CRIME FORECASTING AND PREVENTION: EXAMINING THE ROLE OF MACHINE LEARNING MODELS

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INTRODUCTION

The utilization of **machine learning (ML)** models for crime prediction presents a potential opportunity for the **prevention of criminal activity**(Lin et al., 2017). The goal of this study is to determine which **ML models are effective and deployable for crime prediction in populated areas**, with some insights on their potentials as preventative tools. The practical application of ML models for crime prediction is contingent on their **usability by security agencies** (Shah, Bhagat and Shah, 2021). Therefore, the ease of implementation of these models as security tools is highly important and a factor to be considered for applying them for crime prediction. **To mitigate possibility of bias and privacy**, an examination of the analytical process involved in generating crime predictions, is necessary (Lum and Isaac, 2016). This research would determine the appropriate, effective ML models and the identification of **key data features** that are relevant to crime prediction

RESEARCH OBJECTIVES

- What ML models have been successfully applied to predict crime?
- Which data features influence the performance of ML models for prediction?
- How effective are these ML models for crime prediction and how can their performances be improved?
- How can ethical and legal considerations be addressed in deploying ML models for crime prediction?

## METHODOLOGY

Figure 1: Methodology Flowchart
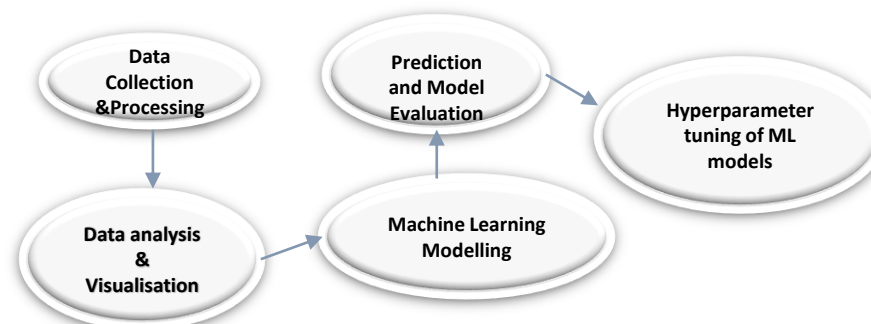
As shown in **Figure 1**, Methodology starts with data collection and processing, then Visualisation with Analysis of the crime dataset. The machine modelling will provide the **prediction of crimes and the performance metrics** are evaluated(Kim et al., 2018). To improve accuracies of the ML models, **hyperparameters will be tuned**, then evaluation of the performances. **Figure 2** is an analysis of a crime dataset with a predictive ML model, Naïve Bayes

Figure 2: Naïve Bayes as prediction model for crimes
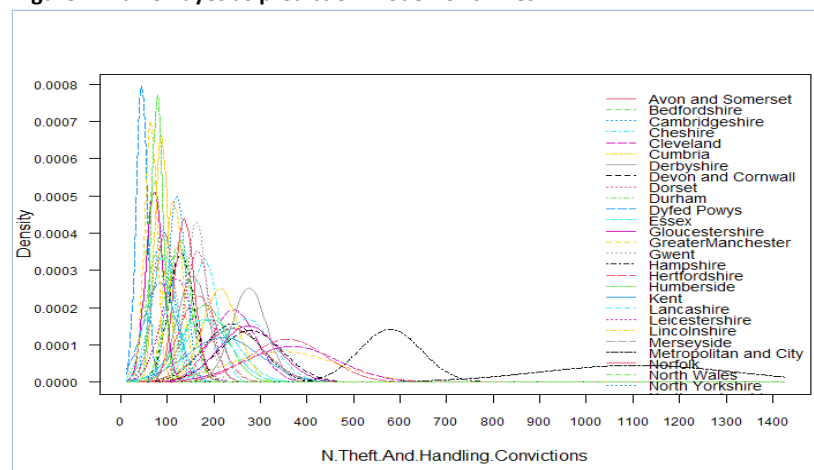
EXPECTED OUTCOMES

- A recommendation of **well-tested, time-saving** ML models which can accurately and effectively predict crimes when compared to other existing models
- Provision of practicable suggestions on how security agencies can deploy these models **as tools for crime prediction with ethical implications addressed. Figure 3** depicts a linear relationship between two correlated features in a crime dataset, useful in predicting crimes
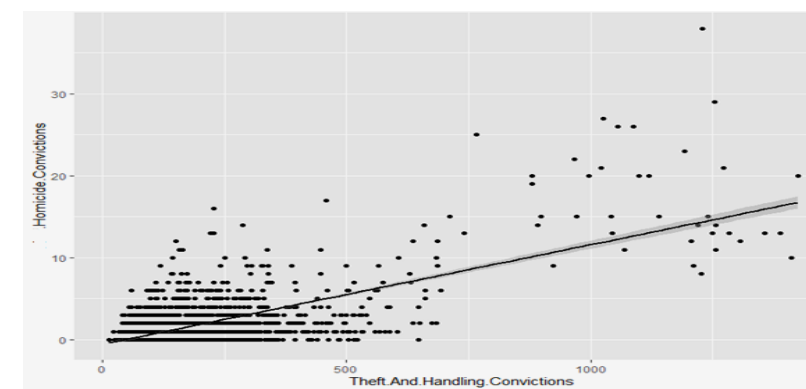
CONCLUSION

The application of effective machine learning models holds the potential to serve as a critical strategy in crime prevention(Saraiva et al., 2022). The deployment of these rigorously evaluated machine learning models as **security tools by law enforcement** agencies and personnel who have undergone requisite training is key to mitigate crime. With appropriate and monitored usage, an efficient ML model framework, is expected to **significantly curtail crime rates and enhance economic growth** in those regions

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