

Recommending Security Level of Particular Place using Collaborative Filtering Approach

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ABSTRACT

In today's world most of the crime data is available in enormous volume, but proper filtering is required to get the knowledge from the data. In our system we are giving analysis of crime level for particular location of person's interest. The existing solutions to crime are not sufficient to give the proper recommendation on the basis of the crime prediction. There is not a system available to give the proper judgment of the crime on the prediction basis. In this system we are using item base collaborative filtering to get the correct prediction of crime. Final report of crime will help person to understand what kind of crime is happening in particular region. This will help them to take the decisions of travelling, migrating for education, job etc.

Our system will also recommend security of particular location i.e. hotspot areas and hence help the people to take right decisions.

Index Terms: Crime Prediction, Hotspot, Crime analysis, Collaborative filtering.

1. INTRODUCTION

Data mining is data analyzing techniques to find patterns and trends in crimes. It can help solve the crimes more speedily and also can help to alert the criminal detection automatically.

The crime patterns are consistently changing and rapidly growing. The crime data previously stored from various sources have a tendency to increase steadily. The management and analysis of huge crime data are very difficult and complex.

The new advance technologies can help address such issues. Crime mapping and analysis have developed significantly. This analysis focuses on crime hotspot detection. Crime hotspot is an area where more crimes occur compared to other areas. Based on the huge crime data we are predicting the safety levels of particular region using collaborative filtering techniques. These techniques also help to recommend safety measures. Thus we are designing a system that will use collaborative filtering technique to predict the safety level of particular location.

2. LITERATURE SURVEY

1. In this paper [1] GIS is used to grasp spatial and temporal patterns of crime offenses has become additional prevalent in recent years; GIS makes possible to optimize effectiveness within the reduction of crime and to extend the security of residents. Vital method offered through GIS is that the identification of crime hotspots, or crime locations with a high crime rate. The identification of crime hotspots in time might even

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be awfully important, make possible in higher understanding of crime pattern build a criminal offense reduction display and conceding the strategic deployment of resources naturally and places after they will make the best distinction. Spatial-Temporal crime analysis plays a fundamental role in lots of security related crime forecasting applications.

2. This paper [2] tells that Crime is classically “unpredictable”. It is not necessarily random, but neither does it take place consistently in space or time. In this study, they have discussed the preliminary results of a crime forecasting model developed in collaboration with the police department of a United States city in the Northeast. The datasets contain aggregated counts of crime and crime-related events categorized by the police department embedded in the data. This paper used the hotspot and cold spot system which depends upon the threshold value of the system.

3. This paper [3] proposes that solving crimes is a complex task that requires human intelligence and experience. In this research we believe data mining is a technique that can assist law enforcement officers with crime detection problems, so the proposal tries to benefit years of human experience into computer models via data mining. The proposed model is a three correlated dimensional model; each dimension is a dataset, first one present crime dataset second present criminal dataset and the third present geo-crime dataset. This model applies the Association Rules AR data mining algorithm on each of the three correlated dataset separately.

This paper used the map system which easily determines the location of the cities of the crimes.

4. This paper [4] proposed that Crime analysis uses past crime data to predict future crime locations and times. Criminology is an area that focuses the scientific study of crime and criminal behavior. The exponentially increasing amounts of data being generated each year make getting useful information from that data more and more critical. Analysis of the data includes simple query and reporting, statistical analysis, more complex multidimensional analysis, and data mining. The wide range of data mining applications has made it an important field of research. Criminology is one of the most important fields for applying data mining. Criminology is a process that aims to identify crime patterns.

5. This paper [5] proposes that crime reduction and prevention strategies are vital for policymakers and law enforcement to face inevitable increases in urban crime rates as a side effect of the projected growth of urban population by the year 2030. Studies conclude that crime does not occur uniformly across urban landscapes but concentrates in certain areas. This phenomenon has drawn attention to spatial crime analysis, primarily focusing on crime hotspots, areas with disproportionately higher crime density. In this paper we present CRIMETRACER, a personalized random walk based approach to spatial crime analysis and crime location prediction outside of hotspots. They have proposed a probabilistic model of spatial behavior of known offenders within their activity space. Crime Pattern Theory concludes that offenders, rather than venture into unknown territory, frequently commit opportunistic crimes and serial violent crimes by taking advantage of opportunities they encounter in places they are most familiar with as part of their activity space. Their experiments on a large real-world crime dataset show that CRIMETRACER outperforms all other methods used for location recommendation..

We have referred: In our project we used the concept of the hotspot to trace the crime ratio and the city wise analysis there.

6. Recommendation algorithms are best known for their use on e-commerce Web sites, where they use input about a customer’s interests to generate a list of recommended items. Many applications use only the items that customers purchase and explicitly rate to represent their interests, but they can also use other attributes, including items viewed, demographic data, subject interests, and favorite artists. At Amazon.com, we use recommendation algorithms to personalize the online store for each customer. The store radically changes based on customer interests, showing programming titles to a software engineer and baby toys to

a new mother. The click-through and conversion rates — two important measures of Web-based and email advertising effectiveness — vastly exceed those of untargeted content such as banner advertisements and top-seller lists.

We have referred: In our paper we propose that item based collaborative filtering to give the recommendation of the crime with city.

3. EXISTING SYSTEM APPROACH

The existing solutions to crime are not sufficient to give the proper recommendation on the basis of the crime prediction. There is not a system available to give the proper judgment of the crime on the prediction basis.

4. PROPOSED SYSTEM APPROACH

The proposed system is built with the help of database management system, “My SQL”. Before development of the computerized system, we studied the manual system in very detail and we developed the computerized system. The computerized system is having more advantages than manual system. The systems contain all the information regarding different crimes in the city and display it in the short time. Also getting information about the safety measure and getting appropriate suggestion on crime has become very easy. Many users can get the registration easily. This system will be very user friendly and can be easily operated. Many of the difficulties have been removed; also it gives more information about the crimes in the city.

Advantages of Proposed System

1. To compare the performance of various crime level forecasting models.
2. To examine whether particular city is safe or unsafe according to the crime rate.
3. To give the proper recommendation / help to the user.

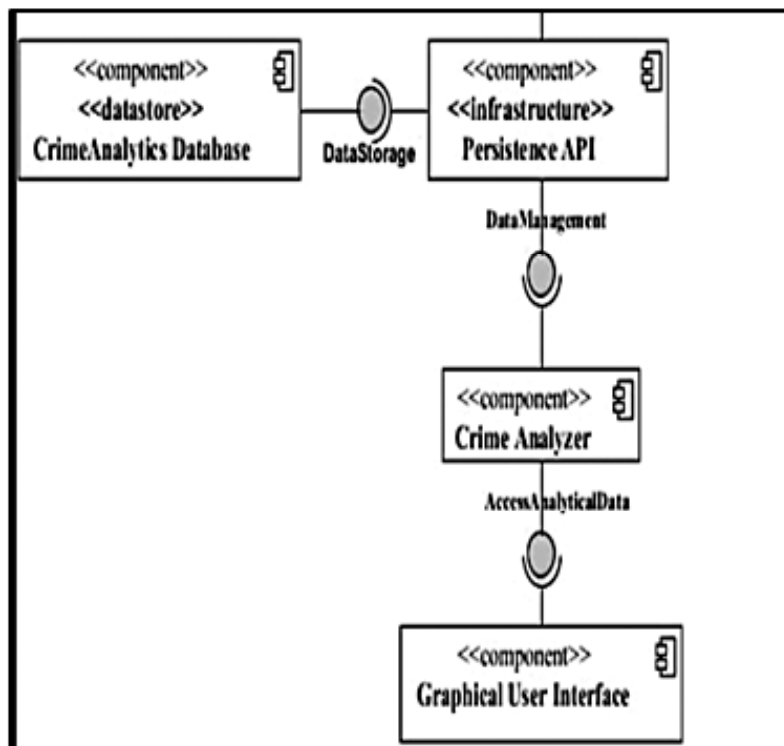


Figure 1: System Architecture

4.1. Crime Analytics Database

All the crime information is stored in database, with major attributes as locations and different types of crime. Using MySQL, different operations are performed on the database.

Eg.

<i>Sr. no.</i>	<i>City name</i>	<i>Crime name</i>	<i>Longi-tude</i>	<i>Latitude</i>	<i>Month</i>
1.	Pune	Murder	18.52	73.85	Nov.
2.	Pune	Theft	18.52	73.85	Sep.

4.2. Application Program Interface

API consists of the actual interface that provides various interfaces to the user to access the system.

4.3. Crime Analyzer

Crime analyzer analyze the crime by performing various operations on the dataset. This analysis is done by using item based collaborative filtering approach. We implemented item based collaborative filtering using these parameters:

1. Adjusted cosine base similarly.
2. Maximum number of crimes happened in that city.
3. Name of crime is stored.

e.g.

If dataset consist of the cities and its related crime as murder, theft, chain snatching. Then based on the crime happen in that particular area we are updating the count of the particular crime type. Then we can predict the crime type of particular city on the basis of the misshaped happened in that city.

Algorithm:

1. Begin:
2. Registration
3. Login
4. Enter Location
5. Check Location
6. if available
7. Display Hotspot or Coldspot
8. else
9. goto 14
10. if Hotspot
11. Give Recommendation
12. else
13. goto 14
14. End

5. METHODOLOGY

By using these Recommender systems we can generate personalized recommendations to the user. The recommendations should satisfy the user as well as they should be reliable.

5.1. Computation of Similarity Weight

In the present methodology we are using adjusted cosine similarity for computation of similar crimes.

5.2. Crimes Occurred in the cities

Selection of crimes has to be done more carefully so as to not affect the quality of recommendations generated. Hence we will be choosing the K most similar crimes which are having the highest similarity compared to others. So this value of K must be chosen more carefully.

5.3. Recommending safety measures

In this process recommendations are provided according to the crime occurred in specific city. These recommendations are the safety measures that the users should undertake.

6. CONCLUSION

This project will be helpful for user who wants the information of the particular city according to the crime report or the rate. This project also help to give the proper recommendation according to the crime happened in that city. In future a mobile application can be build and available to user on one click.

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