PREDICTION, PREVENTION AND PROOF: ARTIFICIAL INTELLIGENCE AND PEACE BONDS IN CANADA

Michael Purcell* & Mathew Zaia**

The current trajectory of predictive artificial intelligence and algorithms suggests that their introduction into Canadian criminal courts is inevitable. This paper considers how predictive technologies can feature in Canadian criminal law. It suggests that peace bonds, as tools of preventative justice, are likely to attract the use of predictive technologies. Drawing on Canadian jurisprudence and increasingly used police technologies, the paper discusses the challenges and opportunities of adopting such technologies and addresses how the use of these machines would likely play out in the practice of criminal law. It cautions that a coherent legal framework is essential to optimize artificial intelligence's potential in and out of the courtroom while maintaining Charter-protected liberty interests. The paper concludes by proposing that ongoing dialogue about predictive technology's proper use and scope in criminal law should commence at the earliest opportunity. Particularly, it intends to contribute to the emerging discourse surrounding artificial intelligence and criminal law in Canada.

La trajectoire actuelle du développement de l'intelligence artificielle et des algorithmes prédictifs suggère que leur introduction dans les tribunaux canadiens est inévitable. Les auteurs examinent la manière dont les technologies prédictives peuvent constituer des éléments du droit pénal canadien. Ils suggèrent que les engagements de ne pas troubler l'ordre public, en tant qu'outils de la justice préventive, risquent de susciter le recours aux technologies prédictives. Se fondant sur la jurisprudence canadienne et les technologies policières utilisées de plus en plus couramment, les auteurs examinent les difficultés et les avantages de l'adoption de ces technologies et traitent de la manière dont l'utilisation de ces machines pourrait se dérouler dans le contexte de l'exercice du droit pénal. Ils préviennent qu'il est essentiel de posséder un cadre juridique cohérent pour optimiser le potentiel de l'intelligence artificielle à la fois à l'intérieur et à l'extérieur des prétoires tout en protégeant les libertés prévues par la Charte. Les auteurs concluent en proposant que s'ouvre dès que possible un dialogue permanent au sujet de l'utilisation et de la portée appropriées de la technologie prédictive dans

* B.A. (Hons.), J.D., Assistant Crown Attorney, Ontario Ministry of the Attorney General, Part-Time Professor, University of Ottawa Faculty of Law. The comments expressed herein are solely those of the authors in their personal capacity and should not be attributed to the Ontario Ministry of the Attorney General or the Ottawa Law Review.

** B.A. (Hons.), M.A., J.D. Candidate, Editor-in-Chief of the Ottawa Law Review.

le contexte du droit pénal. Plus particulièrement, ils ont pour objet de contribuer à la nouvelle conversation au sujet de l'intelligence artificielle et du droit pénal au Canada.

Contents

> The long enduring history of preventive judicial powers means that they are part of the fabric of our law even in cases where no offence has been proven. Their policy rationale is clear: where the reasonably certain commission of an offence can be prevented, it may be in the interest of the likely offender, his potential victim and of society to prevent the offence. This is particularly true when the preventive measures employed are less restrictive than the punishment that might flow from a conviction. Therefore, I take the view that there is nothing inherently contrary to fundamental justice in lesser restrictions on liberty that are based on the potential for future offences, provided they are carefully drafted.
>
> However, the Court cannot grant a license to legislate just any preventive measure imaginable. The breadth and severity of the preventive restrictions must be in keeping with the triggering event that legitimizes the restriction and with the standard of proof required in proving the risk posed by the potential offender. In other words, a conviction for a serious offence with proof of dangerousness beyond a reasonable doubt can justify even indeterminate detention; proof on a balance

> of probabilities that an offence will be committed may only permit restrictions on liberty short of detention.[1]

1. Introduction

Writing in 1996, Justice Edward Then was tasked with ruling on the constitutionality of section 810.1 of the *Criminal Code of Canada*.[2] Enacted three years prior, the provision allowed for the imposition of preventative conditions on any person likely to commit a sexual offence against a child under the age of 14 years. The provision was found to be constitutional as it struck "a reasonable balance between the liberty interests of the defendant and the state's interest in protecting young children from harm."[3] The Ontario Court of Appeal endorsed Justice Then's analysis and acknowledged the "impossibility of making exact predictions" about a person's future dangerousness. The substitute for exactitude, both courts held, is a "reasonably based sense of apprehension" about a future event that is proven by evidence; in other words, it is one that "equates to a belief, objectively established, that the individual will commit an offence."[4] The courts referred to such a "reasonably based sense" as originating from a reasonable person's perspective. But what if that "sense" comes from a machine?

Artificial intelligence ("AI") transforms vast amounts of data into "actionable predictions and identifications,"[5] including places where harm will occur, the type of predicted harm, and by whom the harm may be caused.[6] AI is now able to "identify likely targets for police intervention and prevent crime … by making statistical predictions."[7] Police services across the Western world—including the United States (US),[8] United

---

1 *R v Budreo*, 27 OR (3d) 347, 1996 CarswellOnt 24 (WL Can) at paras 56–57 (Ct J (Gen Div)) [*Budreo (TD)*], aff'd *R v Budreo*, 46 OR (3d) 481, 2000 CanLII 5628 (CA) [*Budreo (OCA)* cited to CanLII], leave to appeal to SCC refused, 28230 (02 May 2001).

2 RSC 1985, c C-46 [*Criminal Code*].

3 *Budreo (OCA)*, *supra* note 1 at para 48.

4 *Ibid* at paras 43, 51–52.

5 Elizabeth E Joh, "Increasing Automation in Policing" (2020) 63:1 Communications ACM 20 at 20 [Joh].

6 See Ari Ezra Waldman, "Power, Process, and Automated Decision-Making" 88:2 Fordham L Rev 1 [Waldman].

7 Walter L Perry et al, *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations* (Washington: RAND Corporation, 2013) at xiii.

8 E.g. Jessica Saunders, Priscillia Hunt & John S Hollywood, "Predictions put into practice: A quasi-experimental evaluation of Chicago's predictive policing pilot" (2016) 12 J Experimental Criminology 347.

Kingdom (UK),[9] and Canada[10]—currently employ AI for these very purposes.

The current trajectory of predictive AI[11] (hereafter, "predictive technology") suggests that its introduction into Canadian criminal courts is inevitable. When that day arrives, courts will be tasked with performing their own analyses in respect of AI evidence and its many applications throughout the justice system.[12] This paper predicts that peace bond proceedings will likely feature as a principal forum for those analyses, given the increasing reliance on predictive technology as machine-generated proof of future risk,[13] coupled with the peace bond's function as the quintessential preventative justice tool. The paper considers the possible implications of adopting predictive technology in the peace bond context. It cautions that a coherent legal framework is essential to optimize AI's potential in and out of the courtroom while maintaining *Charter*-protected liberty interests. Although AI is far from infallible, its ability to enhance accuracy and objectivity in the fact-finding process is profound, so long as its promise and potential pitfalls are fully appreciated. These pitfalls, including issues of bias, transparency, and accountability, are discussed in this paper. As such, this paper intends to contribute to the emerging discourse surrounding AI and criminal law in Canada.[14]

The current study is separated into four subsequent sections. Section 2 introduces AI and algorithms and canvasses their use in policing and legal decision-making, with a focus on the criminal justice system. This section outlines how various justice systems have adopted predictive technologies. Section 3 details preventative justice and introduces peace bonds as the judicial tools that seek to further that objective. Section 4 demonstrates how peace bonds will likely attract the use of predictive

---

9 See GO Mohler et al, "Randomized Controlled Field Trials of Predictive Policing" (2015) 110:512 J American Statistical Association 1399.

10 See Nathan Munn, "Canadian Cops Will Scan Social Media to Predict Who Could Go Missing" (17 April 2019), online: *Vice* <www.vice.com>.

11 See Kate Robertson, Cynthia Khoo & Yolanda Song, "To Surveil and Predict: A Human Rights Analysis of Algorithmic Policing in Canada" (1 September 2020), online: *Citizen Lab* <citizenlab.ca> [Robertson, Khoo & Song].

12 See Ashley Deeks, "The Judicial Demand for Explainable Artificial Intelligence" (2019) 119 Columbia L Rev 1829 [Deeks].

13 Andrea Roth, "Machine Testimony" (2017) 126 Yale LJ 1972 [Roth].

14 See Teresa Scassa, "Law Enforcement in the Age of Big Data and Surveillance Intermediaries: Transparency Challenges" (2017) 14:2 SCRIPTed: A J L, Technology & Society 239; Kristen Thomasen, "Robots, Regulation, and the Changing Nature of Public Space" (2020) 51:2 Ottawa L Rev 275. For an examination of artificial intelligence in the civil context, see Gideon Christian, "Predictive Coding: Adopting and Adapting Artificial Intelligence in Civil Litigation" (2019) 97:3 Can Bar Rev 486.

technologies to assist in preventing criminality. This section also describes possible implications arising as a result of the peace bond-AI combination. Finally, after examining the benefits and drawbacks of the peace bond-AI relationship, the paper suggests that lawmakers ought to address the complexities that predictive technologies may present and develop a coherent legal framework to govern its use in criminal courts. Ultimately, this paper concludes that AI is an inevitable presence in our criminal justice system and an ongoing dialogue about its proper use and scope should commence at the earliest opportunity.

2. Artificial Intelligence: Forecasts and Predictions

AI relies on algorithms and machine learning to analyze and interpret big data.[15] In scholarly literature, big data is known for its three V's: volume, velocity, and variety.[16] It ranges from anything as familiar as social media data, to complex biometric data,[17] to more convoluted smart city data.[18] Indeed, big data is often derived "from a range of sources, including but not limited to smartphones, digital cameras, Global Positioning System (GPS) tracking devices, internet searches, consumer databases, social media, open data sources and smart software."[19] Despite the extent to which big data features in our lives, "[i]ts potential is unlocked only when leveraged to drive decision making."[20]

At its core, big data is driven by a simple idea: collect enough information about the past, apply the right analytic tools, and "you can find unexpected connections and correlations, which can help you make unusually accurate predictions about the future."[21] These predictions range from the banal (who will buy what product?)[22] to the life-saving

---

15 Waldman, *supra* note 6.

16 See Amir Gandomi & Murtaza Haider, "Beyond the Hype: Big data concepts, methods, and analytics" (2015) 35 Intl J Information Management 137 [Gandomi & Haider].

17 See Shoshana Magnet, *When Biometrics Fail: Gender, Race, and the Technology of Identity* (Durham, NC: Duke University Press, 2011).

18 See Debopriya Ghosh et al, "Big Data-based Smart City Platform: Real-Time Crime Analysis" (2016) Proceedings of the 17th International Digital Government Research Conference on Digital Government Research 58.

19 Kelly Hannah-Moffat & Kelly Struthers Montford, "Unpacking Sentencing Algorithms: Risk, Racial Accountability and Data Harms" in Jan W de Keikser, Julian V Roberts & Jesper Ryberg, eds, *Predictive Sentencing: Normative and Empirical Perspectives* (Hart Publishing, 2019) 175 at 182–83.

20 Gandomi & Haider, *supra* note 16 at 140.

21 Jonas Lerman, "Big Data and its Exclusions" (2013) 66 Stan L Rev Online 55 at 57.

22 *Ibid*.

(who will commit a terrorist attack?).[23] To produce accurate predictions, big data requires a constant supply of information, "including information about people, places, and things collected by sensors, cell phones, click patterns, and the like."[24]

The combination of big data and algorithms is now being used for administrative decision-making.[25] Automated decision-making is used in a number of contexts internationally, which include health care[26] and environmental predictions.[27] Domestically, automated decision-making is featured in contexts such as tribunal adjudication[28] and immigration.[29] Given the growth of algorithms, the Government of Canada recently implemented the Directive on Automated Decision-Making.[30] The Directive applies to government entities and ensures that "Automated Decision Systems are deployed in a manner that reduces risks to Canadians and federal institutions, and leads to a more efficient, accurate, consistent, and interpretable decisions made pursuant to Canadian law."[31] As evinced by the Government of Canada, predictive AI applications are sometimes referred to as Automated Decision Systems ("ADS").[32] These systems assist human decision-making processes through the application of statistical or computational techniques.[33] As ADS relate to the legal sphere, Jesse Beatson divides them into two types: (1) legal expert systems, and (2) predictive analytics.[34] First, legal expert systems enable swift and efficient legal decision-making processes. The systems are provided a set

---

23 See Kathleen McKendrick, "Artificial Intelligence Prediction and Counterterrorism" (2019) Royal Institute of International Affairs 1 at 5, 12.

24 Neil M Richards & Jonathan H King, "Three Paradoxes of Big Data" (2013) 66 Stan L Rev Online 41 at 42.

25 See Carole Piovesan & Vivian Ntiri, "Adjudication by Algorithm: The Risks and Benefits of Artificial Intelligence in Judicial Decision-Making" (2018) 36:4 Adv J 42 [Piovesan].

26 See AI Now, "Litigating Algorithms: Challenging Government Use of Algorithmic Decision Systems" (2018) AI Now Institute Report.

27 See Tod Newcombe, "Is Government Ready for AI?" (August 2018), online: *Government Technology* <www.govtech.com>.

28 See Jesse Beatson, "AI-Supported Adjudicators: Should Artificial Intelligence Have a Role in Tribunal Adjudication?" (2018) 31 Can J Admin L & Prac 307 [Beatson].

29 See Petra Molnar & Lex Gill, "Bots at the Gate: A Human Rights Analysis of Automated Decision-Making in Canada's Immigration and Refugee System" (2018) University of Toronto International Human Rights Program.

30 See Government of Canada, "Directive on Automated Decision-Making" (5 February 2019), online: <www.tbs-sct.gc.ca>.

31 *Ibid.*

32 See also William S Isaac, "Hope, Hype, and Fear: The Promise and Potential Pitfalls of the Big Data Era in Criminal Justice" (2018) 15:2 Ohio State J Crim L 543 [Isaac].

33 *Ibid.*

34 Beatson, *supra* note 28.

of rules that are designed to conduct legal analyses on a case-by-case basis. Beatson provides an example of a legal expert system in Australia, where the technology "provide[s] guidance on the applicability and content of relevant legislation, policy, and case law."[35]

Second, predictive analytics are undertaken by using big data and machine learning. Machine learning is already being tested and used in several police departments across the Western world[36] and is at our fingertips through daily technologies such as smartphones and tablets. In brief, technologies equipped with machine learning can sift through newly acquired data and self-teach, ultimately keeping them accurate and up-to-date. Beatson summarizes their unique capacity succinctly: "An important trait of [machine learning] algorithms is that rather than process a stable set of instructions repeatedly, they typically exhibit 'self-learning', rewriting themselves as they run."[37] Without machine learning, "it could take weeks or years of sifting through a database to discover a pattern"[38] for predictive purposes.

A) Current Applications in Criminal Justice—Policing

Predictive technologies are currently employed throughout justice systems in a number of countries in both policing and criminal court contexts.[39] In the policing context, AI transforms available data into actionable person- and place-based predictions.[40] Among others uses, these predictions can be used to plan police patrols (place-based)[41] and identify those who are likely to become victims or perpetrators of crime (person-based).[42]

---

35 *Ibid* at 310.

36 See Annette Vestby & Jones Vestby, "Machine Learning and the Police: Asking the Right Questions" (2019) Policing: A J Policy & Practice, online: <doi.org>.

37 Beatson, *supra* note 28 at 311.

38 Cynthia Rudin, "Predictive Policing: Using Machine Learning to Detect Patterns of Crime" (ND), online: *Wired* <www.wired.com>.

39 See Daniel Konikoff & Akwasi Owusu-Bemphah, "Big Data and Criminal Justice – What Canadians Should Know" (ND) at 4, online: *Broadbent Institute* <www.broadbentinstitute.ca> [Konikoff & Owusu-Bemphah].

40 See Joh, *supra* note 5.

41 Electronic Privacy Information Center, "Algorithms in the Criminal Justice System: Pre-Trial Risk Assessment Tools" (ND), online: <www.epic.org> [Electronic Privacy Information Center].

42 Mason Marks, "Artificial Intelligence-Based Suicide Prediction" (2019) 18:3 Yale J Health Policy, L, & Ethics 98 at 101; Cade Metz & Adam Satariano, "An Algorithm That Grants Freedom, or Takes it Away" (6 February 2020), online: *New York Times* <www.nytimes.com>; Konikoff & Owusu-Bemphah, *supra* note 39; Dan Hurley, "Can an Algorithm Tell When Kids Are in Danger?" (18 January 2018), online: *The New York Times* <www.nytimes.com>.

The great promise of predictive policing is that data can inform targeted strategies to reduce crime and violence in a more efficient manner.[43] As Andrew Guthrie Fergusons explains,

> [p]redictive policing has become a generic term for any crime fighting approach that includes a reliance on information technology (usually crime mapping data and analysis), criminology theory, predictive algorithms, and the use of data to improve crime suppression on the streets.[44]

Predictive policing features most prominently in the US. In 2011, the Los Angeles Police Department ("LAPD") coined a program known as LASER, or the Los Angeles Strategic Extraction and Restoration.[45] The program was used to designate recidivists by providing LAPD officers with photos and descriptions of individuals who the program deemed "chronic offenders."[46] Moreover, one of the most popular models of predictive policing is known as "PredPol," which is used by approximately 60 police forces in the US[47] as well as corporate private security companies. The program—one that seemingly fits with the theory of hot spot policing[48]—is used to predict criminal activity within certain geographic areas. It incorporates daily-updated maps and "generates place-specific crime forecasts … as small as 500 by 500 square feet."[49]

Risk-terrain modeling ("RTM") is an example of predictive policing. Ferguson describes how RTM may be used to prevent a drug transaction:

> The data drove an assessment of what happened, which allowed analysts to predict where it would happen next, which in turn led to interventions to stop it happening again. RTM was able to predict the risk, and then offer suggestions

---

43 Andrew Guthrie Ferguson, *The Rise of Big Policing: Surveillance, Race, and the Future of Law Enforcement* (New York: New York University Press, 2017) at 46.

44 Andrew Guthrie Ferguson, "Predictive Policing and Reasonable Suspicion" (2012) 62 Emory LJ 259 at 265.

45 See Grace Baek & Taylor Mooney, "LAPD not giving up on data-driven policing, even after scrapping controversial program" (23 February 2020), online: *CBSN Originals* <www.cbsnews.com>.

46 Eva Ruth Moravec, "Do Algorithms Have a Place in Policing? How a Pakistani-born retired pilot took on a controversial, data-driven policing program in Los Angeles–and won" (5 September 2019), online: *The Atlantic* <www.theatlantic.com>.

47 See Mark Puente, "LAPD Pioneered Predicting Crime With Data: Many Police Don't Think it Works" (3 July 2019), online: *Los Angeles Times* <www.latimes.com>.

48 Andrew Guthrie Ferguson, "Predictive Policing Theory" in Tamara Rice Lave & Eric J Miller, eds, *The Cambridge Handbook of Policing in the United States* (Cambridge, UK: Cambridge University Press, 2019) 491 [Ferguson, *Predictive Policing Theory*].

49 Caroline Haskins, "Dozens of Cities Have Secretly Experimented With Predictive Policing Software" (6 February 2019), online: *Vice* <www.vice.com>.

> to the city government to fix the environmental vulnerabilities so as not to have the crime happen again at that location … The big idea behind RTM is to rethink police organizations 'as risk management agencies that address vulnerabilities and exposures in the communities that they serve through strategies that go beyond specific deterrence of offenders.'[50]

RTM is also employed for violent crimes to identify and prevent recurring shooting patterns. RTM exemplifies the purpose of predictive policing: "intervene before any infraction or crime has been committed."[51] Even among models beyond RTM that are able to provide real-time updates for intervention,[52] predictive policing tools are based on risk assessments by their very nature.

In Canada, police services currently employ similar predictive technologies for several purposes[53] including crime detection and prevention.[54] Since late 2015, the Vancouver Police Department has used GEODASH, a preventative predictive technology that forecasts the location of property crime.[55] In Saskatchewan, police services are in the process of crafting technology "that will analyze social media posts, police records, and social services information to predict who might go missing."[56] In early 2020, the Edmonton Police Service ("EPS") similarly launched the "Community Solutions Accelerator" with several corporate partners.[57] According to the EPS, the Accelerator uses AI and machine learning to predict crime, improve public safety, and identify the "root causes of a person's actions, and focus on the interconnected challenges of crime, addiction, homelessness and mental health."[58] These predictive

---

50 Ferguson, *Predictive Policing Theory*, *supra* note 48 at 495–96.

51 Aaron Shapiro, "Predictive Policing for Reform? Indeterminacy and Intervention in Big Data Policing" (2019) 17:3/4 Surveillance & Society 456 at 458.

52 See Ferguson, *Predictive Policing Theory*, *supra* note 48.

53 Public Safety Canada, "The Hub - Centre of Responsibility (COR)" (14 March 2018), online: *Government of Canada* <www.publicsafety.gc.ca>; Nathan Munn, "Canada's 'Pre-Crime' Model of Policing Is Sparking Privacy Concerns" (19 January 2017), online: *Vice* <www.vice.com>.

54 Konikoff & Owusu-Bemphah, *supra* note 39.

55 Vancouver Police Department, "Vancouver Police Adopt New Technology to Predict Property Crime" (21 July 2017), online: *Media Releases VPD* <www.mediareleases.vpd.ca>.

56 Ontario Association of Police Services Board, "Predictive Policing" (14 November 2019), online: <www.oapsb.ca>.

57 Edmonton Police Service, "Partnering with technology to fight crime and improve public safety" (11 February 2020), online: <www.newsroom.motorolasolutions.com>.

58 *Ibid*; Caley Ramsat & Vinesh Pratap, "Edmonton police use data, artificial intelligence to combat crime" (12 February 2020), online: *Global News* <www.globalnews.ca>.

technologies are accompanied by other AI, including biometric software, for investigative purposes.[59]

B) Current Applications in Criminal Justice—Courts

Predictive technology features prominently in US criminal courts. As risk assessment tools, predictive technologies are employed to calculate the probability of recidivism for bail, sentencing and parole decisions.[60] As explained by Sarah Brayne and Angèle Christin:

> Risk-assessment instruments are explicitly designed to 'structure' decision-making and curtail judicial discretion by providing a clear set of guidelines, scores, and recommendations to legal professionals throughout the adjudication and incarceration process. Pre-trial risk assessment instruments evaluate the probability that a defendant is a threat to public safety or will fail to appear in court. During adjudication, they can be used for sentencing decisions. Post-adjudication, they are used to predict recidivism for probation and parole decisions. Risk scores also serve as correctional instruments to determine the security classification of incarcerated individuals.[61]

There are no reported decisions where Canadian criminal courts have used AI for these very purposes. But criminal courts and correctional authorities have long employed actuarial tools that use statistical techniques to predict a person's risk.[62] As detailed below, these actuarial tools have faced similar questions to that of AI about their reliance on data, which further perpetuates existing biases.[63]

---

59 See Robertson, Khoo & Song, *supra* note 11. See also Miles Kenyon, "Algorithmic Policing in Canada Explained" (1 September 2020), online: *Citizen Lab* <citizenlab.ca>.

60 See Danielle Kehl, Priscilla Guo & Samuel Kessler, "Algorithms in the Criminal Justice System: Assessing the Use of Risk Assessments in Sentencing" (2017) Responsive Communities Initiative, Berkman Klein Center for Internet & Society, Harvard Law School; Thomas H Cohen, Christopher T Lowenkamp & William E Hicks, "Re-validating the Federal Pretrial Risk Assessment Instrument (PTRA): A Research Summary" (2018) 82:2 Federal Probation 23; Julia Angwin et al, "Machine Bias" (23 May 2016), online: *ProPublica* <www.propublica.org>.

61 Sarah Brayne & Angèle Christin, "Technologies of Crime Prediction: The Reception of Algorithms in Policing and Criminal Courts" (2020) Social Problems 1 at 4 [Brayne & Christin].

62 See Glen Luther & Dr. Mansfield Mela, "The Top Ten Issues in Law and Psychiatry" (2006) 69 Sask L Rev 401; Martin Grann, Henrik Belfrage & Anders Tengström, "Actuarial Assessment of Risk for Violence: Predictive Validity of the VRAG and the Historical Part of the HCR-20" (2000) 27:1 Crim Justice & Behaviour 97 at 98.

63 See *Ewert v Canada*, 2018 SCC 30 at paras 12, 49; *R v Gardner*, 2016 ONCJ 45 at para 79; Deeks, *supra* note 12 at 1833.

C) Commentary Surrounding Predictive Technology

Predictive technology is the subject of extensive scrutiny and controversy. Broadly speaking, proponents of predictive technology highlight its potential for transparent, pragmatic, data-driven policymaking[64] and its ability to promote "accuracy and objectivity in fact finding."[65] They argue that AI can reduce or eliminate bias, create efficiencies, support public safety, and reduce incarceration rates[66] because predictive algorithms are more accurate, objective, and consistent than human decision makers.[67] Proponents suggest that we ought to use the "millions of observations about how criminal defendants actually behave" rather than dispose of such valuable information from which we could learn.[68] This argument has been adopted in recent studies where algorithms have been found to predict recidivism better than humans.[69] Indeed, using predictive technology would "increase knowledge about the criminal justice system itself."[70]

Conversely, opponents raise questions about potential prejudice, unfairness, accountability, transparency, and the ethics of adopting machine-generated proof.[71] Many of these questions stem from the proprietary nature of predictive technology and bias embedded in the data itself. Because the inner workings of predictive technology are often hidden from public view for corporate competition purposes,[72] there are questions about whether two people accused of the same crime could potentially receive "sharply different bail or sentencing outcomes based on inputs that are beyond their control—but have no way of assessing or challenging the results."[73] Such a "black box" dynamic may cause insurmountable barriers for accused or convicted persons who wish to challenge potential biases in the algorithmic data or the algorithms

---

64 Isaac, *supra* note 32.

65 Roth, *supra* note 13 at 1976.

66 Piovesan, *supra* note 25.

67 See Anthony J Casey & Anthony Niblett, "Artificial Intelligence, Big Data and the Future of Law: Self-Driving Laws" (2016) 66:4 UTLJ 429.

68 *Ibid* at 432.

69 See Zhiyuan "Jerry" Lin et al, "The limits of human predictions of recidivism" (2020) 6:7 Science Advances 14.

70 Aleš Završnik, "Algorithmic Justice: Algorithms and Big Data in Criminal Justice Settings" (2019) European J Criminology 1 at 15.

71 See Elizabeth E Joh, "Artificial Intelligence and Policing: First Questions" (2018) 41 Seattle U L Rev 1139. See also Kashmir Hill, "Wrongfully Accused by an Algorithm" (24 June 2020), online: *New York Times* <https://www.nytimes.com>.

72 See Andrew G Ferguson, "Policing Predictive Policing" (2017) 94:5 Wash U L Rev 1109.

73 Electronic Privacy Information Center, *supra* note 41.

themselves in their risk calculations. We will further explain how this may play out in the courtroom later in this paper.

Criminal courts are alive to these concerns. In *State v Loomis*,[74] the Wisconsin Supreme Court addressed the issue of algorithmic opacity. Mr. Loomis was convicted and sentenced to the maximum duration of imprisonment for his offences. The caveat was that an algorithmic risk assessment tool, namely COMPAS,[75] assisted the sentencing judge with the decision. After Mr. Loomis challenged the lower court's use of the algorithm, the Wisconsin Supreme Court held that the sentencing court's use of an algorithmic risk assessment tool did not violate the offender's due process rights, despite the non-disclosure of its methodology to the court or the offender.[76] In making this finding, the Court directed sentencing courts to use caution moving forward, as the algorithmic risk tool in question was only able to "identify groups of high-risk offenders—not a particular high-risk individual."[77]

Beyond these transparency concerns, predictive technology also attracts criticism about how it replicates, exacerbates, and perpetuates existing biases.[78] Critics question the objectivity of the data upon which predictive technology relies; such criticism is not limited to predictive technologies in the justice system.[79] Fundamentally, "machine output reflects human choices about input."[80] Research indicates "that the unrepresentative nature" of such data affects predictive policing:

> First, the presence of bias in the initial training data leads to predictions that are subject to the same biases that already exist within the records … Second, the newly observed criminal acts that police document as a result of these targeted patrols then feed into the predictive policing algorithm on subsequent days, generating increasingly biased predictions.[81]

Civil liberty advocates similarly argue that predictive technologies facilitate police contact on those "who have yet to commit a crime under the guise of historical crime patterns that are not representative of all criminal

---

74 *State v Loomis*, 371 Wis. 2d 235 at paras 53, 65, 74 (SC TD) [*Loomis*].

75 Ed Yong, "A Popular Algorithm is no Better at Predicting Crimes Than Random People" (17 January 2018), online: *The Atlantic* <www.theatlantic.com>.

76 *Loomis*, *supra* note 74.

77 *Ibid* at para 74.

78 Deeks, *supra* note 12.

79 See Asher Zafar & Sarah Villeneuve, "Adopting AI in the Public Sector: Turning Risks into Opportunities Through Thoughtful Design" (25 April 2018), online: *Brookfield Institute* <www.brookfieldinstitute.ca>.

80 Roth, *supra* note 13 at 2043.

81 Isaac, *supra* note 32 at 6–8.

behaviour."[82] And as Carmen Cheung observes, "the potential for false positives is not trivial. This potential is concerning when algorithmic tools are used to inform decisions which may implicate liberty interests."[83]

Recently, the Citizen Lab and the International Human Rights Program at the University of Toronto's Faculty of Law published a report investigating algorithmic policing practices in Canada. The report concludes that their use "has the potential to violate fundamental human rights and freedoms."[84] The report then makes a series of recommendations for authorities and legislators to develop a legal framework that would limit "the use of algorithmic policing technologies."[85] These recommendations include but are not limited to further law enforcement transparency, enactment of directives, publishing public reports, and law enforcement taking caution when dealing with algorithms and data-driven policing.

D) Future Considerations for AI in Criminal Courts

Despite the lack of consensus about predictive technology's utility and efficacy, it appears predictive technology is here to stay. In the context of administrative tribunals, some authors suggest "the future of administrative adjudication and regulation in Canada will likely feature AI, particularly in a supportive role vis- à-vis human decision-makers."[86] In the criminal law context, others predict "we are on the precipice of a criminal justice data revolution,"[87] which will change how we calculate risk and make findings of fact.[88] To manage this impending revolution, Stephen E Henderson encourages the development of guidelines for the criminal justice system to "reap [its] benefits and avoid the pitfalls of this newly data-centric world."[89] Henderson proposes ten "high-level rules" to guide criminal justice big data implementation, including that "the ultimate decision should *always* be a human one."[90]

Elsewhere, Ashley Deeks focuses on the role of judges in promoting algorithmic transparency. Deeks identifies judges as a "key set of actors who will interact with machine learning algorithms with increasing

---

82 *Ibid* at 5.

83 Carmen Cheung, "Making Sense of the Black Box: Algorithms and Accountability" (2017) 64 CLQ 540.

84 Robertson, Khoo & Song, *supra* note 11.

85 *Ibid*.

86 Beatson, *supra* note 28 at 308.

87 Stephen E Henderson, "A Few Criminal Justice Big Data Rules" (2018) 15 Ohio State J Crim L 527 at 527 [Henderson].

88 Roth, *supra* note 13.

89 Henderson, *supra* note 87 at 527.

90 *Ibid* at 533 [emphasis in original].

frequency and whose lifeblood is real-world controversies."[91] According to Deeks, judges "should demand explanations for algorithmic decisions, recommendations, or predictions" and by doing so, "will play a seminal role in shaping the nature and form of explainable AI" to ensure that algorithms are trustworthy and fair.[92] In addition, Deeks suggests that judges can, "[i]n the administrative law setting … sit as neutral reviewers of an agency's use of machine learning algorithms."[93]

Finally, other scholars like Andrea Roth consider the practical implications of introducing information generated by predictive technology as evidence—or as "witness against" an accused person—in a criminal proceeding.[94] Roth argues that using such information to prove guilt in the US justice system "seems to implicate many of the same dignitary and accuracy concerns underlying the framers' preoccupation with in-the-shadows accusations and ex parte affidavits."[95] In Canada, these concerns implicate fundamental trial rights under sections 7 and 11(d) of the *Charter of Rights and Freedoms*,[96] such as the right to confront a witness.[97] Roth connects the inscrutability of machine processes to the "dignity of the accused and the perceived legitimacy of the legal process," and ultimately proposes a legal framework to conceptualize and regulate machine evidence.[98]

The extent to which predictive technology should be incorporated into the criminal justice system—both inside and outside the courtroom—is a subject of ongoing scholarly debate. Despite the many criticisms of AI, the predominant focus of this debate tends not to be on *whether* it can augment human decision-makers, but *how* it can best achieve that objective. Implicit in this debate is an acknowledgment that AI is here to stay and that we ought to identify how and where it best belongs. This position accepts that "the 'human alone' legal decision-making model may not be the best of all possible models."[99] The Canadian criminal justice system would be well served by a proactive discussion about the promise and potential pitfalls of AI before its arrival. Peace bond proceedings are a

---

91 Deeks, *supra* note 12 at 1830.

92 *Ibid* at 1830.

93 *Ibid* at 1842.

94 Roth, *supra* note 13.

95 *Ibid* at 2042.

96 *Canadian Charter of Rights and Freedoms*, ss 7, 11(d), Part I of the *Constitution Act, 1982*, being Schedule B to the *Canada Act 1982* (UK), 1982, c 11, s 91(24) [*Charter*].

97 See *R v Levogiannis*, 1 OR (3d) 351, 1990 CanLII 6873 (CA), aff'd [1993] 4 SCR 475, 16 OR (3d) 384.

98 Roth, *supra* note 13 at 2042.

99 Beatson, *supra* note 28 at 324–25.

logical starting point for such an analysis given their focus on preventative justice.

3. Preventative Justice in Canada

Criminal courts regularly perform the same calculations as predictive technology, but with human decision-makers at their helm. Courts are required to calculate risk and impose various conditions to influence an accused person or offender's future behaviour at the bail, peace bond, and sentencing stages. Their overarching purpose when doing so is to prevent the commission of crime, which is a primary objective of criminal law in Canada.[100]

This objective is manifested both inside and outside the courtroom. The warrantless arrest provisions of the *Criminal Code* provide an example of police powers that are targeted towards this purpose. Section 495(1)(a), the most expansive provision, provides that an officer can arrest any person who, on reasonable grounds, s/he believes *is about to commit* an indictable offence. Whereas a "breach of the peace" under other arrest provisions[101] must involve "some level of violence and a risk of harm,"[102] section 495(1)(a) "encompasses—and extends beyond—the activities which have historically been classified as breaches of the peace."[103] Section 83.3(4)(b) of the *Code* also authorizes a peace officer to arrest a person without a warrant if the officer suspects, on reasonable grounds, that the detention of the person in custody is *likely to prevent* a terrorist activity. Each of these powers contemplates the prevention of future crime.

Crime prevention is also an objective of common law. In *Brown v Durham Regional Police Force*, the Ontario Court of Appeal, in *obiter*, applied the ancillary powers doctrine[104] to recognize a power to arrest or detain a person "who is about to commit a breach of the peace."[105] The Court restricted the application of this power to acts which result in "actual or threatened harm to someone,"[106] situations where the apprehended breach is imminent and the risk is substantial,[107] or where intervention

---

100 *R v Penunsi*, 2019 SCC 39 [*Penunsi*].

101 *Criminal Code*, *supra* note 2, s 31(1).

102 *Fleming v Ontario (AG)*, 2019 SCC 45 at para 59.

103 *Ibid* at para 61.

104 See *R v Waterfield*, [1963] 3 All ER 659 at 660–62, [1963] 3 WLR 946 (Eng CA); *R v Clayton*, 2007 SCC 32.

105 *Brown v Durham Regional Police Force*, 43 OR (3d) 223, 1998 CarswellOnt 5020 (WL Can) at para 70 (CA), citing *Hayes v Thompson* (1985), 60 BCLR 252, 17 DLR (4th) 751 (CA).

106 *Ibid* at para 73.

107 *Ibid* at paras 73–74, 78.

is required to avoid the harm likely to flow in the immediate future.[108] The Supreme Court later commented on and developed this power in a number of seminal decisions surrounding ancillary police powers.[109]

A) Peace Bonds as Tools of Preventative Justice

Preventative justice is also achieved through "the exercise of judicial power not in order to sanction past conduct but to prevent future misbehavior and harm."[110] Peace bonds are special tools that criminal courts use to fulfil their preventative justice function. In general, peace bonds are "order[s] from a judge to keep the peace, be of good behaviour and abide by certain conditions."[111] They are issued for pre-emptive purposes[112] where a defendant "appears likely to commit a criminal offence, but there are no reasonable grounds to believe that an offence has been committed."[113] The Supreme Court traces modern peace bonds back as early as the 1300s to the common law practice of binding over: "[T]he judicial authority to make preventive orders to maintain social order despite no specific crime having been charged, aimed at preventing a wide range of undesirable activity."[114]

Peace bonds differ from other forms of preventative justice. They are not "offences" under the *Criminal Code*; do not require the commission of an offence as a pre-condition; and require a lower standard of proof than a finding of guilt.[115] In addition, they depend on evidence from an "informant" who has reasonable grounds to fear that an individual may or will cause any number of harms to persons including, *inter alia*, damaging property or committing a terrorism offence. Those who are subject to peace bonds are not convicted of a criminal offence. Instead, individuals enter into peace bonds "to stipulate with and to give full assurance to the public, that such offence as is apprehended shall not happen."[116]

---

108 *Ibid* at paras 71, 72, 74, citing *R v Howell* (1981), 73 Cr App R 31 (Eng CA) and *Albert v Lavin* (1981), [1982] AC 546 (UK HL).

109 See e.g. *Dedman v R*, [1985] 2 SCR 2, 20 DLR (4th) 321; *R v Godoy*, [1999] 1 SCR 311, 41 OR (3d) 95; *R v Mann*, 2004 SCC 52.

110 *Penunsi*, *supra* note 100 at para 14, citing *Budreo (TD)*, *supra* note 1 at para 45.

111 *Penunsi*, *supra* note 100 at para 1.

112 See Peter M Neumann, "Peace Bonds: Preventive Justice - Or Preventing Justice" (1994) 3 Dal J Leg Stud 171.

113 Department of Justice, "Peace Bonds Fact Sheet" (1 August 2017), online: *Government of Canada* <www.justice.gc.ca>.

114 *Penunsi*, *supra* note 100 at para 15.

115 *Ibid*.

116 *R v Siemens*, 2012 ABPC 116 at para 17, citing *Mackenzie v Martin*, [1954] SCR 361, [1954] 3 DLR 417.

Peace bonds find their authority in both statute and common law. Statutory peace bonds obtained through an information sworn under section 810 of the *Criminal Code* are available in specific circumstances. Several of the statutory peace bond provisions require the consent of the Attorney General (or delegate) to lay an information. At common law, peace bonds have a different scope than those provided by statute: a reasonably apprehended breach of the peace.[117] They do not require a sworn information be laid. Additionally, there is no maximum period for a common law peace bond, whereas statutory peace bonds are limited to 12 months.

Beyond safeguarding the general public, peace bonds are intended to protect especially vulnerable groups, such as children at risk of sexual offences (section 810.1), forced marriage, or removal from the country (section 810.02). The Supreme Court recognizes the general peace bond (section 810) as "an important tool used to protect women leaving abusive relationships."[118] The *Criminal Code* also houses specialized peace bonds to protect society from specific types of offences. Section 810.011 stipulates that anyone "who fears on reasonable grounds that another person *may* commit a terrorism offence may … lay an information before a provincial court judge."[119] Such a peace bond is "used to constrain liberty of those who authorities fear may commit a terrorism offence."[120]

Terrorism peace bonds are especially noteworthy for their diminished threshold. The *Anti-terrorism Act, 2015* amended the *Criminal Code* to provide that terrorism peace bonds be issued where there is fear that someone *may* commit a terrorism offence. In ordinary recognizances, the requisite fear must pertain to an individual who *will* commit an offence. This modification means that terrorism peace bonds can be based on a mere *possibility* (rather than a *probability*) of a terrorism offence being committed.[121] In addition, an officer must believe, on reasonable grounds, that a recognizance is only *likely* to prevent (rather than being *necessary* to prevent) the commission of a terrorism offence.[122] The amendment

---

117 *R v Musoni*, 2009 CanLII 12118, [2009] OJ No 1161(QL) (Sup Ct) [*Musoni* cited to QL].

118 *Penunsi*, *supra* note 100 at para 37.

119 *Criminal Code*, *supra* note 2, s 810.011(1) [emphasis added].

120 Craig Forcese & Kent Roach, "Yesterday's Law: Terrorist Group Listing in Canada" (2018) 30:2 Terrorism & Political Violence 259 at 265.

121 Richard Jochelson, James Gacek & Lauren Menzie, *Criminal Law and Precrime: Legal Studies in Canadian Punishment and Surveillance in Anticipation of Criminal Guilt* (New York: Routledge, 2018) [Jochelson et al].

122 Department of Justice, "About the *Anti-terrorism Act, 2015*" (20 June 2017), online: *Government of Canada* <www.justice.gc.ca>.

enabling such terrorism peace bonds ensured "further investigative powers for police officers."[123]

Once a peace bond process has been initiated, the resulting procedure is essentially indistinguishable under statute or at common law. The party applying for a peace bond bears the onus on a balance of probabilities and, to meet that onus, must offer evidential proof determined as fact.[124] The defendant can either seek to show cause why s/he should not enter the bond, decide to enter the bond as proposed, or not show cause but contest one or more of the suggested terms.[125] If an application succeeds, the court may impose a number of relevant conditions, such as staying within a certain geographic area, not having contact or communication with identified people, abstaining from the consumption of drugs or alcohol, or avoiding the use of social media.

Despite the fact that peace bonds are not "offences" under the *Criminal Code* and do not require the commission of an offence as a pre-condition, serious consequences may flow from non-compliance, including a criminal conviction and custody up to four years.[126] Breaches of common law peace bonds are prosecuted under section 127 of the *Criminal Code* and carry similar penalty provisions as section 811 of the *Code*, but with a lower maximum penalty of incarceration. While the possibility of incarceration for non-compliance is a significant risk, Justice Then, in *Budreo (TD)*, found that it is "not such an unreasonable burden or expectation … that … exposure to it should be supportable only by proof beyond a reasonable doubt."[127]

4. Predictive Technology and Preventive Justice

Predictive technology helps answer the central question asked by a peace bond: does someone pose a risk of harm? Where that potential exists, the justice system uses peace bonds as measures of proactivity to address the risk that predictive technology identifies, rather than waiting for the possible commission of an offence. This section expounds the potential complexities of the peace bond-AI relationship.

---

123 Jochelson et al, *supra* note 121 at 97.

124 *R v Shaben*, [1972] 3 OR 613, 1972 CanLII 358 (HC).

125 *Musoni*, *supra* note 117 at para 1.

126 See *R v Labbe*, [2006] OJ No 4347 (QL), 2006 CarswellOnt 6717 (WL Can) (CA); *R v Gabriel*, 2013 MBCA 45; *R v Zimmerman*, 2011 ABCA 276; *R v Ballantyne*, 2009 SKCA 27; *R v Green*, 2013 ONCJ 423; *R v Ituluk*, 2018 NUCJ 21; *R v Bambrick*, 2011 NLCA 79; *R v Kematch*, 2016 ABPC 58.

127 *Budreo (TD)*, *supra* note 1 at para 23.

Predictive technology factoring into peace bonds does not stretch the imagination. Consider the potential use of peace bonds in a data-driven crime prevention model like the Crime Strategies Unit ("CSU") in Manhattan, New York. This "Moneyball"-inspired strategy of violent crime-fighting is *not* a predictive technology system *per se*,[128] but still operationalizes a proactive data-driven approach in which prosecutors "harness, analyze, and share intelligence in order to craft proactive strategies that address specific crime trends and target priority offenders."[129] To do so, the CSU divides Manhattan into five geographic areas, assigns a senior prosecutor to each area to target high-risk individuals—the "primary crime drivers … [of] high-violence" neighbourhoods with five or more convictions and a violent history—and isolates them for closer attention.[130] The central software system behind the CSU, the Arrest Alert System, functions as follows:

> When someone in the Arrest Alert System is picked up, even on a minor charge or a parole violation, or is arrested in another borough, any interested prosecutor is automatically pinged with a detailed email. People outside the D.A.'s office like parole officers or police intelligence officers are often notified, too. The database can be programmed to send arrest alerts for a particular defendant, a particular gang, a particular neighborhood or housing project, and can be sorted to highlight patterns of crime from bike theft to homicide.[131]

Relying on the Arrest Alert System, the CSU's ultimate objective is to remove these "bad apple" targets from problematic areas in Manhattan by coordinating and enhancing prosecutorial measures, even if there are no outstanding warrants for their arrest nor sufficient evidence to charge them with a violent offence.[132] To achieve this objective, the CSU employs "all the power of the prosecutors' office … to incapacitate the individual," including bail applications, additional charges, and more serious sentencing recommendations.[133]

The CSU model as applied to "primary drivers" of violent crime is potentially adaptable and scalable to any number of risks that predictive technology can identify. Although the predictive power of AI may vary

---

128 Chip Brown, "Cyrus Vance Jr.'s 'Moneyball' Approach to Crime" (3 December 2014), online: *New York Times Magazine* <www.nytimes.com> [Brown].

129 District Attorney's Office of New York, Manhattan, "Crime Strategies" (ND), online: <www.manhattanda.org>.

130 Andrew Guthrie Ferguson, *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement* (New York: New York University Press, 2017) at 42 [Ferguson, *The Rise of Big Data*].

131 Brown, *supra* note 128.

132 Ferguson, *The Rise of Big Data*, *supra* note 130.

133 *Ibid* at 43.

across different types of risk, the growth of training data (of sufficient quality and quantity) is likely to promote more meaningful correlation and accurate predictions across categories of potential harm.

This paper proposes that predictive technology will likely factor into peace bond proceedings in two principal ways: first, by generating actionable person- and place-based tips or leads for targeted intervention and enforcement; and second, at the hearing stage, by measuring a person's future risk and assisting decision-makers with determining whether the threshold for a peace bond has been met. Both scenarios imply that the source or trigger of a peace bond order could be a machine.[134] Such a human-machine dynamic will fundamentally alter and disrupt existing paradigms of legal procedure and analysis that courts regularly work through to determine whether interference with individual liberty and autonomy is justified.[135] The dynamic will present several challenges, including those that are procedural and evidentiary in nature. These procedural and evidentiary challenges are discussed below.

A) Reasonableness of "Fear"

Criminal courts must be satisfied that informants have reasonable grounds for their fear to grant a peace bond application. As the Ontario Court of Appeal explained in *Budreo (OCA)*, the requisite "reasonableness" of the grounds lend objectivity to the informant's apprehension and, read together, the phrase "connotes a reasonably based sense of apprehension about a future event, or, as Justice Then put it, it "equates to a belief, objectively established, that the individual will commit an offence."[136]

In evaluating the reasonableness of an informant's fear, courts now rely on "analog" forms of similar data that predictive technology analyzes.[137] Consider the following examples of data tendered as evidence in past peace bond proceedings. In *Budreo (TD)*, Justice Then described the kind of evidence that could satisfy the requirement under a section 810.1 peace bond (sexual offence, in this case against minors):

> [E]vidence may be led that the defendant has made a threat or sexual proposition to a specific child or a group of children … [or] concerning the individual's general proclivity to abuse children sexually. This could be based on a relevant criminal record and past behaviour around children. Evidence of a diagnosed medical mental disorder that predisposes the defendant to be sexually attracted

134 *Budreo (OCA)*, *supra* note 1 at paras 43, 51–52.
135 Ferguson, *The Rise of Big Data*, *supra* note 130.
136 *Budreo (OCA)*, *supra* note 1 at para 51.
137 See e.g. *R v Fuson*, 2004 BCPC 351 at para 2 [*Fuson*].

> to children might weigh in favour of ordering a recognizance, just as evidence of continuing successful treatment will be in the defendant's favour.[138]

Other peace bond applications, such as those under section 810.2 (serious personal injury offences), rely on similar data. In *R v Schafer*,[139] the Crown submitted a detailed affidavit from a police officer that included a risk assessment outlining reasons to fear that the defendant would commit a serious personal injury offence. The Crown's assessment was based on materials provided by Corrections Canada, which included the defendant's criminal record and several risk and psychological assessments conducted by Corrections Canada personnel. The evidentiary record in *Schafer* mirrors those illustrated in cases like *Penunsi*, where the defendant was similarly scheduled to be released from prison. Peace bond applications on this basis appear to be quite common.[140]

The shift from human- to machine-driven risk identification and proof will pose many procedural and evidentiary challenges. The extent of those challenges will depend on the degree to which peace bond informants rely on predictive technology to identify, ground, or measure risk. This reliance could manifest in several ways.

First, informants who derive their fear exclusively from a predictive technology become mere conduits for statistics, potentially undermining the subjectivity of their own beliefs. In other words, the informant's role becomes redundant and perhaps dispensable; if a technological apparatus offers a prediction suggesting heightened risk, what more would informants provide? Are informants then required to opine on the accuracy or sufficiency of the given prediction? Second, informants may *partially* rely on predictions with grounds inclusive of a combination of human decision-making and technology. Such a scenario may, for instance, involve a prediction serving as a "lead" to target a certain individual, which would likely then require further investigation to either substantiate the basis for the prediction (the data) or the corroborate the prediction itself (the risk). This scenario would result in significant overlap and duplication of effort between human and machine.[141] And, third, how would informants articulate or explain the basis for their fear,

---

138 *Budreo (TD)*, supra note 1 at para 31.

139 *R v Schafer*, 2018 YKTC 18 [*Schafer*].

140 See also *Fuson*, *supra* note 137; *R v Cachine*, 2001 BCCA 295; *R v Bird*, 2010 SKPC 25; *R v Zimmerman*, 2011 ABCA 276; *R v Obed*, 2000 CarswellNS 95 (WL Can), [2000] NSJ No 18 (QL) (Prov Ct); *R v S(RN)*, 2014 SKPC 40; *R v Kematch*, 2016 ABPC 58; *R v Ituluk*, 2018 NUCJ 21.

141 Research suggests that any such "disagreement between human experts and expert robots generally speak[s] in favor of delegating decision-making to the robots": Jason Millar & Ian Kerr, "Delegation, relinquishment, and responsibility: The prospect

especially in a court of law that is governed by the rules of evidence? This question is considered in greater detail below.

B) Evidence of an Informant's Fear

The statutory peace bond provisions do not specify the type of evidence that is required to persuade the court of a reasonable apprehension of harm.[142] Because peace bond hearings are not trials, the rules of evidence tend not to be applied as rigorously.[143] At minimum, criminal courts must be satisfied by evidence that an informant's fear is sufficiently reliable and trustworthy to make findings about future dangerousness.[144]

Evidence of future risk is generally driven by several factors, including public danger.[145] Predictive technology is said to provide more objective evidence about that danger. But the practical utility—and admissibility—of AI evidence in criminal courts is an open question because AI evidence does not lend itself to conventional rules of evidence. As Roth observes, the shift from human- to machine-generated proof has resulted in "doctrinal and conceptual confusion" about machine evidence.[146] Depending on the appropriate category of evidence under which predictions fall, certain implications necessarily follow. Some of these implications are discussed below.

First, AI predictions may be categorized as hearsay if offered for the truth of their content. This could arise where predictive technology serves as proof of the reasonableness of an informant's fear or to substantiate future risk. In this context, a prediction may serve as an out-of-court "statement" made by a machine, or the "declarant." Classifying AI predictions in this manner would result in their presumptive inadmissibility, unless they fall under a traditional exception or the principled exception to hearsay, the latter of which would require a prediction to be both necessary and reliable.[147]

To state the obvious, machines cannot be cross-examined. Indeed, the Supreme Court of Canada has held that a safeguard to ensure the

---

of expert robots" in Ryan Calo, A Michael Froomkin & Ian Kerr, eds, *Robot Law* (UK: Edward Elgar Publishing, 2016) 102 at 126.

142 *Budreo (TD)*, *supra* note 1 at para 25.

143 *Ibid* at paras 34–48, citing *R v Zeolkowski*, [1989] 1 SCR 1378, 61 DLR (4th) 725.

144 *Budreo (OCA)*, *supra* note 1 at paras 20, 53. See also *Schafer*, *supra* note 139 at para 23.

145 *Budreo (TD)*, *supra* note 1 at para 28, citing *R v Lyons*, [1987] 2 SCR 309 at 333, 44 DLR (4th) 193.

146 Roth, *supra* note 13 at 1977.

147 See *R v Bradshaw*, 2017 SCC 35 [*Bradshaw*].

reliability of a hearsay statement is the ability to contemporaneously cross-examine the deponent.[148] This lends credence to characterizing AI predictions as hearsay evidence[149] and begs the question: if admitted for the truth of their content, how can machine "statements" be tested? Roth suggests an approach driven by algorithmic transparency, which involves a pre-hearing challenge to the "witness" machine that tests "different parameters or inputs (much like posting hypotheticals to human experts)" or publicizing the inner workings of the algorithm.[150] This approach creates other practical and proprietary concerns that are discussed in the "Disclosure Considerations" section below.

In the alternative, AI predictions may not be classified as hearsay if they are employed for more limited purposes, like providing tips or leads to police for further investigation. Consider the Supreme Court's treatment of statements adduced for the purpose of establishing grounds in the context of an anonymous tip about an impaired driver. If the police rely on such a tip to pull a suspect vehicle over, and that tip is then introduced into evidence for the sole purpose of establishing the police officer's grounds for stopping that vehicle, the Court is clear about its non-hearsay function: "it does not matter whether the unidentified caller's statement was accurate, exaggerated, or even false."[151] By analogy, if AI identifies a specific person who poses a particular risk of harm, and through further police investigation substantiates that risk to the threshold required for a peace bond, the fact that the informant's belief has its genesis in a machine may be of little consequence, at least to the extent that the informant can articulate the grounds for his or her belief separate and apart from the information s/he obtained from a machine. There are obvious differences between an anonymous tip from a human (who hears or observes something) and a "tip" from a machine (which interprets the things that humans have seen or heard), but both suffer from their own potential shortcomings.

Second, a predictive machine that makes findings about future risk could be treated as an expert providing opinion evidence. As defined in *McWilliams' Canadian Criminal Evidence*, "[a]n opinion is an inference, deduction, impression or conclusion from an observed fact or facts.

148 *Ibid*.

149 *Ibid* at para 1.

150 Roth, *supra* note 13 at 1981.

151 *R v Khelawon*, 2006 SCC 57 at para 36 [*Khelawon*]. See also *R v Reilly*, 2008 CanLII 1177, [2008] OJ No 164 (QL) (Sup Ct), leave to appeal dismissed, 2009 ONCA 158; *R v Charles*, 2012 SKCA 34 at paras 19, 24; *R v Musurichan*, 107 AR 102, [1990] AJ No 418 (QL) (CA); *R v Sesula*, 93 Sask R 271, [1991] SJ No 377 (QL) (CA); *R v Eliuk*, 2002 ABCA 85 at para 12; *R v Toma*, 2009 ABQB 146 at paras 30–32; *R v Zimney*, [2007] OJ No 4198 (QL) at para 37, 2007 CanLII 45920 (Sup Ct); *R v Crooke*, 2012 ONSC 5923 at paras 29–30.

Secondary inferences, conclusions derived from primary facts, are exclusively within the province of the trier of fact."[152] By this definition, predictive technology draws secondary inferences from facts—or data—that has been previously observed and collected by any number of persons or technologies.

Although general opinion evidence is typically inadmissible, and a predictive algorithm would likely not amount to providing a lay opinion that is within common knowledge, it is theoretically possible that an AI machine could provide an "expert" opinion about its specialization: future risk. Expert opinions, however, are subject to a series of requirements for admissibility purposes.[153] Even when the evidence meets these requirements, which are outlined in *R v Abbey*,[154] trial judges must fulfil their gatekeeper function and determine whether the benefits of admission outweigh potential risks.[155] The many practical and policy implications of qualifying a machine as an expert are beyond the scope of this paper, but undoubtedly warrant further scrutiny and attention.

C) Disclosure Considerations

If an informant—or the Crown, by extension—relies on predictive technology during a peace bond proceeding (as part of the investigation or to assist with meeting the requisite onus), several disclosure issues are likely to arise. These disclosure concerns relate to, first, the vast amount of data that AI requires to make "actionable predictions and identifications"[156] and, second, the machine-learning processes it performs and/or the given source code. Resolving these concerns requires the reconciliation of several competing interests.

First, the Crown has an obligation to disclose all relevant information in its possession relating to the investigation against an accused. Few exceptions exist: clear irrelevance, privilege, or other laws that govern the information.[157] The Crown also holds discretion with respect to

---

152 S Casey Hill, David M Tanovich & Louis P Strezos, *McWilliams' Canadian Criminal Evidence*, 5th ed (Carswell, 2019) at Chapter 12:10.

153 See *R v Mohan*, [1994] 2 SCR 9, 114 DLR (4th) 419; *White Burgess Langille Inman v Abbott and Haliburton Co*, 2015 SCC 23.

154 *R v Abbey*, 2017 ONCA 640.

155 *Ibid*. This discretion is not unlike the discretion that judges possess to exclude evidence after finding that it fits under the principled exception to hearsay: see *Khelawon*, *supra* note 151; *R v Hall*, 2018 MBCA 122.

156 Joh, *supra* note 5 at 20.

157 For example, disclosure that may compromise the protection of national security is not subject to ordinary disclosure obligations: see *Canada Evidence Act*, RSC 1985, c C-5, s 38.

the manner and timing of disclosure to protect personal privacy and avoid harm or prejudice to the public interest. This obligation includes information that has a reasonable possibility of assisting the accused in their exercise of the right to make full answer and defence,[158] as enshrined and protected by sections 7, 10 and 11 of the *Charter*.[159] Among other things, these rights include the right to cross-examine witnesses called by the Crown.

These rights may be at odds with highly sophisticated predictive technologies that rely on trade secrets. Recall that predictive technologies and the algorithms they station require an endless supply of data to properly and accurately function. In addition to what is already an unquantifiable amount of data, the type of data the algorithm uses may be problematic for disclosure purposes. For example, an algorithm could theoretically use data acquired from confidential informants, law enforcement partners, or even intelligence sources. Indeed, the Supreme Court has stated that

> [c]riminal investigative files may contain highly sensitive material including: outlines of unproven allegations; statements of complaints or witnesses—at times concerning very personal matters; personal addresses and phone numbers; photographs; medical reports; bank statements; search warrant information; surveillance reports; communications intercepted by wiretap; scientific evidence including DNA information; criminal records, etc.[160]

Some of this information, which may be included in algorithmic assessments, presents a glaring issue: the best technology-produced predictions rely on veiled data. From a procedural standpoint, this issue of concealed data may foreclose the use of predictive technologies in certain situations.

A second (and related) concern involves the inner workings of the algorithm, the machine-learning process, and the source code. Predictive technologies in the policing context are often proprietary in nature and are not disclosed to the public.[161] For example, predictive technologies like the above-mentioned PredPol use "a proprietary statistical algorithm."[162] This black-box dynamic is largely irreconcilable with disclosure obligations. The defendant's ability to make full answer and defence arguably rests

---

158 *R v McNeil*, 2009 SCC 3 [*McNeil*]; *R v Stinchcombe*, [1991] 3 SCR 326, 83 Alta LR (2d) 193.

159 *Charter*, *supra* note 96, ss 7, 10, 11.

160 *McNeil*, *supra* note 158 at para 19.

161 See Mathew Zaia, "Forecasting Crime? Algorithmic Prediction and the Doctrine of Police Entrapment" (2020) 18:2 CJLT (forthcoming) [Zaia].

162 Moish Kutnowski, "The Ethical Dangers and Merits of Predictive Policing" (2017) 2:1 J Community Safety & Well-Being.

on understanding how the predictive technology works. In other words, it is reasonable to suggest that a defendant's ability to test the validity and accuracy of the algorithm depends on their access to the data and processes employed "against" them, or by perhaps consulting experts and using their own algorithms. Roth expounds this point succinctly:

> [L]awmakers should consider pretrial disclosure and access rules for machines, especially machine "experts." These rules might allow litigants to access machines before trial to test different parameters or inputs (much like posing hypotheticals to human experts). The rules might also require public access to programs for further testing or "tinkering"; disclosure of "source code," if necessary to meaningfully scrutinize the machine's claims; and the discovery of prior statements.[163]

Henderson echoes this sentiment and suggests that "any underlying algorithm used in adjudication or policing should be publicly available, or—at the very least—available for and subject to inspection by independent authorities."[164]

Those against whom the algorithm forms its predictions can face barriers through both the algorithm itself and their ability to challenge the algorithm. These issues, among the others identified, may pose the greatest obstacle to employing predictive technology in the peace bond context. But these obstacles may be overcome by emphasizing access and transparency.

D) Other Considerations: Police Discretion and Pre-Crime Policing

Police officers have a duty to enforce the law and investigate crimes, but this duty is not absolute.[165] The Supreme Court recognizes that police discretion is an essential feature of the criminal justice system.[166] As Justice La Forest wrote in *R v Beare*, eliminating police "discretion would be unworkably complex and rigid."[167] In practice, this means that a police officer who has reasonable grounds to believe that an offence has been committed, or that a more thorough investigation might produce evidence that could form the basis of a criminal charge, "may exercise his or her discretion to decide not to engage the judicial process."[168]

---

163 Roth, *supra* note 13 at 1981.

164 Henderson, *supra* note 87 at 535.

165 *R v Beaudry*, 2007 SCC 5 at para 37 [*Beaudry*].

166 *Ibid* at para 37.

167 *R v Beare*, [1988] 2 SCR 387 at 410, 55 DLR (4th) 481.

168 *Beaudry*, *supra* note 165 at para 37.

Police discretion requires both rational justification that is proportionate to the seriousness of the conduct and exercising discretion in the public interest. As the Supreme Court held in *R v Beaudry*, "while some exercises of discretion are almost routine and are clearly justified, others are truly exceptional and will require that the police officer explain his or her decision in greater detail."[169] Whether and to what degree police officers should maintain their discretion when relying on predictive technologies involves a host of policy considerations. Should police maintain discretion to act on every "lead" provided by a prediction?[170] Or should police maintain their discretion to bypass or ignore some of the machine's predictions?[171] While predictive technologies are theoretically capable of injecting a degree of objectivity into crime-prevention and policing, they may also serve to amplify and perpetuate existing practices that further marginalize over-policed groups. The extent to which these technologies are incorporated into our justice system and the manner in which police exercise their direction in respect of these technologies has far-reaching implications.

5. Conclusion

The peace bond defendant is uniquely positioned as a person accused of no crime, but one who faces liberty restrictions on a diminished standard of proof. The Supreme Court held in *Penunsi* that "it is the responsibility of every justice system participant to guard against the deprivation of the defendant's liberty unless absolutely necessary."[172] In emphasizing this responsibility, the Court echoed the words of Justice Iacobucci in *R v Hall*:

> At the heart of a free and democratic society is the liberty of its subjects. Liberty lost is never regained and can never be fully compensated for; therefore, where the potential exists for the loss of freedom for even a day, we, as a free and democratic society, must place the highest emphasis on ensuring that our system of justice minimizes the chances of an unwarranted denial of liberty.[173]

As we move towards a future where technology enhances our ability to "warrant" the deprivation of liberty, we must answer a fundamental question: What is the appropriate balance between preventing crime and infringing liberties?

---

169 *Ibid* at para 40.

170 Brayne & Christin, *supra* note 61.

171 Zaia, *supra* note 161.

172 *Penunsi*, supra note 100 at para 68.

173 *R v Hall*, 2002 SCC 64 at para 47.

Together, predictive technology and peace bonds have the potential to manufacture a more efficient, preventative and precautionary approach to tackling criminality. The peace bond-AI relationship could capture what Lucia Zedner calls our "shift from a post- to a pre-crime society, where preventing future crime gradually takes precedence over identifying and bringing to justice perpetrators of crimes already committed."[174] If predictive technology is able to predict when and where crimes will be committed and by whom, some degree of pre-crime intervention by the state can be justified. That intervention will likely take the form of a peace bond.

The extent to which our justice system should shift to one that is pre-crime oriented is the central policy question that arises from the peace bond-AI relationship. Meaningful discussion of this question is beyond the scope of this paper. But it should start immediately. As tools of preventative justice, peace bonds are likely to attract the use of predictive technology. This will likely occur in two ways: by providing person- and place-based tips or leads for targeted intervention and enforcement; and at the hearing stage, by providing evidence of risk. The use of predictive technology in both contexts will create a human-machine dynamic that will challenge existing paradigms of evidence and procedure. Many practical and policy issues will arise as a result of this dynamic: Can machine evidence be meaningfully tested and evaluated? Is the proprietary nature of AI technology an obstacle to maintaining *Charter*-protected rights? What is the appropriate exercise of police discretion when relying on predictive AI?

These questions should be seriously considered by Parliament when attempting to legislate in this area. As with any new technology, there are costs and benefits. AI is an inevitable presence in our justice system and an ongoing dialogue about its proper use and scope should commence at the earliest opportunity.

---

[174] Heidi Mork Lomell, "Punishing the Uncommitted Crime: Prevention, pre-emption, precaution and the transformation of criminal law" in Barbara Hudson & Synnove Ugelvik, eds, *Justice and Security in the 21st Century: Risks, Rights and the Rule of Law* (New York: Routledge, 2013) at 84, citing Lucia Zedner, "Pre-Crime and Post-Criminology?" (2007) 11:2 Theoretical Criminology 261.