

CRIMINOLOGICAL ANALYSIS USING DATA MINING

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ABSTRACT

Day-by-day the crime rate is increasing considerably and is posing threat to the mankind itself. Criminology is an area that focuses the scientific study of crime and criminal behavior and it's a process that aims to identify crime characteristics. Analysis of crime is a part of criminology that includes exploring and detecting crimes. We propose here a data mining based approach for analyzing the available crime data for predicting the possible crime rate and areas of concern. This approach will help law, empowerment and also provide a guideline for the civilians regarding security.

KEYWORDS: Criminology, Crime, Data Mining, Prediction

INTRODUCTION

Day-by-day the crime rate is increasing considerably. According to crime bureau records crimes like burglary, arson, etc. have been decreased with respect to crimes like murder, sex abuse, etc. Even though we cannot predict who all may be the victims of crime but can predict the place that has the probability of its occurrence.

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As there is a huge amount of a crime dataset and the complexity of the relationships between this data have made criminology an appropriate field for applying data mining techniques.

We propose an integrated system that will take a given description of a crime, including its location, type and time. Based on this data the system will generate patterns of the areas which are crime prone for a particular crime.

The idea is to try to capture years of human experience into computer models via data mining. The criminal is becoming technologically sophisticated in committing crimes. Therefore police needs such a crime analysis tool to catch criminals and remains ahead in eternal race. The police can use the current technologies to give them the much-needed edge. Availability of relevant and timely information is of utmost necessity in conducting of the daily business and activities of the police, particularly in crime investigation and detection of criminals. Police organizations everywhere have been handling a large amount of such information and the huge volume of records.

We can also create awareness campaigns in crime prone areas based on the patterns generated the police can use various strategies to reduce crime rates. The system uses various data mining techniques to generate patterns and handle complex data.

LITERATURE SURVEY

According to the information reviewed by talks with the police officials, the necessity for the use of Information Technology in the field of criminology was highlighted. The police stations have abundance of crime data which are

maintained in the file as criminal records. Most of the data is maintained on file and hence it is very difficult to analyze and classify it manually. The digitization of this system is being worked upon by the government, but is far from satisfactory as of now.

Traditional System

In traditional system all the data related to the crime are maintained manually. The police department has to maintain all the data of crime such as the crime location, date, type of the crime, information about the victim and also the suspect. Records of the data are maintained in files.

The drawback of the traditional system is that there is the possibility of unauthorized modification of the crime data due to manual interventions. Also the manual mechanism is liable to other natural failures including failure. The analysis of the data is practically impossible.

MODERN INVESTIGATION TOOLS

Crime and Criminal Information System (CCIS) and Common Integrated Police Application (CIPA)

CCIS is a national project of sharable database on crime and criminals at district, state and national level for assisting investigating and supervising officer and police planners to formulate a crime-control strategy. Common integrated police application (CIPA) provides the basis for evolution for crime and criminal information system (CCIS) which is uniform across the country from police station level onwards. It aims at automation of all functions carried out at primary source of information itself the police station.

Drawback

- The absence of an intelligent decision support system made it a somewhat standalone system.
- No analytical tools for analyzing large databases.

Coplink

COPLINK a tactical, line-level solution to the problem of inaccessible or irretrievable information as a result of disparate law enforcement information system that lack a common language or platform. IBM COPLINK is police software with capabilities to consolidate data from many sources, aid collaboration and help generate tactical leads.

Drawbacks

- COPLINK have limited areas. It is used only in Arizona.
- One of the biggest drawbacks of COPLINK is that it is complicated to use. Multiple queries need to be fired to get the required information.

ReCAP

The regional crime analysis program (ReCAP) system is a computer application design to aid local police forces. ReCAP is a tool which uses data mining technologies to analyze crimes.

Drawbacks

- Highly localized.

- Works on specific data structures and relies on RDBMS.

PROPOSED SYSTEM

Approach

The prediction of future crime trends involves tracking crime rate changes from one year to the next and use data mining to project those changes into the future. The basic method involves cluster the states having the same crime trend and then using "next year" cluster information to classify records. This is combined with the state poverty data to create a classifier that will predict future crime trends. To the clustered results, a classification algorithm was applied to predict the future crime pattern. The classification was performed to find in which category a cluster would be in the next year. This will allow us to build a predictive model for predicting next year's records using this year's data. The decision tree algorithm can be used for this purpose.

System Architecture

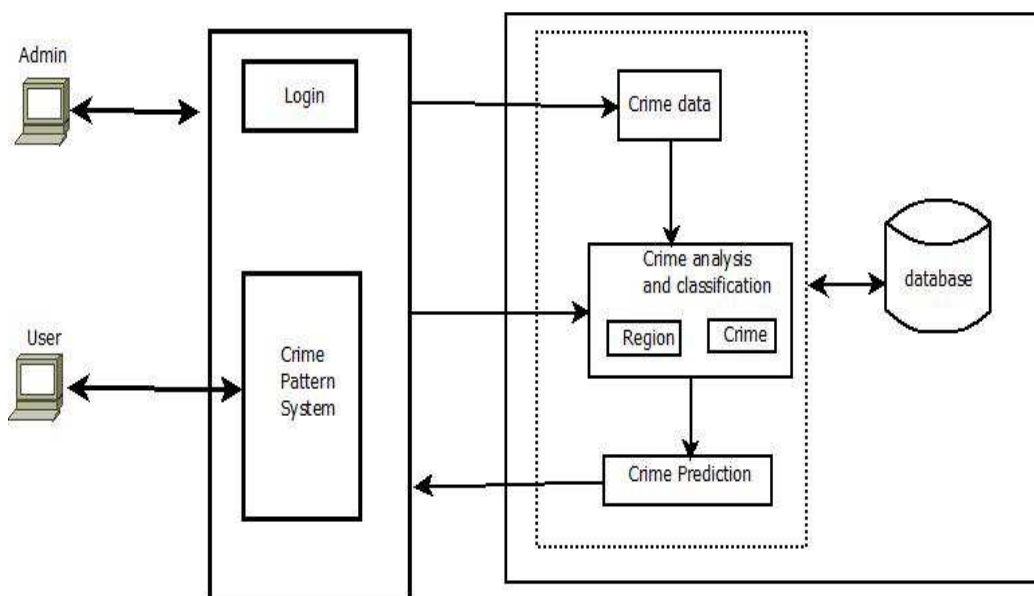


Figure 1

MODULES

Hotspot Detection

Hotspot detection focuses on detecting active areas in crime, i.e. an area where a particular crime frequently occurs. The input to this module is queried by area or query by crime.

The data clustering algorithm is used to divide the data objects into subsets. Clustering is the process of partitioning a set of data objects into subsets. Each subset is a cluster, such that objects in a cluster are similar to one another, yet dissimilar to objects of other clusters. Different clustering methods may generate different clusters on the same data set. Two possible approaches for clustering are:

- K-Means (A Centroid-Based Technique)
- K-Medoids (A Representative Object-Based Technique)

Fore Casting

Crime forecasting helps to identify which areas are crime prone which helps the police officials to take various measures to tackle it and generate awareness among people, thereby making them vigilant about any suspicious activity which in a way helps the police officials.

By using a fitted value algorithm the value of crime prediction will be generated. The predictive value used will be approximate and it will help the police to figure out or predict the future occurrence of crime.

Spatial statistics is being used for specifying area using Google maps.

Expected Result

This system allows the law enforcers to analyze the crime prone areas so that the proper action could be taken by them. This will help in reducing the crime rate by taking proactive actions. Also, it allows for more awareness among common people for them to be able to avoid the unwanted incidents.

CONCLUSIONS AND FUTURE SCOPE

As the crime rate and criminal psychology is increasing, it is becoming a threat rather than a concern for humanity. The only way to curb this threat is to increase the awareness among the people and also to help the lawmakers and police to prevent such crimes. This can be achieved by being able to predict the possible criminal threats and the area of concern. The paper proposes a data mining approach for predicting the possible crime rates to help curve the crime rate and also to make people aware about the possible situations helping the more concerned to take preventive measures.

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