Chapter 11

Machine Learning–Based Prediction Analysis of Unlawful Activities to Aid Law Enforcement

Vijayalakshmi G. V. Mahesh

https://orcid.org/0000-0002-1917-7506

BMS Institute of Technology and Management, India

Shilpa Hiremath

https://orcid.org/0000-0002-1577-8523

BMS Institute of Technology and Management, India

Chandra Prabha R.

https://orcid.org/0000-0003-4236-2782

BMS Institute of Technology and Management, India

ABSTRACT

One of our society's most significant and pervasive issues is crime. Numerous crimes are perpetrated often each day. The development of policing strategies and the implementation of crime prevention and control depend greatly on crime prediction. The most popular prediction technique right now is machine learning. Little research, however, has rigorously contrasted various machine learning approaches for crime prediction. The dataset in this instance consists of the date and the annual crime rate for the corresponding years. The crime rate used in this project is only based on robberies. Utilising historical data, the authors employ the linear and random forest regression algorithms to estimate future crime rates. The algorithm receives the date as input, and the result is the total number of crimes that year.

1. INTRODUCTION

Crime poses a serious threat to humanity. They are growing and dispersing quickly and widely. Crime occurs everywhere, in both tiny towns and large cities. There are many distinct forms of crimes, including robbery, manslaughter, assault and false imprisonment. Due to the increase in crime rates, cases must be resolved significantly and more quickly. In order to manage and lessen crime, which has been growing at an increasingly rapid rate, law enforcement has to take necessary measures to control and reduce the crime activities. The primary goal of law enforcement is crime prevention and criminal identification. Due to the vast amount of data available on crime, technology is required so that case solving can be completed more quickly.

The biggest drawback noticed is that as the population grows daily, crimes likewise grow in various locations, making it impossible for officials to anticipate the crime rate with any degree of accuracy. The authorities may not be able to forecast future crimes because they are focused on so many different issues. Even when the authorities and police personnel work to lower the crime rate, they may not fully succeed.

For law authorities, predicting the future crime rate may be challenging. Numerous works have been done in relation to crimes. To aid in the tracking of law enforcement, extensive datasets have been evaluated and information like location and crime nature have been extracted. These databases have been exploited by existing techniques to locate crime hotspots and identify them. There are numerous maps programs that display the precise crime scene as well as the type of crime for every specific city. Despite the fact that crime scenes have been located, there is no information on the day and time the crime really occurred or any methods for reliably predicting future crimes.

It has been established via numerous studies and situations that data science and machine learning may expedite and simplify the task. With the aid of a machine learning(ML) system, this approach aims to forecast crime. The goal of this work would be to create a prediction model. The test dataset will be used to validate the training on the training data set. For the purpose of predicting crime, multiple linear regression and random forest regression is used. By assisting law enforcement organizations in predicting and detecting crime per capita in a community, this work aids in lowering the crime rate.

The rest of the chapter is organized into four sections. Section 2 details about the related works on crime prediction based on machine learning. The process followed in the implementation and the related information is presented in section 3. The experimental results and discussion are provided in section 4. The chapter is finally concluded in section 5.

2. RELATED WORK

To address the issue of crime prediction and to minimize crime, various researchers have offered numerous approaches, and several crime-prediction algorithms have also been proposed. The type of data used and the attributes used for prediction affect the prediction's accuracy.

According to (Bogomolov et al, 2014), mobile network activity was utilized to gather information on human behavior that was then used to predict the hotspot for crime in London with an accuracy of roughly 70%. The key innovation of the suggested method was how it approached the problem of crime prediction by using aggregated and anonymized human behavioral data obtained from mobile network activity. The results of earlier research projects, which either used historical context or offender profiling, reinforced the idea that aggregated human behavioral data collected from the mobile network infrastructure.

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