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Long Response 1: Case Studies

As technological advancements continue to emerge at an unprecedented rate, every passing day sees automated decision-making systems becoming more and more prevalent in our everyday lives, whether we notice it or not.. These systems are used to aid decisions in sectors such as healthcare, incarceration, and even policing. The latter of these is known as “predictive policing.” Predictive policing, simply put, is the use of algorithms to sift through and analyze crime data in order to predict, and prevent future crimes. PredPol is an example of an automated decision-making system that implements this idea of predictive policing. As of 2020, PredPol’s algorithm is the most commonly used predictive policing algorithm in the U.S, as it is used by more than 60 police departments around the country (Benjamin, 83).

Investigating the history of Predpol will give us key insights to why the algorithm works the way it does, and the associated ethical concerns and harms. PredPol, the company and the software, grew out of a research project between the Los Angeles Police Department and the University of California, Los Angeles. The chief of police at the time, Bill Bratton, wanted to find a way to use old crime data for more than just historical purposes. Furthermore, the research team wanted to understand if this data could provide any forward-looking insight to where and when future crimes were most likely to occur. Before PredPol, police officers had to either wait for crimes to occur then send units in response, or patrol where future crimes may occur solely based on intuition. Chief Bratton and researchers from UCLA and Santa Clara University sought to create a better system. Researchers analyzed numerous data types and behavioral forecasting models to find a predictive model that could help law enforcement keep communities safer by reducing the amount of crimes that happen. After over 70 years of PhD-level analysis, modeling, and development, PredPol was finally ready to be field tested (Predpol).

Now that we have some insight on how and why PredPol was created in the first place we can dive into why the algorithm works the way it does and how it is intended to be used to prevent future crimes. During the decades of detailed academic research into the causes of crime pattern formation, the research successfully linked many relevant aspects of offender behavior to a mathematical structure that is used to predict how crime patterns in a region will evolve day-to-day. These mathematical structures of crime pattern formation take the form of a complex partial derivative equation that takes into account over 10 unique variables. This equation is the basis for what machine learning experts call “a meta-algorithm.” A meta-algorithm is the set of instructions used to learn from data. The three aspects of offender behavior that make up the roots of the meta-algorithm are: repeat victimization, near-repeat victimization, and local search. In order to train the PredPol model for each specific jurisdiction it is implemented into, the company uses data from the police agency’s records management system to pull current and historical crime data. Once the data’s accuracy is ensured, the data is fed into the machine-learning algorithm explained above in order to make predictions. The developers of PredPol use 4 main data points for each incident in its data set to generate predictions. These categories include: an incident identifier, a crime or event type, a location of incident, and the start and end time for the incident. After these data points are fed into the meta-algorithm, the predictions the model makes takes the form of a ‘hotspot' map of where crime will most likely happen next. This allows police departments to allocate resources in hopes of preventing crime.

The idea behind this algorithm had great intentions, as preventing crime is something most people can support, but the model itself had major flaws. These flaws took the form of ethical harms and concerns .The first ethical concern that was produced by the implementation of PredPol was the lack of transparency from the parent company, as well as agencies that used their software. In a recent MIT Technology Review article the author explains that a number of studies show predictive policing models perpetuate systemic racism. Yet we still know little about how they work or who is using them. The reason for this is that the PredPol model is what is known as a “black box algorithm,” which is an algorithm that doesn’t allow users to see the inner workings of the algorithm itself. As Jumana Musa explains in a December 2021 Gizmodo article, “It’s like trying to diagnose a patient without anyone telling you all the symptoms.” No one knows how the algorithm works, even auditors, because PredPol themselves don’t want to face any repercussions for the harm their models produce. This issue is multifaceted, as there is also a lack of transparency from the agencies that implement these models. The main concern surrounding the police departments that use these technologies is that they aren’t required to show how, when, or why they use the predictions PredPol makes. One example that highlights this concern is the New York Police Department’s unwillingness to save audit logs or prediction history, making it difficult for independent auditors or policymakers to properly evaluate these tools. The good news is that there are many strategies we can implement in order to force transparency from these companies and agencies. The first step in unveiling the true nature of the PredPol algorithm is to make the parent company disclose information to auditors on the inner workings of the meta-algorithm itself. Secondly, agencies that implement this predictive policing technology must be forced to save all prediction data for future auditors. Once these are done the main remedy to this problem is the use of algorithmic impact assessments, which make agencies disclose the systems they are using and allow outside researchers to analyze them for future problems.

The next ethical concern surrounding the implementation of the PredPol software into modern policing practices is that the impacts of the model show a deviation from the ideal target, formally known as “label choice bias.” Emily Bembenek, in a 2021 Brookings article explains, “The gap between the ideal target and the actual target results in what we call label choice bias.” This means that if there is a difference between what an algorithm actually does and what it intended to do, the model is considered biased. Despite the company's claims that its research found the software to be twice as accurate as human analysis when it comes to predicting where crimes will happen and reducing crime in general. However, in March 2019, an LAPD internal audit concluded that there was insufficient data to determine if PredPol software helped reduce crime.” Furthermore there was no evidence the software provided police with information that they hadn’t already gathered.In her 2019 book *Race After Technology* Ruha Benjamin calls predictive policing software like PredPol “crime production algorithms.” She gives these models this candid label as police officers more heavily patrol areas PredPol flags as “likely for crime,” with the officers expecting to see crime, arrest people based on prejudice rather than need. This self-fulfilling prophecy deviates from the main goal of the software as there is a stark difference between increasing arrests and reducing crime. The remedy to this problem comes in the form of using more reflective data instead of using proxy data that only captures a part of the issue. In this case, the arrest data used to train the PredPol software is more reflective of police decisions as opposed to actual committed crimes. The Federal Bureau of Justice Statistics found that only forty-percent of violent crimes and less than one-third of property crimes were actually reported to the police on average. In order to make the software better at predicting where crimes are actually happening we need to find a way to extrapolate this data instead of using current arrest data to make the training data more representative of crimes as a whole.

The final ethical concern that arises from the PredPol software is its production of algorithmically biased results that negatively impacts historically marginalized groups in the U.S. The problem with the algorithm itself lies with the data the algorithms feed upon, as PredPol is easily skewed by arrest rates, which have been shown to target minority communities more. By law PredPol isn’t allowed to use race as a predictor, however they still use identifiers that act as a proxy to race. This allows the software to learn how to connect crimes with certain groups of people, and thus targets the areas these groups usually live. Katy Wheatington states in the aforementioned MIT Technology Review article, “we took bad data in the first place, and then used tools to make it worse.” This idea is reflected by the popular data science term “garbage in, garbage out,” which means if we train models with bad input data, we will receive outputs that reflect this bad data. We have seen that biased data has provided the model with “garbage in,” but it is also ever apparent in the real world that the model is producing the “garbage out” as well. This is shown in a study done by Gizmodo which analyzed the results of over 5.9 million predictions by PredPol throughout the states where the software is used in. The findings of this study showed that residents of neighborhoods where PredPol suggested few patrols were that of whiter and middle-to-upper-income families. On the contrary, neighborhoods where PredPol suggested more patrols were more likely to be home to African Americans, Latinos, and families that would qualify for Federal Free and Reduced Lunch programs. One staggering piece of information found by the study was that the most suggested neighborhoods had upwards of 11,000 predictions, showing just how much this software targeted these specific marginalized communities. For this particular harm there is really only one way to negate its impacts without scrapping the tool entirely, and that is to stop the use of prejudiced training data before meta-algorithms can even use it to make models. Although, this idea of completely unbiased and perfectly representative data is unattainable, if we make a board of ethically trained data auditors whose one job is to analyze data for any major biases or ethical concerns, we could greatly reduce the unintended negative impacts these machine-learning models emit.

With the rapid presence of machine-learning and artificial intelligence in our daily lives from things like facial recognition and social media sorting algorithms, to automated decision making systems such as predictive policing and credit card application services, it is ever so important that we take a step back and truly analyze the ethical concerns these technologies may produce. When AI and machine-learning technologies start to negatively impact the lives of those they are trying to enrich, we know it is time to slow down and really look at the consequences of a completely digitalized world. It is then our duty as citizens, and as consumers to hold companies accountable for their actions before we reach a point of no return, in which the ethical standards that activists took so long to attain seemingly vanish with every new system implemented.

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