

## Chapter 23

# Prognostication of Crime Using Bagging Regression Model: A Case Study of London

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### ABSTRACT

*Crime is a social and economic problem that affects a country's quality of day-to-day life and economic growth. However, analyzing and forecasting crime is not a straightforward job for a law enforcement investigator to manually unravel the underlying nuances of crime data. To make this process easier and more automated, the authors present a machine-learning model for crime analysis and predictions. The authors used a London crime dataset and enhanced the data set by incorporating population density, percentage of economically inactive working age, and average monthly temperature. The pre-process step prepares the raw data and makes it suitable for the machine-learning model. Bagging and boosting ensemble techniques were used to find a better machine-learning model. GridSearchCV was used to tune hyperparameters to find the best-performed model. Parameters were tuned as an iterative processes. Eventually, the researchers compared all the algorithms and selected the Random Forest bagging regression model as the best-performed algorithm.*

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## INTRODUCTION

Human consciousness has progressed in both positive and negative directions. Although this human mind developed pleasures, numerous people were deprived of essentials due to the concurrent population growth, which resulted in the development of intrusive thoughts. Some people were adapted to meet their basic needs at any expense, so they turned to crime. The word crime is derived from the Latin term “crimen,” which means both an offense and a wrongdoer. Crime is regarded as an anti-social action as well as a public wrong. It is an offense that breaches state law and is strongly condemned by society. Crime is defined as acts or omissions prohibited by law and punishable by imprisonment or a fine (Sowmyya, 2014). Crimes include murder, robbery, burglary, rape, drunken driving, child abuse, etc.

Crimes are classified into the following categories based on the medium affected: personal crimes, property crimes, victimless crimes, organized crimes, and computer crimes (Yusupov, Okhrimenko, & Pilyukov, 2021). Personal crimes are those that are committed against a single person. Murder, assault, and sexual assault fall into this category. Property crime is one in which the object of the crime is materialistic property. Burglaries, theft, and vandalism are some examples. Crimes such as prostitution, illegal gambling, and illegal drug use are examples of victimless crimes. Because there is no identifiable victim in these crimes, they are called victimless crimes. These acts go against an individual’s moral values (Sowmyya, 2014).

Organized crime is defined as acts committed in an organized manner by two or more criminals working together. These crimes include kidnapping, fraud, selling illegal or prohibited goods, money laundering, human trafficking, vote buying, and so on. Cybercrime is a type of crime that involves the use of a computer and a network. The computer could have been used to commit a crime, or it could be the target. The term “Net crime” refers to the illegal use of the internet. Cyber terrorism, cyber warfare, internet harassment, spam, and internet fraud are some examples of computer crimes (Sowmyya, 2014).

In the past, the crime rate was not exceptionally high. However, the crime rate has risen alarmingly over time. This rise in crime rates could be attributed to various factors and social issues. Numerous factors contribute to a person’s decision to become a criminal. The following are the primary causes of crime: social causes, economic causes, psychological causes, biological causes, and geographical causes. The sum of social factors that determine, induce, and cause crime in society is the social causes of crime. It investigates the social causes of crime and all types of particular social phenomena that contribute to crime. The activities and phenomena that cause or affect crime are called the causes of crime. As part of the fundamental problems of criminology, the social cause of crime is committed. The social cause of crime is associated with the emergence and existence of crime, which is widespread and unavoidable, as well as being prevalent and essential for the actor, subject, or people in society.

Money is at the center of everything and has become the foundation of many relationships in this world. Poverty is the root of most crimes. The poor are unable to meet their most basic needs. To meet their basic needs, they commit crimes such as burglaries, murders, and so on (Yaacoub, 2017). Many young people who are constantly unemployed commit suicide out of frustration. Others resort to thefts, pick-pocketing, robberies, and so on. Therefore, the economic situation is a significant cause of crime. On the other hand, a person may become a psychic for social, economic, or psychopathic reasons. An unusual person has a great deal of freedom, lack of responsibility, revolt, homicidal tendencies, suspicion, inability to control, sadism, feelings, social maladjustment, ill behavior, immaturity, and so on. Therefore, he tends to commit violent acts. He becomes rude, explosive, disobedient, and socially inept.

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