police partner are on patrol. Officer Joe is connected to the police communication network and is alerted that someone called in a complaint that their neighbor's house smells like marijuana. Joe immediately (and electronically) sends an administrative subpoena to the local utility company to access the utility bills for five houses, including the suspect's house and the four surrounding houses. Within a matter of minutes, Joe identifies

⁵³ *Katz v. United States*, 389 U.S. 347 (1967).

⁵⁴ *See generally id.*

⁵⁵ *See generally* *United States v. Jones*, 565 U.S. 400 (2012).

⁵⁶ Something similar occurs in the DUI context when officers use electronic communications such as email or video-conferencing to obtain a warrant. *Missouri v. McNeely*, 133 S.Ct. 1552, 1562 (2013).

the suspect house has an exceptionally high electric bill. Joe then applies for a warrant to use its thermal imaging device based on the tip and the information from the utility bill. As soon as Joe receives an electronic copy of the court order, Joe and the human officer arrive on the scene and Joe uses its thermal imaging device, which indicates a large amount of heat in the basement area. Joe electronically applies for a court order to place a camera on the telephone pole across the street. Within minutes, the court order is granted and the team of Joe and the human partner go to work attaching the camera to the pole. For the next few days Officer Joe Roboto reviews the camera feed and uses a license plate reading tool to capture the names of the car owners who enter the suspect's driveway; the facial recognition software identifies who is entering the house, and Joe simultaneously accesses a criminal database to determine whether any of those visitors have an arrest warrant or prior criminal history. Within a week, Officer Joe Roboto has enough information to arrest the person living in the house (who is actually growing marijuana) and has identified his potential buyers and associates. During the arrest, the suspect tries to run; but Joe uses geolocation data to track the suspect's location through his phone. Once the suspect is apprehended, Joe uses a terahertz scanner to scan for any concealed weapons before the human officer pats the suspect down. With Joe, the investigation has ended in a matter of days. Without Joe, the human officer might still be waiting for records from the utility company or still typing an affidavit for a warrant to use a thermal imaging device.

Currently, Fourth Amendment restrictions remain the same for both Joe and human officers. This is potentially problematic since Joe is more efficient at obtaining a warrant which diminishes the integrity check on police misconduct, i.e., Joe can obtain an electronic warrant effortlessly within seconds or minutes, whereas Joe's human counterparts may spend hours or days to accomplish the same task. There are many judges and legal scholars today advocating a re-evaluation of Fourth Amendment doctrine, particularly the third party doctrine,⁵⁷ to make it more difficult for law enforcement to access such a vast amount of data by a simple administrative or grand jury subpoena.⁵⁸ This is especially relevant in the context of robot officers. The courts cannot seem to keep up with the rapid amount of technological changes.⁵⁹ In the age of Officer Joe Roboto,

⁵⁷ According to *Smith v. Maryland*, 442 U.S. 735 (1979), information that is conveyed to third parties and collected by third parties for legitimate business purposes are not deemed to trigger Fourth Amendment protections and can be shared with law enforcement without a warrant.

⁵⁸ See generally Stephen E. Henderson, *Fourth Amendment Time Machines (and What They Might Say About Police Body Cameras)*, 18 U. PA. J. CONST. L. 933 (2016); Stephen E. Henderson, *A Rose by Any Other Name: Regulating Law Enforcement Bulk Metadata Collection*, 94 TEX. L. REV. SEE ALSO 28 (2016).

⁵⁹ Cellphones were around since 1973 before *Riley* addressed cell phones. Tracking devices were placed on cars long before *Jones* in 2012 addressed the implications of placing tracking devices on cars. Placing beepers inside containers was addressed in 1983 and 1984 with *Knotts* and *Karo*. *United States v. Karo*, 468 U.S. 705 (1984); *United States v. Knotts*, 460 U.S. 276

perhaps a simple warrant or court order will not work. It is critical to begin to think about solutions now rather than wait until the programmers and engineers have already designed their ideal law enforcement humanoid robot. An engineer should design Officer Joe with the legal field's input.

A. *Issue #4: Officer Joe Roboto will require human supervision and intervention.*

Perhaps there should be more human supervision when Joe accesses information or requests a warrant or court order. The amount of human involvement might depend upon the particular task at hand. Officer Joe might have complete autonomy patrolling open source information on the internet but may need strict human supervision when drafting an affidavit for a search warrant. Joe's robotic hierarchical quadratic programming may emulate a self-driving car. The self-driving car has five levels of autonomy depending upon the human independence required, the mission complexity, and the environmental complexity.⁶⁰ Depending on the particular task, a human operator may or may not become involved before Joe makes a decision.

Digital searches, especially those in which Joe is "predicting" crime, are also a great concern, and these types of open-ended searches may be easily abused by law enforcement. The concern is that law enforcement's access of such an enormous amount of data without any particularity requirement on the front end looks eerily similar to the problems confronting the colonists years ago—searches conducted by a government "looking for crime" without any limitations as to who and what will be searched. History tends to repeat itself. In the past, the warrant requirement was the solution; a suspect is identified, evidence is collected, and a warrant is obtained. However, in Joe's technology-advanced society, there may be no suspect until after mega-data analytics points an accusing finger at some previously unidentified individual. This powerful tool should be monitored closely, but in a way that will not hinder law enforcement's efficiency and productivity. Another historical solution to open-ended searches, the exclusionary rule, has had limited deterrent effect on law enforcement.⁶¹

(1983); Washington Post Staff, *The History of the Mobile Phone*, WASHINGTON POST, (Sep. 9, 2014), <https://www.washingtonpost.com/news/the-switch/wp/2014/09/09/the-history-of-the-mobile-phone/>.

⁶⁰ Hui-Min Huang, *Autonomy Levels for Unmanned Systems*, <https://www.nist.gov/sites/default/files/documents/el/isd/ks/ALFUS-BG.pdf> (last visited Feb. 25, 2017); Hope Reese, *Autonomous Driving Levels 0 to 5: Understanding the Differences*, TECH REPUBLIC (Jan. 20, 2016, 10:47 AM), <http://www.techrepublic.com/article/autonomous-driving-levels-0-to-5-understanding-the-differences/>.

⁶¹ "Not surprisingly, the mechanics of deterrence, like other questions of human behavior, are subject to considerable dispute. In fact, commentators across the political spectrum representing a variety of jurisprudential disciplines have acknowledged that deterrence is not susceptible to empirical proof and thus at some level is largely a matter of conjecture." Kit Kinports, *Culpability, Deterrence, and the Exclusionary Rule*, 21 WM. & MARY BILL RTS. J. 821, 832 (2013) (citing

Historically, constables and government agents were kept in check through their fear of a trespass suit if the wrong person was arrested or searched.⁶² The necessity to obtain a warrant may serve as a check on general police action, but may not sufficiently limit Officer Joe. The threat of a civil suit, criminal sanctions, and employment ramifications (firing and suspension) in the event of blatant abuse of power against an innocent citizen or his property deters misconduct by human police officers. However, would these same deterrents work on Officer Joe? What might deter a robot from abusing its power—a permanent powering down?

IV. HUMAN ERROR VERSUS ROBOT ERROR

“Computers are like Old Testament gods; lots of rules and no mercy.”⁶³

Today’s organization of police departments is relatively new. In fact, the idea of a professional police force has only existed since the mid-nineteenth century.⁶⁴ The first police force was created and organized by Sir Robert Peel in London, England, in 1829.⁶⁵ Sir Peel required that his police officers, or “bobbies,” follow twelve principles:

1. The police must be stable, efficient, and organized along military lines.
2. The police must be under governmental control.
3. The absence of crime will best prove the efficiency of the police.
4. The distribution of crime news is essential.

Albert W. Alschuler, *Studying the Exclusionary Rule: An Empirical Classic*, 75 U. CHI. L. REV. 1365, 1368 (2008) (“Quantifying the behavioral effects of the exclusionary rule is . . . impossible.”); see also William C. Heffernan, *The Fourth Amendment Exclusionary Rule as a Constitutional Remedy*, 88 GEO. L.J. 799, 864 (2000) (observing that “a deterrent effect . . . is extremely hard to verify, particularly when police illegality is at issue”); Dan M. Kahan, *The Secret Ambition of Deterrence*, 113 HARV. L. REV. 413, 427 (1999) (discussing “the empirically speculative nature of deterrence”); L. Timothy Perrin et al., *If It’s Broken, Fix It: Moving Beyond the Exclusionary Rule*, 83 IOWA L. REV. 669, 755 (1998) (“The dynamic of deterrence, steeped as it is in the motivations of fallible human beings, defies precise measurement . . .”); Richard A. Posner, *Rethinking the Fourth Amendment*, 1981 SUP. CT. REV. 49, 54 (“No one actually knows how effective the exclusionary rule is as a deterrent . . .”); Christopher Slobogin, *Why Liberals Should Chuck the Exclusionary Rule*, 1999 U. ILL. L. REV. 363, 368 (1999) (concluding that “[n]o one is going to win [this] empirical debate”).

⁶² George C. Thomas III, *Stumbling Toward History: The Framers’ Search and Seizure World*, 43 TEX. TECH. L. REV. 199 (2010).

⁶³ JOSEPH CAMPBELL, *THE POWER OF MYTH WITH BILL MOYERS* (1991).

⁶⁴ CHRISTOPHER SLOBOGIN, *CRIMINAL PROCEDURE: REGULATION OF POLICE INVESTIGATION: LEGAL, HISTORICAL, EMPIRICAL, AND COMPARATIVE MATERIALS*, 2–3 (4th ed. 2007) (citing George Kirkham & Laurin A. Wollan, Jr., *INTRODUCTION TO LAW ENFORCEMENT*, 28–39 (1980)).

⁶⁵ *Id.*

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5. The deployment of police strength by time and area is essential.
6. No quality is more indispensable to a policeman than a perfect command of temper; a quiet, determined manner has more effect than violent action.
7. Good appearance commands respect.
8. The securing and training of proper persons is at the root of efficiency.
9. Public security demands that every police officer be given a number.
10. Police headquarters should be centrally located and easily accessible to the People.
11. Policemen should be hired on a probationary basis.
12. Police records are necessary to the correct distribution of police strength.⁶⁶

Officer Joe Roboto seems perfect for the job. A robot's mission would fall in line with a mandate to be "stable, efficient, quiet, determined, and organized," with "good appearance" and "perfect command of temper." Officer Joe would have no problem adequately distributing crime news, maintaining police records, and assisting with the appropriate deployment of police strength by time and area. Officer Joe would not mind being given a number. In fact, in looking at these principles, a robot could probably do a better job than a human officer. What is missing from these principles is any mention of compassion, empathy, emotion, or whether a police officer can relate to the people in his or her community, whether the officer has the necessary communication skills to de-escalate a domestic abuse scenario or handle a mentally ill citizen. How would Officer Joe behave in those scenarios?

- A. *Issue #5: Robots and human officers may follow the same laws but use different standards to arrest people, i.e., inflexible programming versus discretion.*

A robot's decision in the field obviously depends on the robot's programming and how it learns. The benefits of a robot include having no feelings, emotions, or biases; humans feel but robots do not. A human police officer may have an axe to grind with his neighbor and may keep monitoring the source of his displeasure until he finds a particular violation he can use against the neighbor. A human officer might stop someone suspected of driving drunk, but might let the driver go because she is attractive and sympathetic. A human police officer might decide to make a pretext traffic stop solely based on the color of the driver's skin or the type of car. A male police officer might be going through a divorce and unconsciously arrest every woman he suspects of

⁶⁶ *Id.*

committing a crime regardless of the circumstances. There is a significant amount of discretion police have while performing their duties and interacting with local citizens, particularly at the time of an arrest. How many criminal suspects who are detained or arrested are let go or offered a chance to work as confidential informants? The police officer has options when making an arrest. This flexibility is defined as a judgment call. Prosecutors also use discretion when they decide which cases merit prosecution. In the United States, less than two percent of all crimes are actually prosecuted. With Officer Joe in the field, would prosecution statistics double or triple due to more efficient investigative techniques? What are the ramifications?

B. Issue #6: Robots will have less people skills and common sense than human officers, and it is unclear how they will handle tense situations.

Officer Joe's initial programming cannot adequately prepare it for the infinitely diverse interactions it will encounter with individual citizens. There are "automated suspicion" algorithms that will allow robots to distinguish between individuals who are breaking the law and those who are not.⁶⁷ However, a robot needs experience just like any novice human officer. Unfortunately, the saying "garbage in, garbage out,"⁶⁸ is often true: A robot is only as good as its machine learning algorithms⁶⁹ and human engagement experiences. Microsoft's Tay AI⁷⁰ had to be quickly shut down after a subset of people exploited Tay's "repeat after me" function to transform her from a "teenage AI bot who wants to chat with and learn from millennials, into Tay, the racist and genocidal AI bot who liked to reference Hitler."⁷¹

In its interactions with humans, a robot might not be able to understand humor or emotional subtleties or a change in tone as a situation turns violent. Do robots have intuition? During a game of "Go" between Google's AlphaGo and

⁶⁷ Michael Rich, *Machine Learning, Automated Suspicion Algorithms, and the Fourth Amendment*, 164 U. PA. L. REV. 871 (2016).

⁶⁸ *Garbage in, Garbage out*, DICTIONARY.COM, <http://www.dictionary.com/browse/garbage-in--garbage-out> (last visited Feb. 25, 2017). "This saying points out the fact that a computer can do only what it is programmed to do and is only as good as the data it receives and the instructions it is given. If there is a logical error in software, or if incorrect data are entered, the result will probably be either a wrong answer or a system crash." *Id.*

⁶⁹ An algorithm that is "machine learning" means the computer teaches itself how to do something. *Machine Learning*, DICTIONARY.COM, <http://www.dictionary.com/browse/machine-learning?s=t> (last visited Feb. 25, 2017); *Garbage in, garbage out*, AMERICAN HERITAGE NEW DICTIONARY OF CULTURAL LITERACY (3d ed. 2005).

⁷⁰ Abby Ohlheiser, *Trolls Turned Tay, Microsoft's Fun Millennial AI Bot, into a Genocidal Maniac*, WASHINGTON POST (Mar. 25, 2016), <https://www.washingtonpost.com/news/the-intersect/wp/2016/03/24/the-internet-turned-tay-microsofts-fun-millennial-ai-bot-into-a-genocidal-maniac/>.

⁷¹ *Id.*

the smartest human player of “Go,” Lee Sedol, AlphaGo won the game 4 to 1.⁷² A data analytics expert observed that AlphaGo “imagin[ed] its own games and self learn[ed] from its own creations,” but remained confident that “intuition is still in the hands of the humans with all our frailties. All the machines have done is to self learn for problems where the goals are clear and quantifiable.”⁷³

As a society, we seem to be looking for robots to cure our human weaknesses. In an age of consistent police abuse stories, such as those involving Ferguson⁷⁴ and Freddie Gray,⁷⁵ we are concerned that police officers have too much discretion, that some are racially biased and quick to react negatively in a situation that could have been avoided with a calmer, more compassionate demeanor. However, it is far from clear that robots offer a solution or that they will be the moral saints and perfect law enforcement officers we envision. The criminal code will certainly need to be revised and streamlined if robots are expected to one day perform as autonomous police officers. In some respects, such a situation may force legislators to pare down the many arcane and minor laws on the books.

We want the perfect police officer. One that never makes a mistake. One that has no racial bias. One that handles each call the same regardless of race or sex or religion. Officer Roboto may appear to be the ideal answer to our current tensions with local police departments throughout the country. However, a strong possibility exists these autonomous robots may become more like Frankenstein—a creation we think we understand until it demonstrates that it has a mind of its own and will choose its own path.

One robot designer set out to prove robots cannot be trusted and that robots, on their own, can decide to hurt humans. The designer created a robot which consists of a large robotic arm with a needle attached to its fingers. The robot is able to decide on its own whether to hurt a human who comes within its reach by pricking the human’s finger with its needle.⁷⁶ The robot’s actions are

⁷² Cade Metz, *In Two Moves, AlphaGo and Lee Sedol Redefined the Future*, WIRED (Jan. 27, 2016), <https://www.wired.com/2016/03/two-moves-alphago-lee-sedol-redefined-future/>.

⁷³ Karthik Rajan, *At the Intersection of Machine Learning and Human Intuition. Google Brand is the Winner*, HACKERNOON (Mar. 16, 2016, 7:00 AM), <https://hackernoon.com/alphago-beats-lee-sedol-what-it-means-for-you-clear-winner-is-google-5264c0168692#.pm5mou535>. Karthik Rajan is a regular contributing writer for Forbes, Huffington Post, and Entrepreneur periodicals.

⁷⁴ See generally Michael Brown’s Shooting and its Immediate Aftermath in Ferguson, N.Y. TIMES (Aug. 25, 2014), <http://www.nytimes.com/interactive/2014/08/12/us/13police-shooting-of-black-teenager-michael-brown.html>.

⁷⁵ See generally Freddie Gray Case Ends with No Convictions of Any Police Officers, N.Y. TIMES (Jul. 27, 2016), <http://www.nytimes.com/interactive/2015/04/30/us/what-happened-freddie-gray-arrested-by-baltimore-police-department-map-timeline.html>.

⁷⁶ Laura Sydell, *A Robot That Harms: When Machines Make Life of Death Decisions*, NPR (Aug. 29, 2016, 2:03 PM), <http://www.npr.org/sections/alltechconsidered/2016/08/29/490775247/a-robot-that-hurts-confronts-future-when-machines-make-life-death-decisions>.

unpredictable to everyone, including the person who designed the robot.⁷⁷ The robot decides when to prick a human's finger for no particular reason.⁷⁸ It is unclear what goes into its thought process when choosing to prick a particular human's finger. Human test subjects wonder if today is the day their finger will be pricked. How can we trust that the robots of the future will make the best, ethical decision in the best interest of all humans? And how will they determine whether and when a human's finger needs to be pricked?

V. IS SOCIETY READY FOR LAW ENFORCEMENT ROBOTS SUCH AS OFFICER JOE ROBOTO?

If Officer Joe is ever to become a reality, there needs to be social acceptance of its existence and function. Since Joe as a humanoid law enforcement robot does not exist, we can look to science fiction to observe how robots have been perceived in traditional culture. Many of the public's future fears of "robots" can be predicted by scanning the vast array of books, television, and movies that touch upon the relationship between humans and robots. It is clear the public's perception of robots has evolved as technology has become more sophisticated and complex.

Edward S. Ellis' science fiction novel, *The Steam Man of the Prairies*, first published in 1868, portrayed literature's first robot or non-sentient automaton: the "Steam Man."⁷⁹ The "mechanical" metal man was constructed of iron and was approximately 10 feet tall.⁸⁰ A teenage boy built the robot to pull his carriage across the prairie and take him on various adventures.⁸¹ It is therefore conceivable robots were first viewed as a way to make life easier. In this case, the robot was superior to a horse in strength, endurance, lack of physical needs, and immortality.

"Maria" in the 1927 movie *Metropolis* was one of the first robots ever depicted in cinema.⁸² Maria touched upon fears of the future as she depicted robots that are indistinguishable from humans.⁸³ *Metropolis* tells the story of a society divided into two distinct classes.⁸⁴ Machines would be used to keep the society this way and sabotage humans who tried to bring unity to the class

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ EDWARD S. ELLIS, *THE STEAM MAN OF THE PRAIRIES* (Dover Publications 2016) (1868).

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *THE COMPLETE METROPOLIS* (Kino Lorber Films 2010).

⁸³ *Id.*

⁸⁴ *Id.*

systems.⁸⁵ Not long after Maria came the Tin Man in *The Wizard of Oz*.⁸⁶ He is one of the earliest robots in film (1939),⁸⁷ and is based upon L. Frank Baum's 1900 book. Even though the Tin Man had no heart, he was a friendly robot loved by his Wizard of Oz friends.

Robby the Robot was seen in the 1956 movie *Forbidden Planet*.⁸⁸ Robby was a servant robot, programmed with certain "rules."⁸⁹ These rules later became problematic when Robby refused to kill an enemy because of these rules.⁹⁰ The morally programmed robot theme is explored again in the movie, *I, Robot*. There, robots decided to save the main character rather than a young girl who was statistically less likely to survive.⁹¹

During the '60s and '70s, it seems robots filled helper roles and were primarily viewed with affection. However, these robots were not very sophisticated.⁹² In 1978, H.E.R.B.I.E. (Humanoid Experimental Robot, B-type, Integrated Electronics) was created for Marvel's animated *Fantastic Four* series.⁹³ At the same time, the first actual humanoid robot, the Wabot-1, was designed by Ichiro Kato at Waseda University in 1973.⁹⁴ The first dynamic walking robot, the WLRd, was not created until 1984.⁹⁵

The '80s prompted a shift in how robots and artificial intelligence were viewed. Instead of being beloved servants, robots became sophisticated entities that raised suspicion and questions about what makes us human.⁹⁶ In the movie

⁸⁵ *Id.*

⁸⁶ L. FRANK BAUM, *THE WIZARD OF OZ COLLECTION* (2014). The Tin Man was originally a man who lived in the forest and chopped wood for a living. *Id.* A witch cursed his ax in order to prevent him from marrying his sweetheart, and as a result, the enchanted ax chopped off the man's limbs one by one. *Id.* Each time he lost a limb or an organ, he would replace it with a tin prosthetic. *Id.* This continued until nothing was left of the man, but tin. *Id.* And he could no longer love his sweetheart. *Id.* The story of the Tin Man chronicles his search for a heart.

⁸⁷ *THE WIZARD OF OZ* (Warner Bros. 1939).

⁸⁸ *FORBIDDEN PLANET* (Warner Bros. 1956).

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *I, ROBOT* (Twentieth Century Fox 2004).

⁹² During this era, R2D2 and C3PO from *Star Wars*, Rosie from the *Jetsons*, and the unnamed Robot from *Lost in Space* were created.

⁹³ *FANTASTIC FOUR: THE COMPLETE 1994–95 ANIMATED TELEVISION SERIES* (Buena Vista Home Entertainment 2005).

⁹⁴ *WABOT*, WASEDA UNIVERSITY, http://www.humanoid.waseda.ac.jp/booklet/kato_2.html (last visited Feb. 25, 2017).

⁹⁵ *Biped Walking Robot*, WASEDA UNIVERSITY, http://www.humanoid.waseda.ac.jp/booklet/kato_4.html (last visited Feb. 25, 2017).

⁹⁶ Some were clearly villains like the Terminator (a machine programmed to search out and destroy a particular human), or like ED-209 from *RoboCop*, a menacing replacement for human police officers. Others, like Jinx from *Space Camp* were only dangerous because they were entirely too literal.

Space Camp, friendly robots, such as Jinx, were seen as dangerous because they lacked the ability to understand exaggeration, context clues, and humor.⁹⁷ In the movie, Jinx sent his human friend, Max, into space—not realizing that such an act would nearly kill Max—because Max expressed the desire to travel there.⁹⁸ Though Jinx is the one who causes the problem, he is also the one that saves the day.⁹⁹

Perhaps the best example of the evolution of AI fears can be seen in The Terminator franchise,¹⁰⁰ which dealt with the tenuous need/fear relationship between humans and robots. The Terminator franchise chronicles the story of Sarah Connor, a woman destined to give birth to the man who will save humanity from the machines.¹⁰¹ In the future, a military computer called Skynet becomes self-aware and launches nuclear missiles that kill most of mankind.¹⁰² The remaining humans must escape from “terminator” machines sent to destroy them.¹⁰³ Realizing that they will not win the war, the machines send a Terminator back in time to kill Sarah Connor.¹⁰⁴ Kyle Reese, a man sent back in time to defend Sarah Connor against the machine, aptly describes the terrifying, relentless nature of such machines: “Listen. And understand. That terminator is out there. It can’t be bargained with. It can’t be reasoned with. It doesn’t feel pity, or remorse, or fear. And it absolutely will not stop, ever, until you are dead.”¹⁰⁵

The second¹⁰⁶ and third¹⁰⁷ installments of The Terminator franchise introduced the concept of a “good” Terminator, a machine reprogrammed to protect John Connor, Sarah’s son and the man destined to save humanity from the machines. It was thought to be a necessary evil, because only a Terminator could engage another killing machine and survive.¹⁰⁸ The franchise evoked questions about humanity as John and the audience both grew to love his “good” terminator. So, can a killing machine be good if programmed to be good? Is it worth the risk?

From the Terminator Series, we see some thematic fears emerging; a robotic take-over that humanity sanctions because of safety and convenience, the

⁹⁷ SPACE CAMP (ABC Motion Pictures 1986).

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ THE TERMINATOR (Hemdale 1984).

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ TERMINATOR 2: JUDGMENT DAY (Carolco 1991).

¹⁰⁷ TERMINATOR 3: RISE OF THE MACHINES (C-2 Pictures 2003).

¹⁰⁸ *Id.*

fear that robots who are superior in strength and knowledge, and that robots could be among us without our knowledge.

Ex Machina is a 2015 science fiction movie about a computer analyst invited to study a new model of AI named Ava.¹⁰⁹ This robot was created by a brilliant, disturbed billionaire who uses robots for service and pleasure and destroys them if they don't please him.¹¹⁰ Throughout the film, the analyst and the audience are enchanted by Ava, cheering her on as she plans to escape, until it is finally revealed that she is as malignant of heart and deceptive as her creator.¹¹¹

Robots acquiring artificial general intelligence, including emotions and personality, have become a recent phenomenon observed in both TV and movies.¹¹² A man fell in love with the AI voice of "Samantha" in the movie *Her*;¹¹³ several robots in a robotic theme park begin to show signs of "human consciousness" in HBO's science fiction western, *Westworld*;¹¹⁴ and robots rebel against their creator and exhibit signs of self-awareness in the TV show *HUMANS*.¹¹⁵ These images seem to suggest our perception has evolved from robots being mere assistants to equal partners with similar emotions, personality, independence, and consciousness.

The list of movies, books, and television shows featuring robots is lengthy. However, reviewing the list reveals certain common fears and themes concerning AI: Humans fear that as robots become "self-aware" they will eventually have a desire to destroy humanity. Robots may easily assimilate into society, but they will lack empathy and the ability to make appropriate judgment calls. Humans will need to give up some freedom for the convenience, service, and safety offered by robots. In certain contexts, they must be willing to be replaced by these more advanced beings. In simplistic terms, current literature

¹⁰⁹ *EX MACHINA* (Universal Pictures International 2015).

¹¹⁰ *Id.*

¹¹¹ *ROBOCOP* (Orion Pictures 1987).

¹¹² "Artificial intelligence (AI) is a computer that learns to perform intelligent tasks we usually think only humans can do." Christine Bilbrey, *Artificial Intelligence and the Practice of Law*, THE FLA. BAR PRACTICE RES. INST. (Dec. 28, 2016), <http://pri.floridabar.org/artificial-intelligence-and-the-practice-of-law/> (quoting Andrew Arruda, *Artificial Intelligence Systems and the Law*, PEER TO PEER: THE Q. MAG. OF ILTA, Summer 2016). Artificial general intelligence ("AGI") adds personality, emotions, human-like common sense, and problem-solving to a robot to "allow it to interact naturally with humans and develop motivations to solve problems in creative ways." Sean Captain, *Robots are Developing Feelings. Will They Ever Become "People"?*, FAST COMPANY (Oct. 4, 2016, 11:00 AM) <https://www.fastcompany.com/3062868/mind-and-machine/robots-are-developing-feelings-will-they-ever-become-people>. To date, several *real* projects exist in which engineers are designing robots with emotions and artificial general intelligence. *Id.*

¹¹³ *HER* (Annapurna Pictures 2013).

¹¹⁴ *WESTWORLD* (Bad Robot 2016).

¹¹⁵ *HUMANS* (Kudos Film and Television 2015).

and cinematic themes suggest that robots are either “bad” robots that seek to destroy or “good,” yet naïve, robots that are friendly helpers.

Law enforcement robots have not been banned from science fiction. RoboCop premiered in 1987 as the possible future of law enforcement.¹¹⁶ Fox aired a series in 2013 called “Almost Human,” starring a human police officer with an android partner.¹¹⁷ Surveillance AI in “Person of Interest” saves lives by identifying those who will be involved in future crimes.¹¹⁸ There have been several movies featuring robots as potential law enforcement officers including Chappie; I, Robot; and Total Recall.¹¹⁹ This idea has already been subconsciously placed in society’s mind as a possibility (albeit in the future).

A. *Issue # 7: The community will perceive robo-cops differently than human officers.*

What can we learn from society’s fascination with robots? Humans tend to anthropomorphize¹²⁰ robots, that is, we tend to give human characteristics to our inanimate, robot counterparts. When robots have human characteristics, such as a face, a gesture, a look, or a voice, they tend to feel less alien and more human, and therefore, more trustworthy.¹²¹ We are more accepting of robots when we attribute lifelike qualities to them; we are calmer and more at ease during those interactions.¹²² Google has attempted to capitalize on this knowledge by creating a self-driving car with “[h]eadlights for eyes, a forward sensor for a nose, [and] a bumper line for a mouth tilted slightly upward in a grin.”¹²³ According to Google, “very subtle human features—a name, or a voice, and especially a

¹¹⁶ TOTAL RECALL (Carolco Pictures 1990).

¹¹⁷ ALMOST HUMAN (Frequency Films 2013). The human officer in the TV show does not trust law enforcement robots since his last robo-cop partner left him and his other human partner alone since they had a “low” survival rate while under gunfire.

¹¹⁸ PERSON OF INTEREST (Kilter Films 2011).

¹¹⁹ CHAPPIE (Columbia Pictures 2015); I, ROBOT (Twentieth Century Fox 2004); TOTAL RECALL (Carolco Pictures 1990).

¹²⁰ Rick Nauert, *Why Do We Anthropomorphize?*, PSYCHCENTRAL (Mar. 1, 2010), <http://psychcentral.com/news/2010/03/01/why-do-we-anthropomorphize/11766.html>. “The term anthropomorphism was coined by the Greek philosopher Xenophanes when describing the similarity between religious believers and their gods—that is, Greek gods were depicted having light skin and blue eyes while African gods had dark skin and brown eyes.” *Id.*

¹²¹ Julia Fink, *Anthropomorphism and Human Likeness in the Design of Robots and Human-Robot Interaction*, in SOCIAL ROBOTICS: 4TH INTERNATIONAL CONFERENCE, ICSR 2012, CHENGDU, CHINA, OCTOBER 29–31, 2012. PROCEEDINGS, at 199 (Shuzhi Sam Ge et al. eds., 2012), https://infoscience.epfl.ch/record/180534/files/icsr2012_fink_anthropomorphism_vspringer.pdf.

¹²² Brian R. Duffy, *Anthropomorphism and the Social Robot*, 42 ROBOTICS & AUTONOMOUS SYSTEMS 177–90 (2003), <http://www.prism.ucd.ie/publications/pub2003/dufAnth03.pdf>.

¹²³ Eric Jaffe, *The Psychology of Anthropomorphic Robots*, FAST CO. (Jun. 16, 2014), <https://www.fastcodesign.com/3031825/evidence/the-psychology-of-anthropomorphic-robots>.

face—can help a robot seem mindful and dependable rather than cold and threatening.”¹²⁴

In one study in 2012, students were asked to interact with a humanoid robot named Robovie.¹²⁵ The students socially engaged with Robovie, shaking its hand, following its directions, and assisting it to move a ball.¹²⁶ The participants identified Robovie as having mental, emotional, and social attributes.¹²⁷ During this 15-minute interaction, Robovie also made some incorrect assessments and kept participants from winning a \$20 prize.¹²⁸ Interestingly enough, the students found Robovie to be less morally accountable than an actual human but more accountable than a vending machine.¹²⁹ Poor Robovie could be forgiven for its mistakes.

Significant improvements are being made to create a robot that will physically look and act like a human. Kokoro, a Tokyo-based entertainment company, has collaborated with Osaka University’s Hiroshi Ishiguro to create attractive androids such as “Geminoid F” and “Actroid-F.”¹³⁰ These humanoid

¹²⁴ Google’s self-driving car uses subtle anthropomorphic cues that appeal to human drivers.

In one recent study, the researchers recruited 100 test participants to operate a driving simulator through two courses. Some drove a normal manual simulator. Some operated a semi-autonomous simulator capable of controlling its own speed and its steering. Some operated a semi-autonomous car with a name (Iris), a gender (female), and a voice (pre-recorded human audio files). Not only did test participants humanize Iris—they rated her as smarter and more capable of feeling, anticipating, and planning than the other simulators—they also trusted her more. In self-reports, participants operating Iris said they felt safer in the car and more willing to give up control, compared to those in the normal simulator. Their bodies confirmed the feeling: Heart-rate monitors displayed a lower change in arousal for Iris drivers, compared to both other simulator groups.

Eric Jaffe, *The Psychology of Anthropomorphic Robots*, INT’L SOC’Y FOR PRESENCE RESEARCH (Jun. 16, 2014),

<http://ispr.info/2014/07/09/cars-are-social-actors-subtle-anthropomorphic-cues-increase-machines-perceived-humanity/>.

¹²⁵ “Robovie was developed by researchers at Advanced Telecommunications Research (ATR) in Japan . . . to investigate[] social and moral relationships with a humanoid robot with capabilities that lie beyond those currently achievable by an autonomous robot, but which may be achievable in the not too distant future.” Peter H. Kahn et al., *Do People Hold a Humanoid Robot Morally Accountable for the Harm it Causes?*, HRI ’12 PROCEEDINGS OF THE SEVENTH ANNUAL ACM/IEEE INT’L CONF. ON HUMAN-ROBOT INTERACTION 33 (Mar. 5–8, 2012), https://depts.washington.edu/hints/publications/Robovie_Moral_Accountability_Study_HRI_2012_corrected.pdf.

¹²⁶ *Id.* at 34

¹²⁷ *Id.* at 33.

¹²⁸ *Id.* at 34.

¹²⁹ *Id.* at 33.

¹³⁰ Angelica Lim, *Japanese Robot Android Gets More Social, Has No Fear of Crowds*, SPECTRUM, (Oct. 15, 2016), <http://spectrum.ieee.org/automaton/robotics/humanoids/japanese-robot-actroid-sit>.

imitation robots are strikingly similar physically to humans and they can communicate and behave autonomously.¹³¹

By anthropomorphizing our friendly law enforcement robot, we lean towards the acceptance, trust, and respect one should have for law enforcement. Our fears of replacement and rigidity of the rules is lessened by convincing ourselves that the robots are the better parts of ourselves. As one study examining the psychology of anthropomorphism has suggested, “[a]nthropomorphism helps us to simplify and make more sense of complicated entities.”¹³² The bottom line is no one is perfect—not even a robot. No one or no entity will cure the ills of the criminal justice system. We should not be fooled by the cute humanoid.

B. Issue # 8: Robots should be treated identical to their human counterparts when it comes to law enforcement and the 4th Amendment, e.g., motions to suppress evidence filed on the basis of a robot’s action (or omission), or suspects filing abuse of civil rights claims against robo-cops while in performance of its duties.

If robo-cops are given similar responsibilities to human officers, it should follow they should have certain rights and obligations. In May, 2016, a European Parliament Committee (“Committee”) focused on the legal and ethical uses of robots and proposed rules to protect humans from robots in cases of traffic or drone accidents or invasions of privacy.¹³³ The Committee recently granted robots legal status which require robots to provide restitution for any damage they might cause.¹³⁴

If robots commit constitutional violations, defendants in criminal cases should be able to file typical motions to suppress without a concern they will be summarily dismissed because their complaints are against a machine. Moreover, if a robot uses excessive force, a § 1983 claim should be considered.

In the past, the Supreme Court has used the judicially-created exclusionary rule in an attempt to deter police from committing Fourth Amendment violations.¹³⁵ The belief is that police officers will avoid pushing the

¹³¹ *Id.*

¹³² Rick Nauert, *Why Do We Anthropomorphize?*, PSYCHCENTRAL (Mar. 1, 2010), <https://psychcentral.com/news/2010/03/01/why-do-we-anthropomorphize/11766.html>.

¹³³ See Comm. on Legal Affairs, *Draft Rep. with Recommendations to the Commission on Civil Law Rules on Robotics*, European Parliament PR\1095387EN (May 31, 2016), <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN;Captain, supra note 112>.

¹³⁴ *Robot Kill Switches & Legal Status: MEPs Endorse AI Proposal*, RT (Jan. 12, 2017, 1:42 PM), <https://www.rt.com/viral/373450-robot-kill-switches-status/>. “European Parliament is the only directly-elected body of the European Union.” *Welcome to the European Parliament Website*, EUROPEAN PARLIAMENT, <http://www.europarl.europa.eu/> (last visited Feb. 25, 2017).

¹³⁵ *Mapp v. Ohio*, 367 U.S. 643 (1961).

envelope if illegally obtained evidence is excluded in a defendant's criminal case. However, if law enforcement robots become part of our daily lives, it is unclear if the exclusionary rule will have a deterrent effect on a robo-cop's behavior. If a robo-cop makes a mistake, perhaps it can be re-programmed and not make the same mistake in similar circumstances?

VI. CONCLUSION

As the children's book *Robots, Robots Everywhere* suggests, robots are everywhere and the latest generation is comfortable growing up with robots in their homes, in their school, and out in public. An actual Officer Joe Roboto patrolling the streets in your local neighborhood may currently only exist in science fiction. How long before science fiction becomes reality is unknown. The AI capabilities discussed in this article and law enforcement's current investigative tools are real. While there is no reason to suggest IBM's Watson would be the foundation for such a robot as Officer Joe, IBM seems to be using it in nearly every industry. It is also highly likely that robotics technology will advance enough that AI software will have human-like bodies to inhabit in the not-so-distant future.

As to the legal consequences of such a creation, the courts are constantly trying to catch up to the latest technological invention and privacy implications within the context of the Fourth Amendment. Despite Officer Joe's current fictional quality, we should not wait until after Officer Joe is created to identify the legal ramifications and Fourth Amendment pitfalls.

Robots will likely use multiple law enforcement tools simultaneously, rather than one single tool at a time. Should courts take that into consideration or handle each individual "act" against the backdrop of Fourth Amendment doctrine? How should programmers handle tools that will be used to identify high crime target areas, or tools that will be used for proactive investigations of potential targets, or tools used for reactive investigations to identify a specific suspect? Is Joe the ultimate sensory enhancement¹³⁶ and therefore, does not uniquely trigger Fourth Amendment protections? If Joe is accessing millions of pieces of information in a matter of minutes from a third party company or database, is an administrative subpoena enough? The current analysis of Fourth Amendment doctrine today might not withstand the additional tensions artificial intelligence might place on it.

Thus far, robots with artificial intelligence have focused on a specific task, e.g., Watson learns of a health concern and searches for an answer. Creating a robot that will be responsible for completing several distinctive tasks, interacting with many citizens with many different emergencies, and making

¹³⁶ "Nothing in the Fourth Amendment prohibited the police from augmenting the sensory faculties bestowed upon them at birth with such enhancement as science and technology afforded them in this case." *United States v. Knotts*, 460 U.S. 276, 282 (1983).

split second judgment calls in the field is of greater concern. Legal and engineering experts should work together and decide when a law enforcement robot should be allowed to be autonomous and when they should be controlled by a human operator. A public committee or board composed of neutral, knowledgeable third parties should be established to monitor the progress of this potential AI creation. Once the robot is ready for the field, the board should identify any weaknesses, evaluate the robot's effectiveness, error rate, and compliance with the Fourth Amendment, and ensure these quality assurance parameters are met before robo-cops are allowed to proceed beyond experimentation to becoming operational.

Robots powered by Watson AI and the widespread use of predictive analytics are the future tools of law enforcement in a digital age, and we must come up with solutions how to handle the appropriate use of these tools. Third party doctrine must be reviewed, public sentiment considered, and a balance struck between individual liberty and public safety when it comes to privacy issues. Standards must be created to identify when the robot should be controlled by a human operator and when the robot can rely on its own artificial intelligence.