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Social Impact of Use Machine Learning in Justice System and Policing

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Introduction:

As the technology developing rapidly, new terms such as the era of network society, the era of big data, and the era of artificial intelligence have successively appeared in human society, and the three together constitute a new social era. Due to the rapid development of the information technology and machine learning, the legal industry, one of the main service industries, is also actively integrating into the modern torrent. Consequently, the artificial intelligence products that focused on the legal field are derived from the combination of the legal industry and information technology. Based on the same emphasis on logical deduction, law and artificial intelligence can be connected logically, but if legal provisions are translated into computer language, three prerequisites must also be met: First, the particular issue must be able to express using formational language (ideally mathematics); secondly, there must be an algorithm exist for this issue, that is, a programmed instruction set; finally, this algorithm must be programmable. In short, the legal algorithm must conform to the requirements of quantifiable, understandable and editable. Under the modern machine learning level, the efficiency of data integration is greatly improved, and legal provisions can be stored into trainable artificial intelligence system in the form of data that can be processed into database. With the help of the evolution of computer technology and the improvement of information systems' ability to understand, some legal issues in social life can already be "calculated" by machines. As a result, a large number of artificial intelligence products focused on legal services were born.

As these products gradually enter the public's field and being used in many different situations, the automation challenges posed by big data analysis, machine learning and artificial intelligence systems have made us to reconsider the basic issues of criminal justice. Human judgment has its limitations as the prejudices and biases exist in all human's decisions. The purpose of these products is to enhance human decision-making capabilities by using unbiased machine learning algorithms, and to make the application of the criminal justice system and policing fairer. In theory, machine learning can play a big role in this process, but in the actual operation and application process, many problems have emerged.

Use of machine learning systems in justice system:

There are many potential benefits of using data analysis and algorithms for public security, but it also brings severe risks, including the same bias-related risks as human decision-making. This risk can be embodied in unfair discrimination against certain people based on characteristics, obvious deviations from reality in the decision-making process, or generating results that are less fair to individuals in specific groups. These risks may appear at various stages of using the product or system. The unfairness of the algorithm cannot be considered only as a problem of data bias, in reality, it involves a broader set of laws, the legal environment for law enforcement, and the overall decision-making process that is considered when determining a crime. There are many technical complexities exist in the use of machine learning systems in the criminal justice system and policing to assist the decision-making process. By definition, the intermediate stages of the decision-making process cannot be supervised by humans due to the technical complexity involved, so it usually leads to a so called "black box" effect. In many fields, machine learning has demonstrated new methods of unsupervised learning or active learning that can be run without manual intervention. Similar to multi-speaker detection neural system training, in the active machine learning method using natural language processing, the learning algorithm needs to access a large number of unprocessed samples. And in a series of iterations, the algorithm will select some pre-process samples and request human annotator to label them. This method is called the active method, because the algorithm will determine which samples should be manually labeled based on its current processing algorithm. The idea of active machine learning is to remove all human influence during the process to achieve complete automation. The way of self-training of artificial neural networks is to analyze samples to learn how to perform tasks, so they usually need no extra programming with task-specific rules, thus, artificial neural networks are very useful and popular in many fields because they can take in raw samples and process by themselves. But the problem is, even for the ones who built the system, the operation of the machine learning method is not completely transparent. Although this is not a problem in many areas of using machine learning, the lack of transparency raises significant concerns when being used in justice system and policing scenario. The decision-making process need to be revealed or the result is unacceptable. Due

to the opaque nature of these neural systems, their use in a criminal justice system may cause situations that contradict the basic definition of law practicing. Can the result be used as the explanation of the grounds of a judgment, who should be responsible for this semiautomated decision-making process when it involves machine, and how should responsibilities be allocated in the chain of actors when machines are involved at a certain stage of the criminal procedure, and more fundamentally, is it fair to use machine to make legal decisions involve human's life? These questions should to be answered with clear detail before using machine learning in justice system and policing, and the artificial intelligence system must make decisions under transparent circumstances to ensure the interpretability of each stage and the logic of deduction.

Despite the fact that there are many uncertainties of using machine learning in justice system, there are many applications of neural system and algorithm-based software in legal field. For policing purposes, NYPD is using a system called CompStat which is using geospatial modelling to predict the future crime concentrations in area. In comparison to AI analytics, its limiting factor is the depth of the information and
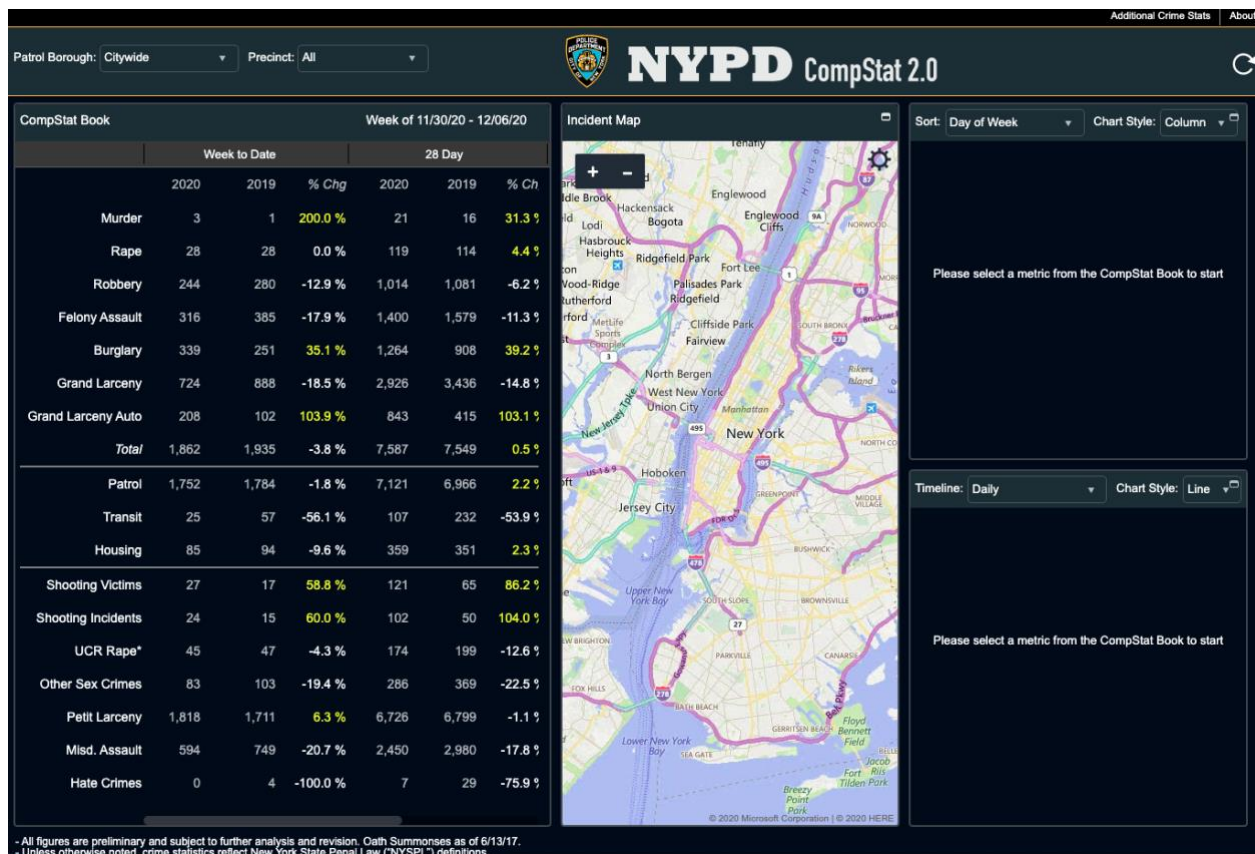
the related breadth of analysis. For transparency, the NYPD made the decision to show it to everyone, as quoted from NYPD official website:

> "*The New York City Police Department has taken the unprecedented step of making much of the crime data developed in the CompStat model available to the public. This advancement, called CompStat 2.0, provides greater specificity about crimes through an online interactive experience.*"

This is not the first AI tool that being used by police to support their daily policing job. As a matter of fact, the history of using computational methods to generate crime predictive map started at least a decade ago. With machine learning to more effectively process the big data set and evolving the model of prediction, these AI tools' role in decision-making of policing becomes more important, the role is shifting from supporter to decision-maker. Some of the AI tools are even used by Police for intervening the yet-to-be-committed crime during early stages. Automated tools are considered to be useful for precautionary measures to mine offenders who have not committed these crimes from large amounts of data. Therefore, tools that use algorithms to identify high-risk potential criminal individuals have also begun to be used for policing and surveillance.

Not only in policing, criminal courts also use machine learning systems to assess the probability of recidivism, the probability of the flight of the awaiting trails, and the probability of offenders in bail and parole procedures. Studies showed that compare to human judge, the machine learning system could do a better job on predicting if a suspect would flee or re-offend, but the data used in such studies may not be just. In real life, there will always be additional facts in a specific case that may be unique but not in the factors considered by the algorithm in the studies which might crucially change the outcome of the process. In prisons, there are also new AI tools and systems being used for post-conviction stage for surveillance and for monitoring interventions in sentencing procedures.

Factors affecting fairness of use of machine learning:

The biggest source of bias in machine learning systems is the bad training data. Take crime risk assessment algorithms as an example, the present risk assessment tools' algorithms used historical crime data to train, and used statistical methods to find patterns and connections of individuals and crime likelihood. The idea of using algorithms is to change the inequality of the crime justice system not to reproduce it, however, if the system is using historical crime data to train its model, then it will pick out the exact patterns associated with these past crimes and these patterns sometime are the representation of the existing issues in the policing and justice system which need to be eliminated.

Another factor that will affect the fairness of using machine learning is systematic patterns of inequality. The way machine learning generates the model for decision-making is to analyze big set of data and find the patterns for future predictions, but patterns are correlations, not causations, thus the patterns may involve inequalities hiding deeply under the ethical wall that machine cannot break through.

The limitation of information depth can also be a potential issue. When training models, the data feed into the system are unlabeled and unprocessed for being objective. But despite the type of data, it cannot represent human beings. For using machine learning in justice system and policing, the data are likely all related to individuals and cases involving human activities. The complexity of human behaviors may not be summarized and concluded by using parameters, so the accuracy and effectiveness of the trained model is questionable, moreover, the decision-making fairness cannot be guaranteed. From what I have research and read relating to these issues, the way to improve the accuracy and fairness of algorithms is tightly link to the dataset used for training, so the only way I can see is to figure out the way to create more adequate datasets.

Social impact:

When machine learning first being introduced into the legal system, the idea is to use the unbiased algorithmic model to help justify human bias influences within justice system and policing. The reaction is overwhelmed, as many AI tools and systems got involved into many aspects in legal field, researchers and developers start to focus on relating topics and methods to become a part of the trend. As the machine learning being used more and more frequently, issues and concerns appear. The use of machine learning in criminal justice system and policing potentially affects numbers of criminal procedure rights including the presumption of innocence, the right to a fair trial, the equality of arms in judicial proceedings, the right to cross-examine witnesses, the right to an independent and impartial tribunal, including the right to a randomly selected judge, the principle of non-discrimination and equality, the principle of legality, and blurs the existing standards of proof. In short, using machine learning in justice system and policing impacts human rights. As a matter of fact, based on the existing data, crime risk assessment algorithms used by the AI systems in justice system and policing are, generally speaking, predictably making bias decisions and bias predictions, which immediately caught attention of public. The fairness of the AI systems, the equality of the decision making, the reason behind the bias of AI algorithms, people start to rethink about using machine learning for policing and law practicing. Even though there is no conclusion about should we use it or not, and people have different attitude about it, there is no doubt that use machine learning in justice system and policing has many issues and some of the issues are lethal and need to be prevent. Of course, we should be positive and optimistic about the progress and prospects of judicial artificial intelligence, but the more we do, the more we must attach great importance to its existing problems and its own limitations, so as to carry out reasonable positioning and scientific empowerment. Giving play to the optimization and reshaping effect of artificial intelligence on justice should be carried out simultaneously with the risk prevention of artificial intelligence. It is necessary to set up corresponding regulations and relief mechanisms for algorithmic decision-making, inject the concepts of openness, fairness and responsibility, and then promote the advantages and disadvantages, promote the development of science and technology and create a smart justice for the benign development. Algorithms can only continue and refine human

knowledge, but it is difficult to develop and create human knowledge. Algorithmic decision-making can optimize litigation procedures and handle simple cases through procedural and formulaic calculations, but it is difficult to handle major, complex and difficult cases; it can promote formal justice, but it is difficult to achieve substantive justice. Algorithms may be competent for many tasks in court, but they are not competent for making final decision. When it is critical, people are needed to make decisions, and people are the final decision-makers. Perhaps, with the breakthrough and upgrade of artificial intelligence technology, algorithmic decision-making will replace the human decision-making with higher quality, but it will still be a judicial assistant and a working partner, rather than an independent judge.

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