

Science without Philosophy: The Case of Big Data

Jean-Pierre Dupuy

Abstract: The article investigates the connection between the possibilities and dangers emerging with Big Data and the domain of ethics, that is of action. The true question arising here is if there are any ethical points of orientation an action could rely on that would be able to stand up against the challenges of big data. The article problematizes traditional ethical accounts (Sartre's) by turning to an ancient paradox and its newest guises (among them Minority Report and its real-world equivalent): the paradox that lies in how a prediction of the future prevents this very future from taking place. But there will nonetheless be another, a counterfactual future. How to ethically and politically deal with it?

Keywords: causation, common sense morality, correlation, counterfactuals, PredPol, prophecy of doom

Just as with any new scientific or technical paradigm, Big Data lends itself well to ideological offshoots [*dérives*], which, if we are not careful, could compromise Big Data's indisputable contribution to both knowledge and action - as the other articles in this collection amply illustrate. The convergence of nanotechnology, biotechnology, information technology and the cognitive sciences (NBIC convergence) has given birth to a transhumanist ideology that asserts the need for the fastest possible passage to the next stage of biological evolution; where conscious machines will simply replace us. Meanwhile, the ideology that accompanies Big Data heralds the beginning of new scientific practices that force theoretical concerns into the background, thereby jeopardising the progress of knowledge and, worse still, from our perspective as ethicists, undermines the very foundations of an ethic that wishes to be rational. This double threat will be examined here.

1. Modelling, causality and correlation

The idea that data processing could become the foundation of a new science has slowly begun to materialise. Provided that the available data is sufficiently rich and abundant and that the algorithms exist to identify regularities from the inextricable clutter that constitutes all this data - for example in the form of correlations. This idea has proliferated since the sheer amount and variety of information has increased, but so too has the dazzling progress of computer programming.¹ This idea has quite

¹ We should remember that computer science was born, in part, from the genius of John von Neumann. Von Neumann was confronted with the impossible task of trying to resolve a system of equations to formalise the explosive dynamics of the hydrogen bomb. See below.

literally been displayed recently, and without hesitation, its proponents have proclaimed: “the end of theory.” In June 2008, Chris Anderson, the Editor-in-Chief of that magazine “wired” to Silicon Valley, *Wired Magazine*, entitled one of his articles: “*The End of Theory: The Data Deluge Makes the Scientific Method Obsolete.*” The article stated that henceforth: ‘correlation supersedes causation, and science can advance even without coherent models, unified theories, or really any mechanistic explanation at all.’

In the eyes of historians and philosophers of science, such affirmative statements are both pathetic and lamentable. It’s as though Emile Meyerson,² Karl Popper,³ and Thomas Kuhn⁴’s epistemological theories had never existed. As though they never insisted on the impasses of radical empiricism. Never argued about the impossibility of escaping a “metaphysical research programme.” Never mentioned the indispensable role of hypotheses proceeding by a process of conjectures and refutations for scientific progress - which can be translated by the formula: “there are no raw facts.”⁵

In this paper we will focus on the “causality, correlation, modelling” trio by asserting, or rather, recalling that scientific theorisation is unable to operate without modelling and that banishing the notion of causality to the rung of superstition from the prescientific age is still a long way off. Though, if this were the case, we could understand that Big Data’s ideological attack is only an attack on a straw man; boldly proclaiming causality’s obsolescence and calling for its being put to death by employing correlations. The only problem is that theory has already done that job.

On this question, which is as fecund as it is difficult,⁶ we will limit ourselves to only two examples. The first well-known example is that of the underlying metaphysics of the theory of general relativity dating from between 1907-1915 and Newton’s law of universal gravitation from 1687. As much as the latter preserves causality by proposing that the celestial bodies exert forces of attraction on each other, relativity abandons causality altogether by geometrizing the movement of the stars in space-time in four dimensions. Einstein could argue that Newton’s universal

2 Meyerson 1991

3 Popper 2005

4 Kuhn 2012.

5 So we see that the Latin word "datum," coming from the verb "do," meaning that which is given, is perfectly inappropriate. "Fait," from "facere" is the convenient one. All facts are constructed.

6 I deal with this in chapter 1 “The Fascination with Modeling,” in Dupuy 2009.

attraction, which is not so far removed from Newton’s practice of astrology, was still dependent on the belief in the evil eye, i.e., a causality linked to the interpretation of human things. Or put simply, a call upon magic.

The lesser known second example is the complexity paradigm, more precisely what is known as Complex Systems Modeling, which burst onto the scientific scene when the mathematician John von Neumann first defined this concept in 1946 at a conference held at the California Institute of Technology (CalTech), in Pasadena, California. A complex object, he conjectured, is such that the simplest model that can be given is itself. The information it contains is incompressible. It is interesting that von Neumann resorted to an example borrowed from economic theory to illustrate his point.

The text von Neumann chose is Vilfredo Pareto’s *Manual of Political Economy (1906)*. In it, Pareto explains that the model of general economic equilibrium, developed with Leon Walras, is a model that formalises the mechanism of the formation of price in a competitive market:

Not in the least to arrive at a numerical computation of prices. Let us make the most favourable hypotheses, for such computation; let us suppose that all difficulties regarding knowledge of the data of the problem have been overcome, and all the *ophelimites* (i.e., “utility” or “desirability”, *J.-P. D*⁷) of every commodity for each individual are known, as well as all the conditions of production of the commodities etc. This is already an absurd hypothesis; and yet it is not enough to give us the practical possibility of solving the problem. We have seen that, in the case of 100 individuals and 700 commodities, there would be 70,699 conditions (in fact, a large number of conditions, so far disregarded, would increase that number still further); we would thus have to solve a system of 70,699 equations. That would practically exceed the power of algebraic analysis, and it would do so still more if one were to consider the incredible number of equations that would be needed for a population of forty million individuals and some thousands of commodities. *In such a case, the roles would be reversed*;⁸ it would not be mathematics that would come to the aid of political economy, but political economy to the aid of mathematics. In other words, if all these equations could really be known, the only humanly possible way to solve them would be to observe the

7 Translator’s note: Author’s addition

8 Translator’s note: italics added by the author

practical solution brought about by the market.⁹

In other words, it is only the market itself that can tell us what it is capable of. The best and simplest model for the behaviour of the market is the behaviour of the market itself. The information that the market deploys is at the service of those who let themselves be carried away by its dynamism. This is not "compressible." As a last resort, the market - and by extension all complex systems - is to itself its own cause and its behaviour is not reducible to the game of identifiable causes at a more elementary level.

"Big Data" promises only one thing: it can predict even if we do not understand what it returns. Hence the formula: "with enough data, the numbers speak for themselves."¹⁰ Or even:

in many instances, we will need to give up our quest to discover the cause of things, in return for accepting correlations. With big data, instead of trying to understand precisely why an engine breaks down or why a drug's side effect disappears, researchers can instead collect and analyse massive quantities of information about such events and everything that is associated with them, looking for patterns that might help predict future occurrences. Big data helps answer what, not why, and often that's good enough... A worldview built on the importance of causation is being challenged by a preponderance of correlations. The possession of knowledge, which once meant an understanding of the past, is coming to mean an ability to predict the future.¹¹

Big Data claims to be playing with the *complication* of data. The above statement makes it possible to say that Big Data's stumbling block is the sheer *complexity* of phenomena.¹² If, instead of understanding, predictions are all that Big data has to offer, then in the case of complex systems it *will not understand* why it cannot predict. Big Data will have sacrificed understanding to a non-existent ability to predict.

2. Big Data and the Question of Ethical Foundations

9 Translator's note: Pareto 2014.

10 Anderson 2008

11 Cukier & Mayer-Schoenberger 2013.

12 The distinction between complication and complexity is one of the most important contributions of contemporary epistemology. See Henri Atlan's recently reissued, in Atlan 2006.

Ethics presupposes a human subject that acts. Acting is, etymologically, starting a new process, setting in motion sequences of causes and effects. To think of ourselves as free in a deterministic world, therefore, implies that we must resort to a fiction, but this fiction is necessary for us to give meaning to our actions, to judge them in relation to norms, to evaluate their consequences. According to this fiction, we can act only to the extent in which we are able to start new causal chains, by the effect of our will. To act as if we were free leads us to consider counterfactual¹³ propositions of the type: "If I acted otherwise than I have, then such consequences would ensue."

When big data contents itself with renouncing the search for causal links in the domain of natural phenomena, it does not innovate at all, as we have just seen, and what's more, it blinds itself. But when Big Data's misguided creep continues into the domain of the humanities, it compromises the very possibility of ethics itself.

We will illustrate this assertion with a look at a case that plays an important role in the internal controversies of contemporary rationalist moral philosophy. The question is whether, having to evaluate a certain action in terms of rationality and ethics, we must limit ourselves to its causal consequences or if we must also take into account its non-causal consequences. An example will help to understand these notions.

Let us imagine that, thanks to Big Data, we detected a correlation between certain types of behaviour and the incidence of a disease. Roughly speaking, and only to concentrate these ideas, consider the statistical dependence between smoking regularly and lung cancer. Big Data alone does not enable us to go any further or enter the world of causes. Now, three cases are possible if two variables are correlated: the first may be the cause of the second, the latter may be the cause of the second, or both result from the same common cause. In this example, either smoking causes lung cancer - causality is reversed in the opposite direction - or the propensity to smoke and lung cancer is caused by both, independently, by the same risk factor, say a specific gene for instance.

.....
13 A conditional proposition of the type "if, then" can be indicative ["If it rains tomorrow, I will not go to work"] or counterfactual ["If I were richer, I would buy myself a Lamborghini"]. The term "counterfactual" refers to the presence of an antecedent ["If I was richer"] that is contrary to the facts (alas, I am not richer than I am). The behaviour of these two types of conditionals in our reasoning varies dramatically. To take a classic example, the proposition "If Shakespeare did not write Hamlet, someone else did" is undoubtedly true since the play exists and it necessarily has an author. On the other hand, it is highly problematic to attribute the truth value "true" to the counterfactual proposition "If Shakespeare had not written Hamlet, someone else would have done it". One can think that only the genius of the Bard could produce this masterpiece. Counterfactual propositions are about possible worlds that are "close" to our world, the present world, the only one we have. We cannot do without them, in our thoughts and reasonings, especially when a significant event occurs that might not have happened or, on the contrary, an event does not occur which, if it was produced, would have upset our life or the world, for good or bad.

We should ask, what is good practice? Or what recommendations could we make in each of these two cases? If smoking causes lung cancer, it is evident that we must not smoke. On the other hand, there is no reason to quit in the other case, even if one ignores the presence or absence of the offending gene in a particular individual. It is a principle of rational choice that makes it possible to understand it. Called the Sure Thing principle, so-called by the great American statistician Leonard Savage, who made it an axiom of rational choice theory - an axiom, that is, a proposition that in principle draws evidence from itself, like a tautology. In this case, Logic seems to boil down to common sense. Regardless of the value of a variable hidden from me (in our example, the actuality or not of the gene responsible for lung cancer) the preferred option between the several possibilities offered is always the same (say, I would prefer to smoke rather than to abstain from smoking). It does not matter whether I know the value of the variable. I would simply prefer this option, that's the point, and I choose it without further ado (in this example, I choose to smoke or continue to do so).¹⁴

In the smoking example, smoking is said to constitute the *dominant strategy*: Smoking is the best option regardless of the unknown state of my health. Clearly, the best course of action essentially depends on the causalities behind the correlations: direct on the one hand, and indirect, through a common cause on the other.

The example we have just considered involves a criterion of judgment, which is rationality. Yet, what about ethics proper?

For many, the ethical gesture *par excellence* consists in asking oneself what would happen if other people acted as I did? In *Existentialism is a Humanism* (1946), Sartre writes: 'Certainly, many believe that their actions involve no one but themselves, and were we to ask them, "but what if everyone acted that way?" they would shrug their shoulder and reply, "But everyone does *not* act that way." In truth, however, one should always ask oneself, "What would happen if everyone did what I am doing?" The only way to evade that disturbing thought is through some kind of bad faith.'¹⁵ Under the banner of deontology¹⁶ Kant formalised this gesture into an imperative said to be categorical; which could be paraphrased as: "Act always in such a way that you might be able to *will without contradiction*

14 This axiom is said in terms of preferences: if a subject prefers an option p to another q in the case where the state of the world belongs to a subset X; and also prefers p to q in the complement of X; then he must prefer p to q even if he does not know if the state of the world belongs to X or the complement of X.

15 Sartre 2007, p.25

16 Not to be confused with the deontology as a professional ethics.

that the maxim of your action becomes a universal law."¹⁷

Here's a personal anecdote that illustrates the importance of causality in ethical issues. One summer, I was walking with my then thirteen-year-old daughter in one of Colorado's beautiful canyons. The red sandstones from this region of the world have eroded the fantastic well-known landscapes. We had stopped in the shade of one of these formations, and I had fallen asleep. I woke up with a jolt to the sight of a couple walking towards us, the eyes of the woman betrayed a moral indignation that only a kind of puritanism is capable of arousing. I turn to my daughter and see her engraving her name in the soft rock. I immediately said loudly and in English, so that the threatening couple could overhear: 'Beatrice, stop it!' However, to a girl of thirteen, I do owe an explanation. The only one I could come up with was the most banal: 'Imagine,' I said, 'what would happen if the tens of millions of visitors who come here every year did as you have done? In response to the Dantesque evocation of an immense cliff collapsing under the accumulation of engraved signatures, my daughter's response was quickfire: "But, papa, if the others do like me, it's not my fault! "

Firstly, it should be noted that my daughter's reply flips Sartre's words from the quotation above. Her excuse is not "others do not do as I do," but rather the argument: "supposing that they did do what I did, I'm not the cause; therefore, I am not responsible."

This is common sense morality. It has its strengths and dignities because it is rooted in a phenomenology of action that corresponds to what has been the common experience of humanity throughout its history and until the quite recent past. The common experience was that: 1) actions are more important than omissions; 2) closer effects are much more visible, and therefore more important, than distant effects; 3) individual effects are more important than group effects or compositional effects.

The traits of common sense morality that directly reflect this phenomenology of ordinary action are: 1) Negative duties ("you will not kill") have absolute priority over positive duties ("you will help your neighbour"). We have more responsibility for what we do than for what we let ourselves do. One does not harm an innocent man even if it is the *sine qua non* condition to alleviate the suffering of ten others. 2) There are particular, special, obligations to one's relatives that one does not have in relation to the rest of humanity.

It can be argued that this restrictive conception of normative

17 Kant 1991 ['So act that your maxim could become a universal law'. p.4.] I simplify and complete the original formulation for clarity.

responsibility has become unsuited to our present situation. Positive duties have become as important as negative duties. The distinction between intentional killing by an individual act and killing because one only cares about one's selfish welfare as a citizen of a rich country while the others die of hunger, this distinction is becoming increasingly problematic. We must be concerned about *all* the consequences of our actions and omissions, not just the nearest or the most visible.

Therefore, can we still say that if others do like us, we are not responsible for what they do? There are correlations between our actions, but are these correlations reasons? Many threats to our future result from the synergy of a multitude of tiny individual actions, each of which in isolation has undetectable consequences (think: global warming). The distinction between omission and action loses its meaning: "refrain from [*abstenez-vous de*] using your car for city journeys!" says ordinary language. If we obeyed, would it be an "*abstention*"? It would indeed be an action in the strongest sense of the term; this word has, etymologically speaking, non-causal beginnings, setting in motion something radically new in the network of human relations. Couldn't we extend these considerations to *all* the effects of my action and omissions, including the non-causal counterfactual effects taken into account by Kantian morality: if I abstained from engraving my name on the rock (but I do not do it), then would I inaugurate a virtual world where others would do the same? First, by direct causality: it is obvious that one is less inclined to respect a standard of decency if one is the only one to do it. But also by the pattern of the common cause: the correlations between our actions and those of millions of others often reflect the fact that we are driven by the same factors.

It is legitimate to resist these arguments and to defend, at least by default, common sense morality. Sartre said: 'a man who commits himself, and who realises that he is not only the individual that he chooses to be, but also a legislator choosing at the same time what humanity as a whole should be, cannot help but be aware of his own full and profound responsibility.'¹⁸ We want to reply: it's too much, let's just stay at the level of man.

The focus of my paper is not to take sides on these questions which would demand so many moral and intellectual resources, but simply to say this: if we let them spread, the ideological offshoots [*dérives*] of Big Data will crush and bulldoze all the most fundamental conceptual distinctions that no ethical theory could do without.

18 Sartre 2007.

3. A Case Study: Predictive Policing. Statistics and the Banality of Evil



Le Monde, 12 octobre 2015

Figure 1:

Top Left: "We'll liquidate the terrorist *before* they commit an attack.

Top Right: "But what's your proof that there's actually a terrorist?"

Bottom: "Well, the attack hasn't taken place."

A. A very ancient paradox

The prevention of future crimes leads us to one of the oldest pragmatic paradoxes that humanity has faced ever since it started posing ethical questions. In the age of 'Big Data',¹⁹ this paradox finds itself incarnated in new institutions.

Without harking back to the Ancients, nor to the Bible, we find a particularly effective version of this paradox in *Zadig*, the philosophical tale that Voltaire concocted to ridicule Leibniz's theodicy. When the eponymous hero spots the hermit, who is accompanying Zadig on his travels, assassinating the nephew of their overnight host, Zadig is alarmed. Revolted by his actions, he questions the hermit: can you find no other reward for the generosity of our benefactress than this dreadful crime? To which the hermit, who is none other than the angel Jesrad, the spokesman for Leibniz's system, answers: if this young man had lived, he would have killed his aunt in a year and then, the year after he would have

19 We should feel free to translate this expression "Big Data" as it is understood, provided, of course, that we do the schooling. It was invented by one of my former students of the X [Big Data], now billionaire, Yann Le Cun. Creator of one of the most brilliant algorithms which deals with huge masses of data, he was recruited by Mark Zuckerberg to develop Advanced Artificial Intelligence within FaceBook. He confessed that it was on a whim, and after not much thought, that he forged the expression "Big Data". It turns out that it has flourished, no doubt by mimetic laziness.

murdered you, Zadig. How do you know? Zadig exclaims, the answer: "it was written." It was written, perhaps, but this will not now happen - the fault of a criminal.

The great American science-fiction writer Philip K. Dick was inspired by this tale, drawing a subtle and complex new one, *Minority Report*.²⁰ The paradox is the same: the police of the future, relying on the increasingly accurate predictions made by a trio of Fates, (*Precogs*), neutralise criminals a quarter of a second before they commit their crime - their slogan is: 'it's not the future if you stop it!' Note that the paradox only exists because it is postulated that the future is predictable. In *Minority Report*, not only will a crime come true but it cannot not be realised - in philosophical terms, it is fixed, in the sense that it is counterfactually independent of the actions that precede it. Predictions of the kind found in "*Bison futé*"²¹ do not have this claim: they do not say what the future will be but what it would be if the motorists remained indifferent to the prediction made public.

It would be wrong to believe that this paradox is a mere invention of the idle metaphysician or philosopher, and wrong to believe that there's no practical import too. In its Voltairian vein, it stages the question of the compatibility between free will and determinism of theological flavour. This brings us closer to Big Data; one of its many incarnations involves a stochastic determinism; I am thinking of the defence of Adolf Eichmann by the German lawyer Robert Servatius. This is what Hannah Arendt had to say in her *Eichmann in Jerusalem*.²²

If the defendant excuses himself on the ground that he acted not as a man but as a mere functionary whose functions could just as easily have been carried out by anyone else, it is as if a criminal pointed to the statistics on crime—which set forth that so-and-so many crimes per day are committed in such-and-such a place—and declared that he only did what was statistically expected, that it was mere accident that he did it and not somebody else, since after all somebody had to do it.²³

A regularly discussed case at the University of Yale's Department of Law elicits a proximate reflection:

A clever genie visited the Prime Minister of a certain country and

20 Steven Spielberg directed a film of the same name, alas he sacrificed the metaphysical dimension of the story for fear of lost profits.

21 Translator's note: *Bison futé*, literally 'cunning bison', is the name of the French National Road Traffic Organisation. They prepare traffic reports and often 'predict' motoring queues, delays, and release warnings in advance. (www.bison-fute.gouv.fr/).

22 Arendt 1994.

23 *Ibid.*, p. 289

offered him the following deal: "I know your economy is languishing, I am eager to help you restart it, and I can offer you a fabulous technological invention which will double your Gross Domestic Product, as well as the number of jobs available, but there is a price to pay. Every year I will ask for the lives of 20,000 of your fellow citizens, including a large proportion of young people and women." The Prime Minister pulled back with fright and sent the visitor packing. He had just rejected the invention of ... the automobile.

If our societies can accept the evil that is roadside mortality with such ease, if it doesn't pose them any particular problems of conscience; it is precisely because they never represent it in terms of this apologue. The question that this story presents is a classic moral dilemma, it is about knowing if innocent victims can be sacrificed on the altar of the collective good. Although obsessed with this type of case, classical moral philosophy has never been able to enlighten them satisfactorily. As it is enough to naturalise the terms of the moral question to make it disappear entirely. The traffic flows of the automobile are subsumed under the laws of hydrodynamics, and statistical regularities just assume the arrival of fatalities.

B. The Paradox Embodied: Predictive Policing

In Philip K. Dick's short story, the three Fates are called "Precogs" (for "pre-cognition"). Their real-world counterpart is a Californian startup set up in the university city of Santa Cruz and named Predpol (for "Predictive Police"). The idea behind it came from UCLA anthropology professor Jeffrey Brantingham.²⁴ He intended to set up a "mathematics of crime." Convinced that crime is predictable in the short term, especially concerning the locations of the occurrences of crimes. His model was to be the forecasting of earthquakes. The first shock is very difficult to anticipate, but it is much easier to predict the aftershocks. Similarly - at least in California - if a house is broken into, the probability of it being broken into again in the near future is doubled. 'Whatever the causes,' says our anthropologist, 'the facts are there. The sequence of events is modelable.' Anticipating what a political or moral objection might be, he adds: 'We do not do any profiling, we do not look at the perpetrators. For our predictions, offenders' identities, or their socio-cultural characteristics, are worthless.'

The police department of Modesto, a modestly sized town in the San Joaquin Valley in central California, granary to the world, was one

24 The word "crime" in English has a much wider gamut of meaning than in French. In France, a robbery is not a crime but a *délit*, though in English it remains a 'crime.'

of the first to pay for Predpol's services and did so with the aim of saving money. And it turned out to be "effective": robberies dropped by more than a quarter while half of the arrests occurred in the priority areas defined by the algorithm. Some older police officers have had a hard time applying these new methods on the grounds that 'we are not predicting the future.' Others simply observe with pleasure as the risk zones, defined and operated by Predpol, begin to disappear from the priority map after a certain time: this is proof that the system has worked. About 100 American cities, including Los Angeles and Atlanta, are using today's Predpol services. France is seriously considering following suit.

There are very few political and ethical analyses on the presuppositions and implications of this practice, both in the Anglo-American world which invented the practice as well as in France. We nevertheless find articles and controversies on the technical dimensions of the problem.

Two young French researchers have echoed this concern. The sociologists Ismaël Benslimane from the Joseph-Fourier University in Grenoble et Bilel Benbouzid of the University of Paris-Est Marne la Vallée. We should say at the outset that this literature is very verbose, pretentious, and often hollow - that is to say quite ideological. Yet, some remarks should draw our attention. What makes it interesting is that, without even perceiving it, the authors stumble on the same paradoxes as those we presented.

At a technical level, the main criticism of the PredPol software is that it just pushes on open doors. Much simpler algorithms and even the experience-based knowledge of the police can do just as well, if not better perhaps. The reason is the very particular nature of the spatial distribution of crimes and offences in the cities of the industrial world. For example, in the case of a city like Chicago, we can say that approximately 80% of crimes are concentrated in around 20% of the city. This very high concentration is the expression of a law of fractal probability, also called Pareto law. This law appears when mimetic phenomena are at stake. As is the case here since, as we have seen, the existence of a crime or offence in a given place increases the chances of recidivism in an interval of time that is not very long.

A thought experiment is useful to understand the mechanisms involved. Imagine a rain of ten thousand chips that fall evenly over an area where there are a hundred bowls ready to receive them. The chips fall independently of each other, the distribution of the number of chips per bowl will obey the bell curve (called Gaussian distribution). Most cups will contain a number of chips that will not be very far from the average, say a hundred chips. There will be a small number of cups that will hold very few chips or on the contrary several hundred. Let us now change the

conditions of the experiment by postulating a given cup that will have more chances of attracting the falling tokens, while already containing a large number. The distribution of chips on all the cups then acquires an entirely different physiognomy. A self-reinforcing mechanism amplifies deviations from the mean of the bell curve. Extreme events gain a considerably increased probability. The distribution thus obtained is said to be fractal because it retains the same physiognomy regardless of the threshold at which it is cut, that is to say, the minimum number of tokens below which it is decided not to count the corresponding cups.

So there are areas, at every moment, where crimes and misdemeanours are highly concentrated, and the police do not need software to figure that out. These areas evolve over time, depending on the circumstances but also, of course, the presence and actions of the police. Here again, they are already at the forefront of knowing about it.

According to this critique, PredPol is useless. However, the authors do not stop there; they continue, and, citing their sources mainly English, they argue that this technique has adverse effects. The most important is of a political nature, through the mass of statistics analysed by Big Data, crime becomes naturalised. Just as we naturalise road accidents, as revealed by the Yale University apologue analysed earlier, thereby masking the economic and social causes of crime.²⁵

However, it's the economic efficiency argument that maintains our attention because it brings us back to the paradoxes of the first part. Since there are fewer burglaries, there is less need for police officers. So there are fewer police officers and, more generally, less public spending on security, and that is a bad thing, we are told.²⁶ We thought that was the goal! This logic is reminiscent of the circumstances that brought the US-Soviet summit in Reykjavík to a head in October 1986. Reagan and Gorbachev jointly agreed on a goal of the total denuclearisation of the world. Reagan, however, believed that he couldn't return to his country if he were to renounce the construction of a missile defence shield. This, in turn, would violate the 1972 Anti-Ballistic Missile Treaty (ABM) treaty. But since there would no longer be any atomic weapons, Gorbachev kept asking: 'what do you want to protect yourself from?' The paradox, as we

.....
25 Sociologist Ismaël Benslimane says: "Predpol seems to express, in a politically correct way, that thanks to data on a map, that there are more crimes in certain areas of a city, without saying anything about the precariousness of these areas. (...) Predpol is a way to hide a social reality. Instead of saying that it is a poor neighbourhood, we will say that it is a crime zone. This gives a probability value to an offence, whereas one could correlate crime with other factors, such as population density."

26 Sociologist Bilel Boubouzid on Rue89 [Translator's note: Rue89 is a French News Website]: "PredPol, for me, is a right-wing algorithm. It allows for a reduction in public spending and a reduction in the number of people in the police force - in short it saves money."

have seen, is that the present future is not enough, we must also consider counterfactual futures.

We find the same paradox in what Benslimane and Boubouزيد tell us of the validation procedures of the PredPol software: it wins at every turn! PredPol will announce that a crime is to take place in a specific area of the city. Off the policeman goes to respond to the situation. One of two things will happen: either a crime takes place as planned and the policeman stops the offender, in which case the PredPol software receives its gold star; or no offence occurs. But this is probably linked to the on the spot presence of the policeman, and so it is still a gold star for the software. We cannot blame PredPol, which prevented the crime.

This is nothing other than the very same paradox we found in Voltaire's *Zadig*. That is to say, the paradox of the prevention of future reported crimes. But what gives us food for thought is that these sociologists criticise PredPol for being so immune to criticism. And yet, they themselves face the exact same paradox; all they want from PredPol, as the prophets of misfortune, is either to predict accurately or to predict not at all. The sociologists' dilemma is the following one: either PredPol's forecasts are proven right and we are ungrateful (when we're not accusing them of being the cause of the reported misfortune), or the crimes just don't occur, the predicted disaster did not happen, and we later mock PredPol's prophetic attitude of doom and gloom (*Cassandra metaphor**) [*attitude de Cassandra*].²⁷ But Cassandra was condemned to irrelevance by the gods who ordered that her words would always go unheard. It doesn't seem to have occurred to anyone that, if a disaster does not take place, it might be precisely because the advanced warnings were already announced and heard. As Jonah writes:

The prophecy of doom is made to avert its coming, and it would be the height of injustice later to deride the "alarmists" because "it did not turn out so bad after all." To have been wrong may be their merit.²⁸

Translated by Sinan Richards

²⁷ Translator's note: 'attitude de Cassandre' is play on the French expression 'Jouer les Cassandre' which references the Greek mythological prophet 'Cassandra' who was doomed to prophesies real events that no one would believe. It signifies a fatalistic attitude in the text.

*Added by translator

²⁸ Jonas 1984, p. 120
It is very interesting to compare this paradox of Jonah to another Jonah's paradox - this time not Hans Jonas, twentieth-century German philosopher, but of Jonah son of Amittai, the biblical prophet of the 8th century BC mentioned in 2 Kings, 14, 25. Recall the structure of the story:
Now the word of the LORD came unto Jonah the son of Amittai, saying, Arise, go to Nineveh, that great city, and cry against it; for their wickedness is come up before me. But Jonah rose up to flee unto Tarshish from the presence of the LORD,
[King James (Nahum 1:1-15)]
God asks Jonah to prophesies the fall of Nineveh who sinned before the Lord. Instead of doing his

Bibliography:

Anderson Chris 2008, *The End of Theory*, available online at <https://www.wired.com/2008/06/pb-theory/>
Arendt, Hannah 1994, *Eichmann in Jerusalem. A Report on the Banality of Evil*, (1965), London: Penguin
Atlan Henri 2006, *L'Organisation biologique et la théorie de l'information*, Paris: Seuil
Cukier, Kenneth & Mayer-Schoenberger, Viktor, "The Rise of Big Data. How It's Changing the Way We Think About the World," *Foreign Affairs*, May-June 2013.
Dupuy, Jean-Pierre 2009, *On The Origins of Cognitive Science: The Mechanization of the Mind*, Cambridge MA: MIT Press.
Jonas, Hans 1984, *The Imperative of Responsibility: In Search of Ethics for the Technological Age*, Chicago/London: The University of Chicago Press.
Kant, Immanuel 1991, *The Metaphysics of Morals*, Cambridge: Cambridge University Press
Kuhn, Thomas 2012, *The structure of Scientific Revolutions*, Chicago/London: The University of Chicago Press
Meyerson, Émile 1991, *Explanation in the Sciences*, Dordrecht: Springer
Pareto, Vilfredo 2014, *Manual of Political Economy: A Critical and Variorum Edition*, Eds., Aldo Montesano, Alberto Zanni, Luigino Bruni, John S. Chipman, and Michael McLure. Oxford: Oxford University Press.
Popper, Karl 2005, *The Logic of Scientific Discovery*, London/New York: Routledge
Sartre, Jean-Paul 2007, *Existentialism is a Humanism*, New Haven & London: Yale University Press

job as a prophet, Jonah fled. Why? Nothing is said to us about it. We are all familiar with the rest of the story, they embark on the ship that goes to Tarsis (Strait of Gibraltar), the great punitive storm, the draw that reveals the guilt of Jonah. He is thrown overboard, at his own request, by the sailors in order to calm the wrath of Yahweh, the great merciful fish who finally swallows him and, three days and three nights later, vomits him onto dry land. But it is only at the end of the story that we understand why Jonah disobeyed God. It was because Jonah had planned, as an effective prophet, what would happen if he made his prophecy! What would have happened is what is happening now, when Yahweh, for the second time, gives him the order to prophesies the fall of Nineveh and this time, having understood what it costs him to disobey, he obeys. The Ninevites repent, convert, and God forgives them. Their city will be spared. But for Jonah, it's a bitter failure, which leaves him all 'thwarted' [contrarié] says the text. I built my 'Will' [mon Pour] for an enlightened catastrophism (Paris, Seuil, 2002) around the confrontation between these two paradoxes.