Assignment 2: Proposal

Data Science Project Proposal

31268102

Shihan Zhang

Project Description

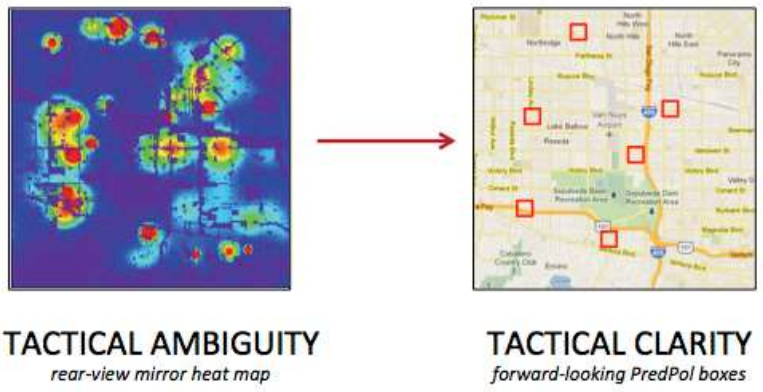
Introduction

The terrorist attack on September 11 in the United States was regarded as a failure of information sharing among the intelligence community. This unprecedented tragedy encouraged the government to introduce advanced surveillance networks. It stimulated taxpayers to invest more in taxes to develop new surveillance systems and related data mining programs to generate strategic intelligence (Sarah, 2017). Using surveillance networks combine with emerged big data and machine learning technology, law enforcement agencies transform passive police operations that focus on the rapid response into active police operations which focus on crime prediction.

In this case study, the main study target will be the representative works of predictive policing service - PredPol. The study will investigate from different angles such as the business models, how data science contributed to it and the critical thinking about the approach of machine learning algorithm corporated with humanity.

The background of PredPol

PredPol is not only the company name but also a predictive policing technology which use historical events to train algorithm models for different regions of cities. PredPol uses a data-driven approach called ‘PredPol box’ to perform patrols and updates algorithms based on new events in all target areas. PredPol allows the law enforcement part to be more proactive in the face of potential or existing crimes and to allocate law enforcement more efficiently.



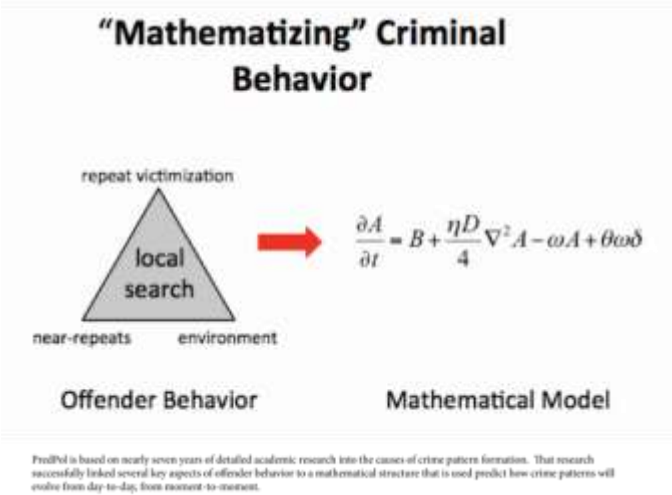
[1] image from PredPol

In 2011, the Los Angeles Police Department (LAPD) adopted the predictive policing technology by signed the contract with PredPol. An official report from PredPol shows that from January 2013 to January 2014, the estimated crime rate of the Foothills Division of the LAPD fell by 20% year over year. However, accompanied by remarkable performance is racial bias. Some critics argued that the program would lead to aggressive policing in communities of color, where reported crime tends to be high (Eva, 2019).

Business Model

Project Aims

PredPol is based on long-term research on the causes of crime patterns succeeded in linking several key aspects of criminal behaviour with a mathematical structure. This mathematical structure is used to predict how crime patterns will change daily.



[2] Image from PredPol

Three aspects of offender behaviour are essential of the model

1. Repeat victimization
2. Near-repeat victimization
3. Local search

These key elements allow the model to predict potential criminal activities more accurately.

PredPol uses data from the record management system of law enforcement agencies to extract current and historical crime data then feeds into machine learning algorithms to generate predictions.

PredPol is committed to real-time regional monitoring through algorithms and distributes law enforcement forces reasonably and efficiently to protect community safety and bring stability to society.

Benefits:

PredPol can contribute to several industries, which summarised as follows:

1. **For national security (social good):**
   a) National security agencies can conduct broad national surveillance to prevent potential terrorist attacks or national security risks through PredPol's real-time data.
   b) Combining PredPol's prediction result with the intelligence network, national security agencies can continue to track specific high-risk security events.

2. **For law enforcement (social good and financial benefit):**
   a) PredPol can reduce the labour cost of law enforcement agencies. PredPol algorithms can help law enforcement forces allocate to areas where they are most needed and reduce the deployment of personnel in low-risk areas.
   b) PredPol use of algorithms to monitor the target area has faster results and more efficient processing capabilities and will not be subjectively affected by human nature. The prediction results generated by the algorithm are more objective and more convincing in risk assessment.
   c) Proactive prevention is often more effective than rapid response. PredPol prediction result can allow the officer to be proactive in high trend area.

3. **For private security company (financial benefit):**

   PredPol can provide customized solutions to help customer lower their costs and improve service quality.

Challenges:

To be successful, PredPol requires a massive volume of COMPSTAT data from the relative agency. The significant amount of community will continue under surveillance 24/7. Challenge this presents to the projects are:

1. The management of the increasing amount of data which grown exponentially is a concern for this project. After Snowden's Prism incident, the public was susceptible to surveillance behaviours.
2. In U.S., the moderate population and living density allows the system to perform efficiently. However, in a country with a vast population, such as India and China, the data processing capacity will face enormous challenges.
3. Although the computation algorithm has a more convincing and objective assessment for potential criminal activity, it also shows the overaction to particular groups or regions, which leads the public to feels stress and loss of freedom.
4. Find a balance between algorithm and human nature is one of the challenges for PredPol. Although algorithms can be continuously optimized, the complexity of human nature cannot be predicted by mathematical models.

Reference:

1. Sarah, B. (2017). Big Data Surveillance: The Case of Policing. *American Sociological Review*, *82(5)*, 977–1008. Retrieved from https://doi.org/10.1177/0003122417725865
2. Moravec, E., R. (2019). Do Algorithms Have A Place in Policing? *The Atlantic,* Retrieved from https://www.theatlantic.com/politics/archive/2019/09/do-algorithms-have-place-policing/596851/

[1] figure 1

https://www.predpol.com/wp-content/uploads/2015/11/clarity.png

[2] figure 2

https://www.predpol.com/wp-content/uploads/2015/11/mathcaption.png