

Predictive Modeling for Topographical Analysis of Crime Rate

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Abstract - Criminal activities are increasing all over the world. It is important to reduce crime as it directly affects the country's economic growth. There is therefore an urgent need for security agencies to fight crime reduction in the community. The proposed system enables us to detect crime and resolve crime cases quickly based on data collected using machine learning strategies. The system helps to predict the type of crime in a particular area based on crime patterns. In this project, we will be using the machine learning method. Contains important information about crime reporting such as date, type of crime, crime scene, etc. The data is downloaded from a website called kaggle.com and is processed in advance so that we can extract the most important environmental features of crime reporting. such as a few streets or places, days, times, and places with a higher crime rate than others. This data is used as an incentive to predict and resolve crime quickly. This work will help us find a way to improve the crime detection system, the type of crime that will occur in a particular area, and how to improve investigative efforts of any kind of crime.

Keywords: Machine learning, Crime prediction

1. INTRODUCTION

Today crime is on the rise worldwide. It affects the quality of life and the development of economic well-being and the dignity of the nation. It directly affects the growth of the nation's finances by burdening the government with financial burden due to the need for more police, and criminal justice courts. With regard to public safety, there is a need for more sophisticated ways to improve crime analysis to protect their communities. Accurate forecasts of crime help to reduce crime but often remain problematic as crime relies on many complexities. The basic pattern of crime and its relationship with the state or region helps us to identify and predict crime in a particular area. According to a previous study, it is clear that in every city there are fewer roads or areas with a higher crime rate than others. Crime can be predicted as criminals become stronger and more active in their comfort zone. When they succeed they try to repeat the crime in one place. The occurrence of a crime depends on a number of factors such as criminal intelligence, local security, etc. Usually, Criminals choose the same location and time to try the next crime. While it may not be true in all cases, the chances of it recurring are high, according to

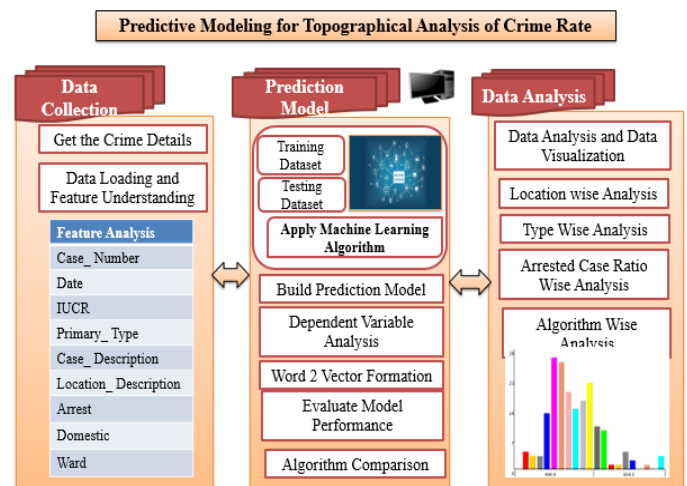
research, and this makes crime predictable. Predicting crime patterns is an important function in developing effective crime prevention strategies or to develop investigative efforts based on prior data acquisition such as case information, location, date, and time. Here, we use machine learning techniques to predict crime and its types in crime areas. Machine Learning is a kind of practical wisdom that helps us to identify patterns using data analysis. There are three stages:

- 1) The database is issued on the official site.
- 2) With the help of machine learning algorithm, we use python as a context to predict the type of crime that will occur in a particular area.
- 3) The model will be trained to predict. Training will be conducted using a set of training data that will be validated using a test database uploaded through the Kaggle website.

2. PROPOSED SYSTEM

The proposed system helps us to detect crime and resolve crime cases quickly based on data collected using machine learning strategies. The program helps to predicting the type of crime in a particular area based on crime patterns. Various machine learning algorithms are compared and a high-precision algorithm is used to predict crime rates.

3. SYSTEM ARCHITECTURE



Data Uploading and feature understanding : The data downloaded from kaggle is pre-processed so that we can extract the important natural features of crime forecasting. Like a few streets or places, date and time, places have a higher crime rate than others. This data is used as an incentive to predict and resolve crime at an instant rate. The main factors used to detect a crime rate are the following

- 1) Number_Case
- 2) The_the day of the crime
- 3) Type_first
- 4) Case_description
- 5) Location_description
- 6) Imprisonment
- 7) Home Affairs
- 8) Ward

Various studies and studies have shown that high crime rates occur at a relatively low level. Also, a comprehensive study of crime in the area helps to understand the root pattern of crime in the area it suffers from.

Reliable Flexible Ratings: Reliable variables or predictive variables are the ones that help determine the most dependent factors for crime-related variability. For example, the Criminal Code (iucr) has nothing to do with predicting crime rates or does not bother to predict. So here through the database, we reach the goals or aspect that most influences crime forecasting. The analyzed data is visualized so that the word becomes a vector and in this well-tuned data we can use an algorithm to obtain the final result.

Statistics: Data Analysis Evaluation is the first process of analysis, where you can summarize data features so that you can predict multiple crimes and predict the type of crime, the potential location, which may occur in the future depending on various circumstances.

Built-in Prediction Model: The system creates a predictive model using a random forest process. It is one of the learning ensembles that combines fewer trunks than a single deciding decision tree. While separating all the trees from the forest randomly gives the class an anonymous example and the class with the most votes will be given an anonymous example. Strategies that make variables dependent on variables and vector-building variables in order to Predict Key Criteria for Finding and Preventing Crime. Data analysis helps to identify useful features for building a predictable model, such as predicting the arrest of a particular type of crime in a particular area and predicting the amount of crime especially by a particular date and time.

4. APPLICATION DESIGN

The peculiarity of User Interface of Crime rate detection app:

User interface screen will be log in screen first. User uploads the resume to the system.

User interface will provide good look and feel effect so that it will user friendly. And he or she can operate system very efficiently for getting resume score and skill recommendation.

Main tasks involved in the projects are

- 1) Task -1 : Data Uploading and feature understanding
- 2) Task - 2 : Dependent Variable Analysis
- 3) Task- 3 : Built Prediction Model to Predict Important Aspects Of Crime

5. IMPLEMENTATION

The first step in data collection is to gather together data from previously available/current data sets from online sources. These data sets are combined to form a common data set on which the analysis will be performed.

Data collection :The data set collected for crime prediction is divided into a training set and a test set. Test suites are predicted based on the accuracy of the test results.

Data Preprocessing: This process involves removing zero or infinite values that can affect the accuracy of the system. The main steps are: Format, Clean and Import. The cleanup process is used to remove or correct missing data that may be incomplete. Sampling is a process that uses the appropriate data, so it can reduce the running time of the algorithm. Preprocessing is done using Python.

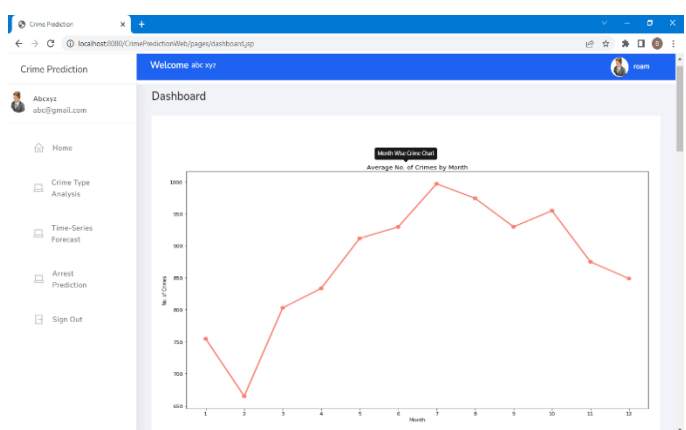
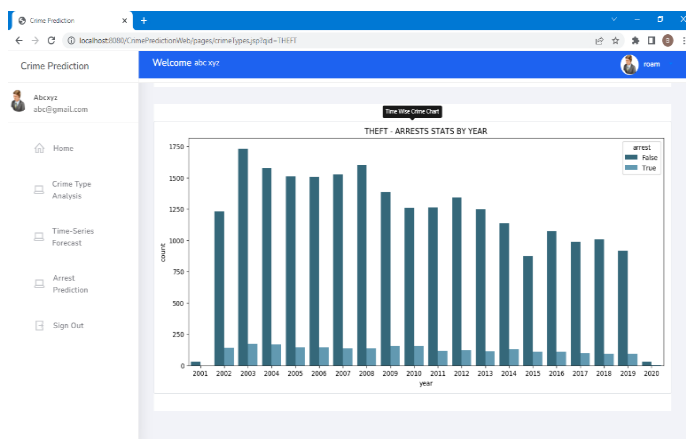
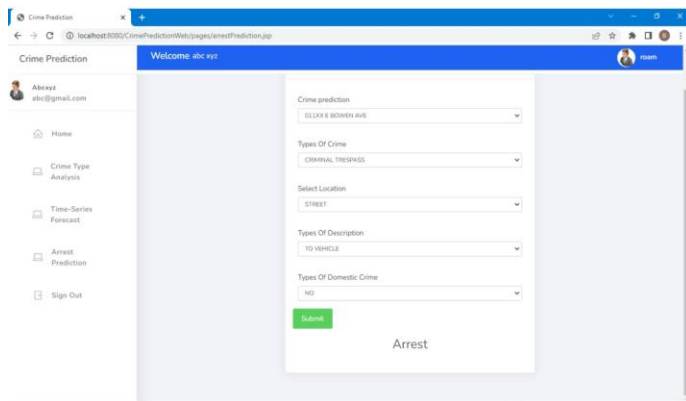
Feature selection: An element has been selected that can be used to build the model. The attributes used for feature selection are .dropna(), .sum(), .unique(), .info(), . read_csv().

Training: This method randomly divides the data set into training and test data in a ratio of 67:33/70:30. Then encapsulate all algorithms. The training data is then fitted to this algorithm so that the computer can learn from that data. This concludes the tutorial part.

Prediction: A prediction method that takes the new feature size of an empty array and that array as input and produces a predicted target value as output. So the expected target value will be 0 or

1. Finally to find the test result that represents the percentage of no. A method of determining which predictions were found to be correct and the total number of predictions made, as well as an accuracy score that basically compares the actual values in the test set to the predicted values.

6. RESULT



7. FUTURE SCOPE

The scope of using the ML model for crime prediction and prevention can change the scenario of law enforcement agencies. Using a combination of ML and computer vision can substantially impact the overall functionality of law enforcement agencies.

In the near future, by combining ML and computer vision, along with security equipment such as surveillance cameras and spotting scopes, a machine can learn the pattern of previous crimes. A possible automation would be to create a system that can predict and anticipate the zones of crime hotspots in a city. This complete automation can overcome the drawbacks of the current system, and law enforcement agencies can depend more on these techniques in the near future. Although the current system has a major impact on crime prevention, it could be the next-generation approach and could lead to a revolution in crime rates, prediction, detection and prevention, i.e. "universal police".

8. CONCLUSION

Criminal activity is present in all parts of the world. Accurate, real-time crime prediction helps reduce crime, but remains a challenge as the number of crimes varies based on complex factors such as crime scene, time, date, crime type, department, household, and more. Attempts to use it are made here. Machine learning algorithms to fight crime and save humanity. The main goal of this work is to create a predictive model that can accurately predict crime for a specific location using random forest machine learning methods. An analysis of various machine learning methods is presented here.

9. REFERENCES

- [1] Hitesh Kumar Reddy Toppi Reddy, Bhavna Sardinia, Ginika Mahajana, "Crime Prediction & Monitoring Framework Based on Spatial Analysis ", International Conference on Computational Intelligence and Data Science (ICCIDS 2018).
- [2] Suhong Kim; Param Joshi; Parminder Singh Kalsi; Pooya Taheri, "Crime Analysis Through Machine Learning", 2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON).
- [3] Lawrence McClendon and Natarajan Meghanathan*, "USING MACHINE LEARNING ALGORITHMS TO ANALYZE CRIME DATA", An International Journal (MLAIJ) Vol.2, No.1, March 2015.
- [4] Adewale Opeoluwa Ogunde1, *, Gabriel Opeyemi Ogunleye2, Oluwaleke Oreoluwa1, "A Decision Tree Algorithm Based System for Predicting Crime in the University ", Machine Learning Research 2017; 2(1): 26-34.
- [5] Dr.J.Kiran, Kaishveen., "Prediction Analysis of Crime in India Using a Hybrid Clustering Approach", 2018 2nd International Conference on I-SMAC (IoT in Social, Mobile, Analytics, and Cloud) (I-SMAC) I-SMAC (IoT in Social, Mobile, Analytics, and Cloud) (I-SMAC), 2018 2nd International Conference.