

Predictive Policing for Public Safety and Security Using AI

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Abstract

Life using AI becomes more prevalent in the next few decades. Keeping people safe could be the major challenge in coming days. As neural networks are increasingly utilized to capture and process data, we look at the benefits and dangers of future AI systems used in policing and security. Predictive Policing is an intelligence-led policing which focus on research based approaches to take another large step away from community policing. It provides the relevant information to describe, understand and foresee crime at different scales: operational, tactical and strategic events. The aim is to simplify decision-making. It makes sure that certain type of Law-enforcements should respond to the potentially lethal crime scenes. This enables police agencies to provide strategic deployment of resources to respond effectively to anticipated crimes. Predictive policing is a software which uses machine learning algorithm to calculate its predictions. The algorithm's trained for each new city's historical datasets, then it updates every-day with new events received from the department. AI isn't going to provide a quick fix for our Justice-system but it's going to simplify the problems.

Keywords: Artificial Intelligence, Predictive policing, Crime-analysis, Law-enforcement, Effective solution, Decision-making.

Introduction

Artificial Intelligence in all sectors of society is increasingly driven by data and analytics. Both government and private organizations are collecting, analysing and interpreting tremendous amounts of quantitative information to improve wisdom, decision making and to maximize efficiency. Crime analysts are now leveraging access to more data to generate predictions about where crime is likely to occur and where the suspects might be located. Law enforcement agencies are participating in the data and analytics revolution to improve public safety.

Objectives

It's developed for Law-enforcements to detect and prevent crimes. It simplifies the job of Law-enforcements by suggesting to take actions against certain crimes. It's implemented in court to take-out bias and for fairer sentencing decisions.

Techniques

There are three types of analysis techniques that police analysts can use to predict crime. They are:

- i. Analysis of space.
- ii. Analysis of time and space.
- iii. Analysis of social networks.

[**Note:** The above techniques are not the only ways of predicting crime, as there are a lot number of techniques increasing every day. However the above techniques provide an overview of different types of analysis commonly undertaken and their pro-cons.]

i. Analysis of Space

This technique uses crime mapping to identify the crime hot spots, areas in which there is greater likelihood of crime than in the surrounding areas. Hot spot detection can inform short-term decision making about resource allocation and long-term policing related to crime reduction. It is important to keep in mind that a hot spot is a perceptual construct. The final location, size and shape of hot spot are influenced on factors such as:

- Which criminal incidents are included in the analysis?
- Whether the hot spots are determined by the concentration of past criminal incidents, environmental characteristics associated with crime, or both.
- The weighting scheme applied to past criminal incidents.

ii. Analysis of Time and Space

The factors mentioned above are used to find hot spots with high crime levels. However they cannot illustrate how the incidence of crime changes over time. The hot spots can help officers to make quick, informed decisions about how to allocate their time during a shift. Some tasks however demand attention to temporal patterns. If a police department has observed a series of robberies and is attempting to predict the next incident in the string, it is critical to identify both spatial and temporal path taken by the suspected offender. To generate or predict when and where the next crime in sequence will occur, an analyst can calculate the average time, distance and direction based on the appropriate interval length and by examining the temporal and spatial relationships between the incidents in a given sequence.

Although this technique has a strong theoretical basis, it does not always produce conclusive results. There are many sequences of incidents in which a clear spatial and temporal pattern fails to emerge. Sequence with small number of incidents or long timespans between incidents may fail to reveal an underlying pattern. An inaccurate data such as exclusion of incidents committed by the offender of interest or inclusion of event committed by another offender will bias the prediction. In conclusion, this technique is a potential tool for crime prevention, this technique requires refinement before it can be regularly used by law enforcements.

iii. Analysis of Social Networks

The chief purpose of the previous two categories of techniques discussed is mainly targeted on geographical locations and timely data. This technique is primarily focused on detecting person of interest, as opposed to location of interest. Through this technique, police can identify individuals that are central to criminal organizations such as gangs, drug distributions and crime networks, and develop effective interdiction strategies. Organized crimes such as drug trafficking, gang violence and serial robberies requires the creation and maintenance of various relationships. For example, a drug dealing network may include suppliers, distributors, smugglers, buyers and money launderers. Criminal networks are embedded in the social context in which they operate.

They victimize and are nourished by members of the community, including family, friends and retailers. This technique helps police analysts to map these numerous interpersonal connections and mine them for actionable information. The effectiveness of this technique is partially dependent upon the decisions made by the analyst, such as:

- Which initial members to include in the network?
- Which types of relationships to include?

If the mapped network is too small or too large, the prediction might not conclude proper results. Specific decisions should be guided by the nature and general known facts of the crime under investigation. Appropriate safeguards and procedures will need to be put in place to ensure the public that such analysis are not misused, to undermine the privacy of individuals who are not under suspicion or undercut the due process rights of individuals who are under surveillance.

Advantages

- Provide a circumstantial awareness leading to specific crime risks.
- Help understand factors and circumstances triggering or facilitating crime in general.
- Support a more effective planning and execution of crime prevention measures.
- Give information helping to initiate/adapt operational, tactical and strategic police activities.
- Contribute to specific case investigations.
- Provide tools for hypothesis building and assessment including the hypothesis evaluation against events or facts over time.
- Provide tools to reveal underlying patterns, meaning and trends within and across datasets via analytics.
- Provide tools for assessing which data is or is not necessary from an analyst perspective.

Downsides

- Overreliance on technology.
- Privacy and security matters.
- Slight fault in data may lead to wrong predictions.

Challenges

1. Improving surveillance in public places.
2. Collecting and managing large volumes of accurate data.
3. Ensuring analysts possess sufficient domain knowledge.
4. Maintaining adequate analytical resources.
5. Fostering productive communication between analysts and officers.
6. Ensuring officer follow-up on recommendations.

Recommendations

- Treat predictive policing as an extension tool or an addition, but not as a substitute for traditional policing methods.
- Keep analysts updated with new implementation techniques and to be available only for law enforcements.
- Consider the nature of jurisdiction and crime.
- Collect accurate and timely updated data.
- Designate experienced and knowledgeable leaders to make final decisions.

Conclusion

Intelligence led policing, a predictive approach of analysing the problems with a proper decision making leads to minimize the crime rates. The historic study of particular location, previous crime type, rates and the frequency of crime patterns are easily assisting policemen to reduce social harms and ethical issues. The policemen have to integrate their knowledge and criminal intelligence for crime analysis to prioritize and classification to come up with a best suitable decision. The same strategy and working principles can be applied for any type of crime irrespective of type, location which may in turn lead to control and get hold of things and people finally making a safe and a better World.

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