Liar, Liar, Pants on Fire!
Examining the Constitutionality of Enhanced Robo-Interrogation

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Abstract

The combination of human-computer interaction ("HCI") technology with sensors that monitor human physiological responses offers state agencies improved methods for extracting truthful information from suspects during interrogations. These technologies have recently been implemented in prototypes of automated kiosks, which allow an individual to interact with an avatar interrogator. The HCI system uses a combination of visual, auditory, near-infrared and other sensors to monitor a suspect's eye movements, voice, and various other qualities throughout an interaction. The information is then aggregated and analyzed to determine whether the suspect is being deceptive. This paper argues that this type of application poses serious risks to individual rights such as privacy and the right to silence. The paper concludes by suggesting that courts, developers, and state agencies institute limits on how and what information this emerging technology can collect from the human's who engage with it.

Introduction

People lie all the time,[1] but we are generally poor lie detectors.[2] Even individuals who are specifically trained to identify deception have only slightly improved accuracy in detecting lies when compared to the average person.[3] But, in an interrogation context, whether in a law enforcement or national security setting, the ability to accurately detect lies is particularly important. For this reason, investigators have long turned to technologies like the polygraph to enhance their lie-detection capabilities. This paper explores the possible future of technological lie-detection in interrogation contexts. As the state of technology progresses to the point of potentially using automated lie-detecting technologies to conduct interrogations ("robot interrogators"), we as a society may be faced with challenging moral and legal questions: can 'truth' and 'falsehood' really be measured? Is there any value in allowing individuals to maintain the capacity to deceive? Are deception-detection technologies neutral, scientific designs or might they be embedded with political priorities and presumptions? This paper takes a more modest focus, and considers how robot interrogators might implicate the rights to silence and privacy, two fundamental constitutional rights in the United States and Canada.

The starting premise for the possibility of a robot interrogator stems from the field of human-computer interaction ("HCI"). HCI is the study of how people interact with computing technology.[4] Research in this field reveals that people are willing, and in some instances may even prefer, to communicate socially with an automated computer or robot.[5] Automated

[1] For example, Kashy and DePaulo (1996) found that "deception is a standard component of everyday interactions, and that lies are told for a variety of reasons" Bella M. DePaulo and Deborah A Kashy, "Everyday Lies in Close and Casual Relationships" (1998) 74 Journal of Personality and Social Psychology 63-79.

[2] Humans are generally poor lie detectors (not usually accurate above 60%): Don Grubin and Lars Madsen, "Lie Detection and the Polygraph: A Historical Review" (2005) 16(2) The Journal of Forensic Psychiatry & Psychology 357-369 at 357-8. See also Bella M. DePaulo et al, "Cues to Deception" (2003) 129 Psychological Bulletin 74-188 at 106, "Behavioral cues that are discernible by human perceivers are associated with deceit only probabilistically. To establish definitively that someone is lying, further evidence is needed."

[3] Charles F. Bond, Jr. and Bella M. DePaulo, "Accuracy of Deception Judgments" (2006) 10 Personality & Soc. Psychol. Rev. 214–234 at 214.

[4] Gary M. Olson and Judith S. Olson, "Human-Computer Interaction: Psychological Aspects of the Human Use of Computing" (2003) 54 Annual Revue of Psychology 491-516 at 492.

[5] See e.g. Joseph Weizenbaum, "ELIZA—A Computer Program For the Study of Natural Language Communication Between Man And Machine" (1966) 9 *Communications of the ACM* 36; Ian Kerr, "Bots, Babes and the Californication of Commerce" (2003-2004) 1 *UOLTJ* 285.

interlocutors may even be able to build rapport and engage people in conversation more easily than another human,[6] making it possible to imagine a robot in the place of a human interrogator.[7]

Beyond this notion, that a robot interrogator might be able to conduct a conversation in ways similar to a human interrogator is the robot's added capacity for one crucial enhancement over its human counterpart: robots can be equipped with deception-detecting technologies. Such enhancements could allow the robot to simultaneously interrogate and detect whether the human interlocutor is lying. The robot can then use this information to direct and manipulate the course of the interaction. Such technology might offer a solution to many of the weaknesses exhibited by human interrogators, including poor deception-detection abilities, exhaustion, bias,[8] and time efficiency.[9]

This of course assumes that the sensor technologies used by the robot are capable of *accurately* detecting deception. Deception-detection methods have exhibited questionable reliability throughout history.[10] This paper takes a charitable approach to deception-detecting technologies, and assumes that the technologies will be capable of accurate detection, as proposed by their designers.[11] It does so in order to hone in on the constitutional implications of what might be considered even the most acceptable devices – those that can with absolute certainty determine if someone is lying, for instance about bringing narcotics or weapons through a border checkpoint. Where deception-detection is anything but perfect, though, the risk that an

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[6] See e.g. Jonathan Gratch et al, "Can Virtual Humans be more Engaging than Real Ones?" (2007) In: Human-Computer Interaction, Part III, J. Jacko (ed) Speinger-Verlag Berlin 286-297; Jonathan Gratch et al, "Virtual Rapport" (2006) In: LNAI 4133, J Gratch et al (eds) Springer-Verlag Berlin pg 14-27.

[7] Interrogation (or "questioning") is a form of interview employed by police, military and intelligence agencies with the goal of obtaining information or a confession from the interview subject. See e.g. Saul M Kassin et al, "Police-Induced Confessions: Risk Factors and Recommendations" (2010) 34 Law and Human Behavior 3-38 at 6.

[8] Of course, security and surveillance technologies have long been argued to be capable of bias and social sorting, see e.g. David Lyon "Surveillance as Social Sorting", online: YouTube <http://www.youtube.com/watch?v=xtAa-f-1rTg>.

[9] Nunamaker J. et al, "Embodied Conversational Agent-Based Kiosk for Automated Interviewing" (2011) 28 Journal of Management Information Systems 17.s

[10] This concern dates back to the witch-hunt and the inquisition, during which deception was detected by a suspect's ability to survive tortuous challenges or sustain her claim to innocence throughout prolonged physical and psychological torture. More recently, critics have emphasized the unreliability of both the polygraph and other deception-detection technologies like brain scans. See e.g. Milton Melzer, The Right to Remain Silent (New York: Harcourt Brace Jovaovich, Inc, 1972); Francis X Shen and Owen D Jones, "Brain Scans as Evidence: Truths, Proofs, Lies and Lessons" (2011) 62 Mercer Law Review 861 at 866 discussing the potential unreliability of brain scans.

[11] See e.g. Nunamaker et al, *supra*.

innocent person might be determined to be a security threat or criminal offender should be a cause for great concern that goes beyond the issues raised in this paper.[12]

While the widespread use of robots in interrogations may not be an imminent concern, recent work on the development of an automated, deception-detecting avatar for questioning at border crossings ("border avatars") suggests that it is not out of the realm of possibility.[13] This paper begins with an overview of the state of technology to be used in robot interrogation. Then, drawing from both American and Canadian examples, the paper demonstrates that the robot interrogator's enhancements over a human interrogator threatens to undermine the long held constitutional right to remain silent. For this reason, the paper urges caution in the design and deployment of this technology. In light of the concerns raised, the paper suggests that further consideration be given to the question of whether we should even allow such technology to be designed and deployed for use by state agencies. However, should the technology be used in the future, this paper proposes that the results of a robot interrogation can only be admissible in court as evidence when a suspect voluntarily chooses to undergo the interrogation.[14] These devices cannot comply with the right to silence if they are mandatory or used forcibly. This of course assumes that the robot interrogator produces reliable information. Where the results are anything but completely accurate, then evidence from the robot interrogator must be treated like the polygraph – inadmissible for any purpose in a criminal trial.

Part I – What is a Robot Interrogator?

A robot interrogator may be any automated technology that questions an individual for the purpose of eliciting information.[15] An interrogator (human or robot) generally seeks to accomplish two things: (1) persuade a suspect to provide information, and (2) assess the veracity of that information. As such, psychological interrogation techniques that persuade suspects to give up information and the behavioral lie-detection methods that assess whether that suspect is

[12] Courts have long sought to protect against the use of unreliable and wrongful confessions and statements in criminal prosecutions. See e.g. Kassin, *supra*.
[13] Nunamaker et al, *supra*.
[14] The right to silence does not bar prosecutors from using voluntary admissions by an accused in court. A voluntary and informed submission to a robot interrogation will arguably fit within this scope of state activities that do not violate the right to silence.
[15] Interrogation is generally conducted for the purpose of obtaining incriminating statements or confessions. Other relevant forms of questioning might include an interview in which the questioner is seeking information. See e.g. Kassin, *supra* at 6.

lying form the twin pillars of modern interrogation.[16] This section will examine the potential effectiveness of a robot interrogator under each pillar of interrogation.

i. The Psychology of Interrogation

A robot interrogator needs to be capable of replicating, if not improving upon, human interrogation in order to be useful. In the modern era of interrogation, this means being capable of complex psychological observation and manipulation. Interrogation involves numerous techniques that tap into human psychology in an effort to persuade an interview subject to provide the desired information.[17]

For instance, one of the leading interrogation techniques used in North America, known as the Reid technique, involves a nine-step approach that aims to reduce the moral blameworthiness of the crime[18] and may involve deceiving the suspect about the facts of the case or investigation[19] in order to induce a confession.[20] The laws in Canada and the United States permit psychological persuasion of this kind, within certain limits.[21]

Interrogation techniques, like the Reid technique, are technical and involve complex and manipulative processes. Interrogators are usually trained in the art of questioning and must be able to build rapport with the subject as well as read the subject's body language and reactions to questions. To be useful, robot interrogators should therefore have the capacity to be similarly manipulative and effective at inducing admissions and confessions.

Persuasive Robots: Findings from the Field of Human Computer Interaction

Since Joseph Weizenbaum first observed that people are willing to enter into detailed and personal conversations with computers, a vast literature has emerged exploring the implications

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[16] Kassin, *supra* at 6.
[17] See e.g. Slonick, J and Leo, R, "The Ethics of Deceptive Interrogation" (1992) 11 Criminal Justice Ethics 3.
[18] Slonick and Leo, *supra* at 5.
[19] Investigators cannot however create false evidence, Slonick and Leo, *supra* at 7.
[20] Fred E. Inbau, John F. Reid, Joseph P. Buckley and Brian C. Jayne, *Criminal Interrogation and Confessions,* 5th ed. (Burlington, MA: Jones & Bartlett Learning, 2011). See also, Kassin, *supra* at 7; Slonick and Leo, *supra* at 6. John E. Reid and Associates Inc., "Company Information" online: <http://www.reid.com/r_about.html>.
[21] Specifically, the common law confessions rule in Canada (*R v Oickle*, 2000 SCC 38, [2000] 2 SCR 3) and the restrictions on threats, abuse or oppression defined in *Bram v United States*, 168 U.S. 532 (1897) and *Brown v Mississippi*, 297 U.S. 278 (1936) in the United States.

of this phenomenon.[22] In fact, Weizenbaum projected that people might be more willing to open up to automated counterparts than they are to other humans.[23] Subsequent studies have found that it is quite easy to trigger this social interaction between a human and a computer or robot.[24]

However, in order to elicit this response, the robot must be properly designed. Conversation has to seem natural – interruptions will destroy the illusion of a meaningful connection between human and robot.[25] With anthropomorphic robots, the use of body language, such as facial expressions, can evoke a sense in the human that her robot interlocutor has beliefs, thoughts and opinions.[26] This air of intelligence can further inspire humans to engage the robot as a social being, even if the robot actually has no ability to analyze anything the human is saying.[27] By exploiting this human social response, robot interlocutors can induce people to give up personal information with relative ease.[28]

To be effective at interrogation, however, it is not enough that a robot can simply engage a person in conversation. That robot must also be able to build rapport with the human suspect, analyze her reactions to its questions and take advantage of her psychological tendencies in order to induce a confession. Recent HCI research suggests that rapport building between an artificial entity and a person is not only possible, but might even be easier for a robot than another human.[29]

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[22] Joseph Weizenbaum, "ELIZA-A Computer Program For the Study of Natural Language Communication Between Man and Machine" (1966) 9 Communications of the ACM 36 at 36: "When in conversation with ELIZA, the user types in some statement or set of statements in natural language using normal punctuation and sentence structures. […] ELIZA then analyzes the user's statement and generates some response which it types out."

[23] Joseph Weizenbaum, Computer Power and Human Reason: From Judgment to Calculation (San Francisco: W.H. Freeman & Company, 1976) at 6-7. Wizenbaum observed that, "ordinary people seemed to enjoy cultivating relationships with artificial entities." This was one of the factors contributing to Weizenbaum's ultimate decision to condemn the continued development of artificial intelligence systems. Kerr, "Bots" *supra* at 305.

[24] See e.g. Clifford Nass, Jonathan Steuer, Ellen Tauber, "Computers are Social Actors" (1994) CHI '94 Proceedings of the SIGCHI conference on Human factors in computing systems: Celebrating Interdependence 72. Nass, C and Moon, Y, "Machines and Mindlessness: Social Responses to Computers" (2000) 56 Journal of Social Issues 81–103; Robins, B, Dautenhahn, K, Boekhorst, RT, Billard, A, "Robotic Assistants in Therapy and Education of Children with Autism: Can a Small Humanoid Robot Help Encourage Social Interaction Skills?" (2005) 4 Special issue, Design for a more inclusive world of Universal Access in the Information Society, 105-120. Nass et al, supra at 72: "[a limited set of characteristics associated with humans provides sufficient cues to encourage users to exhibit behaviors and make attributions toward computers that are nonsensical when applied to computers but appropriate when directed at other humans."

[25] Weizenbaum, "ELIZA" *supra* at 42.

[26] Cynthia Breazeal and Brian Scassellati, "How to Build Robots that make Friends and Influence People" (1999) IEEE/RSJ International Conference on Intelligent Robots and Systems, 858 – 863.

[27] *Ibid*.

[28] See e.g. Kerr, "Bots" *supra* at 310 with respect to online shopping bots and consumer information; Gratch et al, "Virtual Humans" *supra*.

[29] Gratch, "Virtual Humans" *supra* at 287.

Robots can be programmed to reflect certain rapport building characteristics such as positivity, mutual attention and non-verbal coordination.[30] However, even with these characteristics, rapport typically takes time to develop while inhibitions break down and individuals develop emotional bonds between one another.[31] A robot might have an advantage over a human in building rapport though. People may bond with artificial entities more easily because they are "inherently less threatening than other forms of social interaction due to their game like qualities and the inherent unreality of the virtual worlds they inhabit."[32] Interrogation techniques often seek to play down the reality of a situation, such as the severity of an offence under investigation. Early findings regarding human-computer rapport building therefore add to the possibility that robots may someday serve as effective interrogation tools under the psychological pillar of interrogation.

The Psychology of Interrogation in Practice: Border Avatars

Researchers based primarily at the University of Arizona are currently working to develop the first application of automated interrogation technology.[33] They are designing a device to be used at border crossings to conduct pre-screening interviews of individuals seeking to pass through the border. The device will take the form of a kiosk containing a computer screen displaying the upper body of a virtual person.[34] This avatar is designed to exhibit human-like characteristics including rationality, intelligence, autonomy, and an ability to perceive its environment.[35] The device will also contain numerous sensors that will monitor the reactions of human interlocutors throughout the course of the interview.[36]

Through the course of the interaction, the avatar asks a series of questions and displays different images portraying items of interest to border security agents, such as pipe bombs. The virtual agent collects, amalgamates and analyzes the human interlocutor's physiological and verbal responses to these questions and images. It then makes an autonomous decision as to

[30] Gratch et al, "Virtual Humans" *supra* at 287; Gratch et al, "Virtual Rapport" *supra* at 14.
[31] Gratch et al, "Virtual Humans" *supra* at 287.
[32] Gratch et al, "Virtual Humans" *supra* at 288, citations excluded.
[33] Nunamaker et al, *supra* at 18. Other researchers are based at the University of Nebraska at Omaha. The Department of Homeland Security provides funding.
[34] Nunamaker et al, *supra* at 21-22.
[35] *Ibid*.
[36] For example, a high-definition video camera, a near-infrared camera, a microphone, two computer monitors, a proximity card reader, a fingerprint reader, and a magnetic strip reader. Nunamaker et al, *supra* at 19.

whether that person requires additional screening, based on whether their answers and physiology indicate deception or trigger suspicion.

Preliminary studies using this border avatar have shown that it is able to engage in the conversation and enhance the amount of verbal dialogue through various sensors. For example, the use of facial expressions and other body language by the avatar had the effect of increasing verbal fluency.[37] The use of external sensors to monitor the human interlocutor's gestures and statements also allowed the avatar to be more responsive thus making the interview more engaging.[38] These preliminary results not surprisingly align with the current state of HCI research. Furthermore, border agents can also venture into the psychological realm of interrogation.

The computerized nature of this avatar allows for the possibility of tailoring not only its demeanour but also its appearance and non-verbal cues to suit the conversational preferences of each individual it engages.[39] In particular, the gender, ethnicity, hair color, clothing, hairstyle, facial structure, voice pitch, tempo, volume, accent, language and physical dimensions of the avatar can all be manipulated to serve the purpose of eliciting information from the interview subject.[40] Early studies have suggested that large male avatars are perceived as more dominant than small female avatars.[41] Additionally, serious male avatars were perceived as powerful, while smiling female avatars were more inviting.[42] The design of the avatar could theoretically be altered depending on the goal of the interview, the personality of the interlocutor and the most psychologically suitable approach to achieving that goal. Further research may consider whether decision as to which avatar to use reflects gender-based, racial, or cultural stereotypes, and the potential legal and moral implications of these decisions.

While these are preliminary studies, they already suggest that robots have the capacity to use gentleness, flattery, intimidation and other personality traits in order to target the

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[37] Users who talk to an agent that is responsive (e.g. by nods its head, *etc*.) tend to speak for longer and say more, while humans engaging with unresponsive agents (e.g. that simply staring at them with no body language reaction) talk less and have greater rates and frequencies of disruption. Nunamaker et al, *supra* at 22. See also, Douglas C Derrick, Jeffrey L Jenkins, Jay F Nunamaker Jr., "Design Principles for Special Purpose, Embodied, Conversational Intelligence with Environmental Sensors (SPECIES) Agents" (2011) 3 Transactions on Human-Computer Interaction 62-81.
[38] Nunamaker et al, *supra* at 21.
[39] Nunamaker et al, *supra* at 35.
[40] Nunamaker et al, *supra* at 23.
[41] *Ibid*.
[42] Nunamaker et al, *supra* at 35.

psychological tendencies of an interlocutor.[43] Additional research will be needed to see if these enhancements have a positive effect on inducing confessions or admissions from suspects. The potential success of a robot interrogator does not stop with its conversational capacity. The use of technology to monitor a suspect's deception *while* interrogating might further contribute to the rate at which a robot can obtain a confession or admission, or the functional physiological equivalent of such a statement.

ii. The Technology of Interrogation

For more than a century, people have turned to technology to assist in deception detection.[44] This section examines the role of deception-detection technology in interrogation, and how robot interrogators can capitalize on these technological enhancements. The legal and academic concerns about the existing technologies provide insight into some of the constitutional implications of robot interrogation and will be further discussed in Part II of this paper.

Polygraph: Limited Use but Helpful Insight

The polygraph has been in use since the late nineteenth century. It works by monitoring a subject's respiration, vasoconstriction, cardiovascular and electrodermal activity while that person is asked to answer a series of "yes" or "no" questions.[45] When the subject lies, her internal fight or flight instincts will typically generate measurable, predictable physiological responses.[46] A polygraph expert can interpret these reactions in an effort to determine whether the subject was being deceptive when providing specific answers.

The questions asked during the exam are designed to elicit certain physiological responses from a suspect and do not constitute an interrogation in themselves. Instead, the results of the examination will be used as part of the psychological side of the interrogation in an effort

[43] As noted by M. Ryan Calo, "Robots and Privacy" in *Robot Ethics: The Ethical and Social Implications of Robotics*, Patrick Lin, George Bekey, and Keith Abney, eds. (Cambridge: MIT Press, 2011).
[44] Francis X Shen and Owen D Jones, "Brain Scans as Evidence: Truths, Proofs, Lies and Lessons" (2011) 62 Mercer Law Review 861 at 863; See also, Daniel D Langleben, "Detection of Deception with fMRI: Are We There Yet?" (2008) 13 Legal and Criminological Psychology 1 at 1-2; Grubin and Madsen, *supra* at 357-8.
[45] Langleben, *supra* at 2.
[46] See e.g. National Research Council, The Polygraph and Lie Detection (Washington D.C.: The National Academies Press, 2003).

to induce a confession,[47] making the polygraph a useful investigatory tool. However, the theory underlying the polygraph has come under criticism since its emergence for its lack of reliability. Polygraph results have therefore been deemed scientifically unreliable and unhelpful in court, and have therefore been ruled inadmissible in criminal trials in both the United States and Canada.[48]

Brain Scans: Providing Powerful Insight into Deception and Concealment

While the polygraph measures physical reactions that reflect stress, which is associated with lying, more modern technologies have been shown to detect the act of lying itself. Brain scans, for instance, rely on a similar premise to the polygraph – that certain bodily reactions indicate deception. When someone lies or conceals information, specific areas of her brain will be activated.[49] Scanning technologies have made it possible to measure this reaction in order to assess the veracity of an individual's claims. In particular, electroencephalography ("EEG") monitors the electrical activity within the brain[50] and functional magnetic resonance imaging ("fMRI") measures blood flow within the brain.[51] These technologies arguably cannot be cheated through physiological training and are therefore thought to provide highly reliable evidence of deception or truthfulness.[52]

One of the major advantages of the fMRI scan is that it allows for what is known as a Concealed Information or Guilty Knowledge Test.[53] This test is designed to determine whether the subject recognizes secret information, such as details about a crime scene that only the culprit could know. Information or images are put to the suspect, and without her having to give a verbal answer the scanner will detect simulation and brain function. When she recognizes information, her brain will react in a distinct way that can provide circumstantial evidence of

[47] See e.g. *R v Oickle*, *supra*.
[48] See e.g. *Frye v United States,* 293 F. 1013 (D.C. Cir. 1923) and *R v Béland*, [1987] 2 S.C.R. 398 respectively. See also Aldert Vrij, *Detecting Lies and Deceit: Pitfalls and Opportunities*, 2nd ed (West Sussex, UK: John Wiley & Sons, Ltd., 2008) at 317-329.
[49] Owen D Jones, Joshua W Buckholtz, Jeffrey D Schall, Rene Marois, "Brain Imaging for Legal Thinkers: A Guide for the Perplexed" 2009 Stanford Technology Law Review 5 at paras 15-17.
[50] Jones et al, *supra* at para 15.
[51] Langleben, *supra* at 2; Shen and Jones, *supra* at 865.
[52] See e.g. Bruno Verschuere, Gershon Ben-Shakhar, Ewout Meijer, *Memory Detection: Theory and Application of the Concealed Information Test* (New York: Cambridge University Press, 2011).
[53] Verschuere, et al, *supra*.

guilt.[54] The production of this type of information has enormous potential for aiding law enforcement and national security investigations. The prospect of a portable fMRI scanner means that robot interrogators might even someday use this technology.[55]

While useful in investigations, the admissibility of brain scan evidence in court is unclear. In *Iowa v Harrington*, the Iowa District Court held that EEG results are sufficiently reliable to be used as evidence in court.[56] However, in *United States v Semrau,* the court refused to accept exculpatory fMRI results because the results were deemed too unreliable. The unreliability in that case, though, was in part due to the circumstances of the specific fMRI procedures.[57] As more parties seek to admit such evidence in criminal or civil trials, the court's willingness to accept or reject the technology should become more evident.

The role and impact of the robot interrogator can perhaps be best understood in the context of the deception detecting technologies that have come before it. Unlike the polygraph and the brain scan, the robot interrogator is not simply a tool that can enhance a questioning. It is the questioner. It can act as both polygraph examiner and interrogator simultaneously. This adds an interesting and challenging new dimension to the state of deception-detection technology. The next section provides an overview of the potential technological capacity of a robot interrogator. Subsequently, Part II considers how these technological features affect the constitutional rights ordinarily engaged during an interrogation.

The Technological Side of Robot Interrogators

The research outlined above suggests that robots will have the capacity to build rapport with, and potentially manipulate, individuals in an interview or interrogation context. In addition to this social capacity, technological developments can simultaneously allow a robot to perform a lie-detection function. Robots can be equipped with sensor technologies that can monitor the physiological responses of the human much like the polygraph and brain scan discussed above.

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[54] *Ibid*.
[55] *Ibid*.
[56] *Iowa v Harrington*, 659 NW2d 509 (Iowa, 2003). See also, Dov Fox, "The Right to Silence Protects Mental Control" in Law and Neuroscience: Current Legal Issues, M. Freeman, ed. (Oxford: Oxford University Press, 2010), in From The Selected Works of Dov Fox at 9, online: <http://works.bepress.com/dov_fox/21>.
[57] *United States v Semrau*, No. 07-10074 M1/P (W.D. Tenn. May 31, 2010). Mr. Semrau sought to disprove his intention to defraud Medicare through an fMRI exam. The first test results were inculpatory so the test was re-done. The second set of results were exculpatory.

However, unlike these other technologies, the robot interrogator can analyze the results of a scan in real time and use that information to steer the interrogation.

The abovementioned border avatar research capitalizes extensively on this capacity. The concept behind this design suggests that the human-avatar interaction will occur as follows: a traveler will approach the kiosk at which point numerous sensors will be directed at the traveler's body. A computer monitor will display the humanoid avatar, which will ask the traveler a series of questions. A second monitor will be used to display images of various items, ranging from innocuous images of cars to potentially incriminating images of pipe bombs or other contraband.[58] A high-definition video camera will record the interaction. A near-infrared camera will monitor the traveler's pupils, looking to see if they dilate and move in the direction of an incriminating image.[59] That physiological reaction will suggest that the traveler recognizes the displayed image. Where a traveler recognizes a pipe bomb for instance, this will raise an immediate suspicion. [60] A microphone attached to the avatar will monitor for fluctuations in the traveler's voice pitch, further suggesting deception.[61] Additionally sensors will scan for rigidity in the traveler's body, another indication of deceptiveness.[62] Future technological developments may further enhance these avatar kiosks. For example, sensors to measure the body temperature, pulse, blood flow to the eye region will all contribute to deception-detection.[63] If someday fMRI scanners become portable, these could also feasibly be integrated into a device like the border avatar.[64]

While it may seem that the border avatar is simply taking the place of the human border agent to conduct more efficient screening, the enhancements available to this technology trigger different implications for a traveler than would a human-human interview. Throughout the interaction, these sensors are both monitoring for deception,[65] and performing a Guilty

[58] Nunamker et al, *supra* at 19.
[59] Derrick, *supra*.
[60] Nunamaker et al, *supra*.
[61] Nunamaker et al, *supra* at 23.
[62] Nathan W. Twyman, Aaron Elkins, Judee K. Burgoon, "A Rigidity Detection System for the Guilty Knowledge Test" Proceedings of the Credibility Assessment and Information Quality in Government and Business Symposium (January 4-7, 2011) Kauai, Hawaii 48.
[63] See e.g. Pavlidis L and Levine J, "Thermal Image Analysis for Polygraph Testing" (2002) 21 IEEE Engineering in Medicine and Biology Magazine 56-64: The US Department of Defence is presently developing a device that uses high-resolution infrared camera to detect surge of blood flow to eye.
[64] Kerr, "Tessling", *supra*.
[65] Twyman, et al, *supra,* found that rigidity of the body can reveal deception.

Knowledge Test.[66] This latter test will determine whether a traveler has incriminating knowledge of something that the avatar either proposes to them in a statement or displays for them on the screen. It is a means of obtaining information from the traveler without her even offering an answer.[67] Should the traveler demonstrate guilty knowledge of something and offer a deceptive answer to justify that knowledge, then this information will essentially implicate the traveler in the (illegal) activity being investigated. The robot will analyze these results and identify the traveler for further investigation by human agents.[68] The border avatar provides a helpful starting point for considering how constitutional rights might be engaged by robot interrogation.

Part II – Potential Legal Implications

Constitutional protections might be triggered when a state agent interacts with an individual or conducts an interrogation. In particular, the right to silence and the right to be free from unreasonable searches limit the ways in which state agents can interact with individuals. This Part explores the legal implications of robot interrogation, arguing that these same rights and protections can be triggered when a suspect is interrogated by a robot instead of by a human. It proposes that the combination of scanning technology "searches" with interrogation threatens to undermine the right to silence through the performance of a search.

ii. Robot Interrogators as Enhancements on Human Interrogation

The capacity of a robot interrogator to simultaneously question a suspect while scanning and analyzing her physiological reactions may undermine two fundamental constitutional rights. Specifically, using sensors to monitor physiological reactions might constitute a search, which implicates constitutional privacy rights. Moreover, this search might also evoke the right to silence because of the content of the information that it collects. The subject matter of the search – physiological reactions triggered by deception or recognition – are arguably the same in meaning and content as an implied admission or statement.[69] Therefore, unless a suspect has waived her right to silence, the interrogator might be compelling the functional equivalent of an

[66] For instance, Derrick et al, *supra* found that eye gaze can be suggestive of guilty knowledge.
[67] Derrick, *supra*.
[68] Nunamaker et al, *supra*.
[69] Implied admissions (e.g. a pointed finger, a shrug, etc) are treated the same way by the courts as though the person verbally indicated the same information. See e.g. *R v Perciballi*, 2002 SCC 51, [2002] SCR 761.

admission. A compelled admission violates the right to silence. Therefore, the search itself might also constitute a violation of the suspect's right to silence. These constitutional challenges are explored below.

Robot Interrogator Searches

Both the Unites States and Canada have constitutional provisions that protect individuals from unreasonable state searches and seizures.[70] While each country has a slightly different test for determining what the state can search, both protect a similar concept of privacy – "the right to be let alone" by the state.[71] A state agent violates that right if she engages in a search that is not lawfully justified. A "search" for constitutional purposes occurs when a state agent invades something over which an accused has a reasonable expectation of privacy. In order to determine whether using sensors to collect physiological data constitutes a search, a court would first have to decide whether the robot could be considered a state agent for the purpose of triggering constitutional protection. A court would then have to determine whether the individual has a reasonable expectation of privacy in the impugned physiological data.[72]

Is the Robot Interrogator a State Agent?

Where the robot interrogator is put to use by the state, it should arguably be treated no differently than the human agent that it replaces, and should thus implicate the constitution in its interactions with individuals, as does a state agent.[73] However, even if this argument is not accepted by the courts, judicial treatment of existing state investigation tools suggest that robot interrogators will nevertheless trigger constitutional protections as agents or actors for the state.

A helpful analogy can perhaps be made to another autonomous being that is put to use by the state for the purpose of information collection – the sniffer dog. Law enforcement agencies regularly deploy sniffer dogs to smell or "scan" certain objects or areas like bags, cars or lockers for specific odors that might indicate the presence of drugs or explosives. The dog collects and processes the information (scents) in order to make an autonomous decision as to whether a

[70] The Fourth Amendment protects "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures […]" and section 8 of the Canadian *Charter*, *supra*, holds that " Everyone has the right to be secure against unreasonable search or seizure."
[71] See e.g. *Katz v United States*, 389 US 347 (1967); *Hunter v Southam Inc*, [1984] 2 SCR 145.
[72] See e.g. *Kyllo v United States*, 533 U.S. 27 (2001); *R v Tessling*, 2004 SCC 67; [2004] 3 S.C.R. 432.
[73] *R v Buhay*, 2003 SCC 30, [2003] 1 SCR 631.

concealed compartment contains the targeted materials. Courts in both Canada and the United States have treated a dog's sniff as a state act.[74] This act has rather uncontroversially triggered constitutional rights. Therefore, it is probable that for the purposes of a constitutional challenge, a robot interrogator would be considered to be a state agent.

Does an Interrogation Subject Have a Reasonable Expectation of Privacy?

The Subject Matter of the Search

In order to determine whether someone has a reasonable expectation of privacy ("REP") in something, the court needs to identify the subject matter that has allegedly been searched. The subject matter of a search can be anything from the contents of an accused's garbage,[75] the contents of a letter,[76] the odorous contents of a duffle bag,[77] or the heat emanating from a home.[78] Generally speaking, it is the information or physical thing that the state is interested in obtaining.

In a robot interrogation, the subject matter of the search can be characterized as the autonomic, physiological reactions "emanating" from the interview subject, which are imperceptible to the human eye. These reactions directly reflect the emotions and knowledge of the suspect.[79] The data collected by a robot interrogator reveals more than just the movement of the eye or dilation of the pupil. When combined with questioning, it could reveal information about the subject's statements, which may be more or less invasive depending how the interrogator asks a question. For example, where the robot interrogator asks someone to respond to an open-ended question, its sensors can determine whether a response is deceptive, but it cannot identify the true answer.[80] Alternatively, if the robot puts a series of possible answers to

[74] *R v AM*, 2008 SCC 19, [2008] 1 S.C.R. 569; *R v Kang Brown*, 2008 SCC 18, [2008] 1 S.C.R. 456; *United States v Place*, 462 U.S. 696 (1983).
[75] California v Greenwood, 486 U.S. 35 (1988); R v Patrick, 2009 SCC 17, [2009] 1 S.C.R. 579: the contents of one's garbage are not protected once placed on the street for pick up.
[76] United States v Van Leeuwen, 397 U.S. 249 (1970): the inside of a letter is protected, while the outside is not.
[77] *R v AM, supra*; *R v Kang Brown, supra*; *United States v Place, supra*.
[78] *R v Tessling, supra*; *United States v Kyllo, supra*.
[79] Paul Ekman, "An Argument for Basic Emotions" (1992) 6 Cognition and Emotion 169-200; Verschuere et al*, supra*.
[80] For example, if the question is: "where are you coming from" and the suspect answers "Toronto", even though they are coming from elsewhere. The interrogator can rule out "Toronto" based on the deception indicated, but cannot identify the subject's true origin.

the subject in what is known as a Guilty Knowledge or Concealed Information Test, the subject's physiological responses will identify which is the correct answer.[81]

While the presence of deception reveals information about the veracity of the statement, it does not necessarily tell the state what the suspect knows. By contrast, determining the actual answer to a question reveals a piece of the suspect's knowledge, and might implicate that person in a crime or security threat. This latter outcome is problematic because, "[t]here is nothing more interior, and nothing more important and central to individual autonomy than one's consciousness."[82] The physical reaction being monitored is actually reflective of a mental thought, and therefore, the subject matter of the search would seem to be extremely personal.[83] This observation, should it be accepted by courts, would factor significantly into the determination that someone's expectation of privacy in this information is objectively reasonable.

Reasonableness of a Subjective Expectation of Privacy in Physiological Responses

The revealing nature of a robot scan will be an important factor in determining whether an individual has a REP in that information. Through the collection of physiological data, the robot might actually be accessing highly reliable evidence of an individual's knowledge, memory or recognition. One's thoughts and knowledge are jealously guarded from being involuntarily compelled by the state through the self-incrimination protections. As such, a court should be inclined to find a reasonable expectation of privacy in this information. Analogies in the jurisprudence also suggest that one might reasonably expect privacy in these physiological reactions.

Two technologies in particular can be analogized to the robot scan, and therefore might provide helpful insight into the constitutionality of a robot scan. In particular, sniffer dogs can again provide insight on how the courts would treat robot interrogator searches. In recent years, law enforcement agencies have also used scanning technology to measure the amount of heat

[81] For example, if the interrogator asks "the murder weapon was: a) a knife b) a gun c) a brick", a distinct physiological reaction will be generated in response to the correct answer. If this is information that only the guilty person could have, then this provides circumstantial evidence that the subject is the murderer (concealed memory book). Alternately the subject can be shown an image of the thing in question and her physiological reactions will reveal whether she recognizes it. See e.g. *Derrick, supra*.

[82] Richard G Boire, "On Cognitive Liberty" (2000) 1 Journal of Cognitive Liberties 13 at 15.

[83] Kerr, "Tessling" *supra* at 377.

emanating from a home.[84] The use of technology to measure emanations exiting from an enclosed space might similarly provide insight for the application of the constitutional protections in the context of robot interrogation.[85]

Both the American and Canadian Supreme Courts have ruled on whether the use of sniffer dogs or heat-scanning technologies constitutes a search. In Canada, the sniff of a sniffer dog constitutes a search. Significant to the Supreme Court of Canada's ("SCC") determination of this issue is the fact that the drug odors are imperceptible to humans.[86] Because an officer can only detect the odors through the use of the dog, the owner of the bag can expect the odors emanating from it to remain private. This is relevant to robot interrogation, as the physiological emanations from a person can likewise only be detected through additional technology.

In contrast, the Supreme Court of the United States ("SCOTUS") has ruled differently than Canadian courts on the issue of sniffer dogs. In the United States, an individual does not have a reasonable expectation of privacy ("REP") in the odors emanating from a bag into a public place.[87] Because the search is so specific in terms of what it reveals – namely, the presence or absence of contraband – it is deemed to essentially be non-invasive.[88] Importantly though, the court appeared to limit this observation to sniffer dogs (which it considers a *sui generis* investigation tool) due to the very limited amount of information that they can actually reveal.[89] Robot interrogators, by contrast, can reveal a wide range of information by asking a range of questions on any number of topics. The SCOTUS determination that there is no REP in a dog's sniff may therefore not apply to robot interrogators.

Heat scanning cases provide additional insight for how courts might treat robot interrogations. In the United States, while it is lawful to observe the home with the naked eye,[90] this lawfulness does not extent to a technologically enhanced form of observation.[91] As stated by Scalia J in *Kyllo v United States*,

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[84] See e.g. *Kyllo v United States, supra*; *R v Tessling, supra*.
[85] See Kerr, "Tessling", *supra*.
[86] The police officer had to use the dog to "obtain information about the possible presence of a controlled substance inside the appellant's bag […]." *R v Kang Brown, supra* at para 174.
[87] *United States v Place, supra*.
[88] *Ibid*, at para 12.
[89] *Ibid*, at para 13.
[90] "The Fourth Amendment protection of the home has never been extended to require law enforcement officers to shield their eyes when passing by a home on public thoroughfares." *Kyllo v United States, supra* at 4 citing *California v. Ciraolo*, 476 U. S. 207, 213 (1986).
[91] *Kyllo v United States, supra* at 5.

> We think that obtaining by sense-enhancing technology any information regarding the interior of the home that could not otherwise have been obtained without physical "intrusion into a constitutionally protected area," Silverman, 365 U. S., at 512, constitutes a search […][92]

Notably though, Scalia J qualified this by stating that this observation applies "at least" where the technology in question is not in general public use.[93]

By contrast, the use of technology to measure heat emanations from a home is not considered a search in Canada because it does not reveal *meaningful* information about the activities taking place inside of the home.[94] Where the technology is limited to revealing an overall image of heat without being able to identify the source of any of that heat, it is not thought to be looking into the home, but merely looking at the outside of the home.[95] A search of one's emotional responses, however, reveals information that may be reliably indicative of knowledge or recognition.[96] Knowledge and recognition are very much part of the internal workings of the mind. Such a scan would therefore seem to reveal something more equivalent to the activities taking place inside the home.[97]

While the American and Canadian courts have come to different conclusions with respect to these two technologies, their reasoning suggests that an individual can hold a reasonable expectation of privacy in the subject matter of a robot search. The courts have made other pronouncements that would support the objective reasonableness of such an expectation. For example, the SCC has said that, "the use of a person's body without his consent to obtain information about him, invades an area of personal privacy essential to the maintenance of his

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[92] *Kyllo v United States, supra* at 6.
[93] *Kyllo v United States, supra* at 6-7. The law on this point is slightly different in Canada. Canadian courts take a normative approach to the reasonable expectation of privacy vis a vis surveillance technologies. Specifically the court will consider what types of privacy should a free and democratic society protect, regardless of how common that search technology might be. See *R v Tessling, supra* at para 42. The public use exception in *Kyllo* could have a chilling effect with regard to robot interrogators because should there be mass deployment of the devices the reasonableness on an expectation of privacy from these devices might be lost. See e.g. Richard G Boire, "Searching the Brain: The Fourth Amendment Implications of Brain-Based Deception Detection Devices" (2005) 5 The American Journal of Bioethics 62
[94] Heat emanations offer "no insight into his private life, and reveals nothing of his "biographical core of personal information."" *R v Tessling, supra* at para 63 citing *R v Plant*, [1993] 3 S.C.R. 281 at p. 293.
[95] *R v Tessling, supra*.
[96] See e.g. *Thompson, supra* at 344.
[97] See Kerr "Tessling", *supra* at 379-380 making the same analogy with regard to the fMRI: "Whereas thermal imaging can only detect the presence of heat (coinciding with heat-generating activities going on in the house), neuroimaging has the potential to gather information about the brain (coinciding with the thoughts and memories of an individual)."

human dignity."[98] The highly personal nature of the information that the robot scan can reveal therefore weighs in favour of a strong, objectively reasonable expectation of privacy.

ii. Robots, Psychology and Self-Incrimination

The right to silence is constitutionally guaranteed in both the United States and Canada.[99] It operates to ensure that an individual can never be "compelled to testify … or otherwise provide the State with evidence of a testimonial or communicative nature."[100] It places a burden on the state to prove all aspects of a crime without the forced assistance of a suspect. Part of the purpose of this protection is to ensure that no person is forced to share her thoughts or beliefs with the government.[101] In particular, it guarantees, "a 'private inner sanctum of individual feeling and thought and [proscribes] state intrusion to extract self-condemnation."[102] Though state agents are not always obliged to warn a suspect of her right to silence,[103] she can never be forced against her will to give self-incriminating evidence.

Suspects can however voluntarily waive their right to silence and provide statements to investigators whenever they so choose.[104] Additionally, police can generally ask a suspect as many questions as they like, it is her choice to decline to answer or to comply with questioning.[105] Interrogators are even permitted to use psychological techniques to encourage a suspect to talk, so long as they do not violate narrow legal limits aimed at preventing coerced

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[98] *R v Dyment*, [1988] 2 S.C.R. 417 at para 27.
[99] The Fifth Amendment of the US Constitution, *supra*, holds that "No person shall be held to answer for a capital, or otherwise infamous crime […]" and section 11(c) of the Canadian *Charter*, *supra*, holds that "Any person charged with an offence has the right ...(c) not to be compelled to be a witness in proceedings against that person in respect of the offence." Sections 7 and 13 of the Canadian *Charter* also protect an individual against self-incrimination.
[100] *Doe v United States*, 487 US 201 (1988); see also *Miranda v Arizona,* 384 U.S. 436 (1966) at 457-458 reinforced that state cannot compel self-incrimination: "[…] one of our Nation's most cherished principles – that the individual may not be compelled to incriminate himself."
[101] *Doe v United States*, 487 US 201(1988).
[102] *Couch v United States*, 409 US 322, 327 (1973), cited in *United States v Nobel*, 422 US 225, 233. See Sean Kevin Thompson, "A Brave New World of Interrogation Jurisprudence?" (2007) 33 American Journal of Law & Medicine 341-357 at 346.
[103] See e.g. *Miranda v Arizona*, *supra* and *R v Manninen*, [1987] 1 S.C.R. 1233 in Canada.
[104] See e.g. *Raffel v United States* 271 U.S. 494 (1926); *R v Wills* (1992), 12 CR (4th) 58 (Ont CA).
[105] See e.g. *R v Singh*, 2007 SCC 4; [2007] 3 S.C.R. 405, in which the accused asserted his desire to remain silent eighteen times, but the Supreme Court of Canada held that continued questioning did not violate his constitutional rights. See also, *Miranda v Arizona*, *supra*.

confessions.[106] Nevertheless, the constitutions of both the United States and Canada have long ensured that any suspect who refuses to speak is entitled to do so and cannot be forced to do otherwise.

Is Robot Interrogation A Search that Violates the Right to Silence?

The concept of a robot interrogator raises new considerations for the courts' traditional privacy framework. In the past, courts have treated search and seizure challenges separately from challenges to the admissibility of confessions and statements.[107] However, robot interrogation merges these two concerns. Without the questioning from the robot interrogator, there would be no physiological data for it to collect and analyze. Without the physiological data, the robot would not be able to identify an individual's incriminating knowledge. Arguably, physiological evidence demonstrating that the suspect recognizes the murder weapon is functionally equivalent to the suspect declaring, "I recognize the weapon." However, this declaration can be collected whether or not the suspect chooses to verbalize it. Therefore, this section argues that the physiological search generates self-incriminatory evidence.

The right to silence prevents suspects from being forced to make inculpatory statements. In other words, it protects them from self-incrimination. The courts in both the United States and Canada have held that this protection applies specifically to statements and testimony, and not to physical evidence.[108] Statements can include non-verbal conduct such as a head-nod or the pointing of a finger, if that conduct implies an admission.[109] On the contrary, when the police collect DNA, perform a Breathalyzer test, or take other physical evidence without the suspect's consent, these acts do not implicate the right to silence or compel self-incrimination, though they may infringe the suspect's privacy interests.[110] Thus in order to argue that a robot search implicates the right to silence, it is necessary to show that the information collected falls into the former and not the latter category of evidence.

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[106] Specifically, interrogators cannot rely on oppression, duress, trickery, or promises to induce the confession. See e.g. *R v Oickle*, *supra*; *Bram v United States*, *supra*; *Brown v Mississippi*, *supra*. See also Kassin, *supra* at 6.

[107] See e.g. *R v Pickton*, 2006 BCSC 383 and *R v Pickton*, 2006 BCSC 995 in which a cell block interrogation that was surreptitiously filmed was treated as two separate constitutional challenges for the same incident. See also *R v Stillman*, 1997 SCC 32, [1997] 1 S.C.R. 607.

[108] *R v Stillman, supra*; *Schmerber v California*, 384 US 757, 764 (1966). In both cases the extraction of blood and other physical evidence did not invoke the suspect's protection against self-incrimination.

[109] *Pennsylvania v Muniz*, 496 US 582, 587 (1990).

[110] See e.g. *R v Stasiuk* (1982), 16 MVR 202 (Ont Prov Ct); *United States v Wade,* 388 U.S. 218 (1967): standing in a line-up and sound of voice do not constitute testimonial evidence.

Neuroscientific research demonstrates that our conscience is directly connected to perceivable physiological reactions, such as those measured by the robot interrogator.[111] When we think in certain ways or feel certain emotions, those thoughts trigger uncontrollable and often imperceptible physical responses. Because people cannot separate these thoughts from their physical body, neuroscientists argue that a scan of these physiological reactions can actually reveal our mental activities.[112] No other form of physical evidence, such as pictures, handwriting samples, or DNA, compromises an individual's ability to control the disclosure of her thoughts.[113]

For evidence to be considered testimonial, as opposed to physical, it must "explicitly or implicitly, relate a factual assertion or disclose information."[114] The ultimate question here will therefore be whether or not monitoring physiological reactions during questioning relates a factual assertion. In the context of the fMRI, Professor Dov Fox argues that a technology that reveals knowledge is by its very nature communicative. The results of a brain scan for instance are functionally equivalent the making of a statement.[115] This kind of statement would certainly be protected if expressed verbally. If not for the scanning technology, the suspect would have the ability and right to choose whether or not to verbalize her thoughts. Brain scans and other similarly revealing physiological scans however expose the suspect's thoughts with or without her active decision to reveal them.[116] In this way, the physiological search conducted by a robot interrogator arguably threatens the right to silence.

The courts have previously commented on the self-incriminatory nature of deception-detection technology when it is used without the consent of the suspect. In *Schmerber v California*, the majority of the SCOTUS noted that although the polygraph measures physical processes in ways similar to a blood test, the polygraph is actually eliciting responses that are essentially testimonial.[117] A blood test on the other hand is purely physical. The court concluded that compelling someone to submit to a test that could "determine his guilt or innocence on the

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[111] See Eckman, *supra*; Fox, *supra* at 21: "neuroscientists agree that the complex phenomena of thought and behaviour can be explained in terms of the neural activity of the brain."
[112] Fox, *supra* at 22.
[113] Fox, *supra* at 23.
[114] *Doe v United States,* 487 US 201, 210 (1988).
[115] See Fox, *supra* at 20.
[116] Thompson, *supra* at 346; see also Kerr, "Tessling", *supra* at 381: "Neuroimaging techniques have the potential to remove the individual from their role as the gatekeeper of their own personal information, bypassing the person by simply seizing the information from snapshots of their brain activity."
[117] *Schmerber v California*, 384 US 757, 764 (1966) at para 764.

basis of physiological responses," whether or not it is done with consent, undermines the spirit and history of the right to silence.[118] Unfortunately, while informative, it is unclear how persuasive *Schemerber* continues to be in the United States today given the passage of time and its subsequent lack of treatment by the courts.[119]

Nevertheless, in the specific case of the border avatars, a requirement that every traveler engage with a robot interrogator threatens to undermine the constitutional rights of the individuals who pass through the border. Presently, border agents can ask questions of travelers, and if someone chooses not to answer she might not be allowed to continue to her destination. She may even become the subject of suspicion and further investigation. Yet her decision to decline to answer a question and suffer the consequences is her own, and is fundamentally distinct from her being forced to provide an answer. The use of robot interrogators to question all passengers at a border threatens to substantially change the obligations of travelers who seek to cross a border. Perhaps it would sound surprising to suggest every traveler undergo a polygraph examination. The border avatar raises a similar suggestion. In light of the potential constitutional challenges associated with this interrogation technology, Part III makes preliminary recommendations for how these issues might be addressed.

Part III – Recommendations and Conclusion

This paper demonstrates that robot interrogation challenges legal fundamental legal rights. While these interrogation devices might have numerous advantages over human interrogators – for example, innocent suspects could be more readily exonerated, national security threats may be more readily identified, and the transport of illegal cargo or people across borders could potentially be curbed – the negative consequences that might also arise through the deployment and use of these devices demand vigilance. Further discussion is needed in order to determine whether robot interrogation should be permitted, and if so, how and under what limitations. This final section of the paper scratches the surface of how we might start to consider these questions.

[118] *Schmerber v California*, supra at para 765. See also Thompson, *supra* at 348.
[119] See Thompson, *supra* at 348-9.

i. Courts: Limiting Admissibility and Use

The right to silence is a fundamental, constitutionally protected right in both the United States and Canada. By prohibiting forced confessions, it serves many important purposes, including the protection of individual autonomy, liberty, and privacy.[120] Therefore, the courts must reject any technology that forces someone to confess her knowledge of, or involvement in, something.

However, the right to silence is not absolute. A suspect can waive her constitutional protections should she wish to do so.[121] An individual could therefore *choose* to be interrogated by a robot. In fact, this technology, if accurate, could provide powerful exonerating evidence. It could additionally be useful in post-conviction settings, like a parole hearing to show that an offender does not intend to commit an unlawful act again, or at a sentencing hearing to show that an offender is remorseful.[122] Thus, while the courts should not accept evidence procured through a mandatory or forced robot interrogation, there might be room for this evidence in court when the suspect volunteers for the interrogation.[123] However, the courts have rejected this argument with respect to the polygraph due to its unreliability. The state of the law with regard to exculpatory brain scans, by contrast, leaves open the possibility that *reliable* physiological evidence could potentially become admissible in court for exoneration purposes in the future.[124] Courts must nevertheless impose strict limits on when and whether robot interrogation evidence will ever be admissible in court, with a constant view to the implications for the right to silence involved in the use of this technology.

ii. Considering Whether Robot Interrogation Should be Permitted

As demonstrated throughout this paper, robot interrogators are not simply automated replacements for human interrogators. The deception-detection enhancements, made possible by the technological nature of robot interrogators, generate concerns that go well beyond those associated with highly skilled human interrogation. Before such technology can be deployed, further consideration must be given to the question of whether or not it *should* be deployed. This section makes two preliminary recommendations for such an assessment.

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[120] Melzer, *supra*.
[121] See e.g. *Raffel v United States* 271 U.S. 494 (1926); *R v Wills* (1992), 12 CR (4th) 58 (Ont CA).
[122] Shen and Jones, *supra* at 867.
[123] This proposal is supported by numerous authors, see e.g. Boire, "Searching the Brain," *supra* at 63; Thompson, *supra* at 344 and 357; Kerr, "Tessling", *supra* at 380.
[124] See e.g. *Iowa v Harrington, supra*.

First, any future discussion about whether to use such technology must avoid referring to it as an automated equivalent to human interrogation. That approach obfuscates many of the practical implications of robot interrogation. However, it is precisely the nature of the discussion that has occurred to date. Designers perceive border avatars, for instance, as simply more efficient and effective versions of border agents.[125] While on some level this is true, it overlooks the nuanced way in which the avatars are substantially different from border agents. To have a worthwhile discussion on the use of this technology, it must be perceived correctly – as more than merely a polygraph and more than an interrogator. This paper has sought to provide a starting point for such a discussion.

Second, any consideration of the role, if any, for robot interrogation must also address the broader implications of the technology. This paper outlines some of the constitutional challenges that may be faced through the use of robot interrogation. Sociological, anthropological and political economy perspectives on these devices would likely expand the range of issues that should be addressed. Additional concerns may also include the extent to which national security should be prioritized over some of the longest standing and most fundamental constitutional rights; how can we ensure that bias is not programmed into the machine; what will be done to protect the information generated by the interrogator; and what will happen to our moral autonomy if we can no longer deceive?

Moral autonomy and the choice whether to tell the truth or deceive would be virtually non-existent in a situation where one's answer to a question is already available through a physiological scan. Professor Ian Kerr has raised this issue with respect to fMRI scans, arguing that, "[m]orality entails the ability to choose. When one is *compelled* to tell the truth […] that person is precluded from the possibility of full moral agency."[126] The Oregon Supreme Court in a concurring opinion in *State v Lyon* has likewise noted this concern. The Court was uncomfortable with admitting polygraph evidence, even if it were reliable, because it would, among other things, reduce the accused to an "electrochemical system to be certified as truthful or mendacious by a machine."[127] How can someone be a moral actor when technology reduces or removes the potential for deceit? These issues might be best discussed and addressed by

[125] See e.g. Nunamaker et al, *supra* at 18-19.
[126] Kerr, "Tessling" *supra* at 380.
[127] *State v Lyon*, 744 P.2d at 240 (Linde J concurring), discussed in Fox, *supra* at 19.

representative assemblies. This discussion must occur before state agencies implement this technology.

This paper has explored some of the potential constitutional issues associated with robot interrogation. While robots are not currently interrogating people, this possibility seems to be approaching with the development of the border avatar kiosk. While these devices offer a number of extremely valuable benefits, they also risk undermining rights in a fundamental way. It is imperative that courts, state agencies, legislators and designers consider and address the potential implications of this technology before it is widely deployed for use.