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CRIME RATE PREDICTION BASED ON K- MEANS ALGORITHM

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ABSTRACT

In recent days, crime rate is increasing all over the world. Various crime activities like brutal crime, violent crime, property crime, cybercrime, consensual or victimless crime, etc, were that need some protection mechanism for the people and society. On considering this, the proposed approach introduces an automated system for crime investigation. As a first step crime data should be fed into the system as it is necessary for crime investigation process. Crime data in the database is stored in an attribute wise manner. To carry out the process the authors introduced a new approach using a data mining algorithm. Among various algorithms k-means algorithm plays an important role to carry out the proposed approach. It is an unsupervised learning algorithm as it solves most of the clustering problem. Using the algorithm, it is easy to identify the fraudulent person or the group, legal process of crime, identifying relevant pattern of crime, hidden link, link prediction, statistical analysis of crime. Moreover, the proposed system helps to prevent crime in society all around.

Keywords: Crime, Crime data, Data mining K-means algorithm, Crime prediction

I. INTRODUCTION

Most recently, crime rate is increasing in most urban and rural areas. The crime activities like Theft, Chain Snatching, Robbery of vehicles, murder and kidnap, etc, were increasing day by day and the investigation process gets more complicated. To overcome the problem, various mining methods were implemented that solves various complicated criminal cases. One of the best methods that can be used is crime mapping. Crime mapping analysts were the law enforcement agencies which map, visualize the area, and analyze the crime. Crime mapping is probably funded by the Office of Community Oriented Policing Services (COPS). The use of crime mapping to identify crime hotspot area depends upon Geographic information system. The concept is very helpful to the police and enables the reduction of crime in the society and crime disorder. Certain evidences of the crime data based on sample data collected previously is very useful to analyze the crime. Data mining techniques plays a major role here in this analysis process. These techniques easily identify the severe crime zone areas based on criminal details in the corresponding locality. The details like criminal age, gender, skin color, hair type, criminal image, body shape, height, weapon, etc, is very help full for crime prediction. Authorized people can view the historical data.

II. LITERATURE REVIEW

Jyoti Agarwal et al[1], made a systematic review on political and government issues with an aim to reduce the crime incidence. Data mining have high volume of dataset and information gained from data mining technology is useful for police department. Their work only focuses on crime analysis based on crime data set using clustering algorithm. Based on the findings of their review, crime homicide and plotting respect of year got conclusion homicide from 1990 to 2011. Clustering algorithms results easily identify crime happening over year and their system gave precaution for future use in crime.

A. Bharathi et al [2], their data mining approach easily extract and analyze large amount of data and extract the meaning of the data and process the data and summarize to useful information. Crime is a social nuisance. Their paper focus on various clustering techniques. Based on their approach, clustering is the process of making a group of abstract objects into classes of similar objects. Clustering techniques play major role in crime analyst and the investigation process easily solves the unsolved crime. It is also, helpful to find unsolved crime pattern.

Rasoul Kiani et al [3], proposed a method that classifies clustered crimes based on frequency during different years. The major role Data mining is useful for analysis, investigation, and predict different pattern. Data mining techniques such as clustering and classification crime dataset recorded by police in England and Wales within 1990 to

2011.Introducing Genetic Algorithm (GA), GA is used for Rapid miner tool. In clustering process, the feature should be high, low value feature deleted. In their approach, GA method issued for detection in the preprocessing phase, and the fitness function was defined based on accuracy and classification error parameters.

Benjamin Fredrick David et al [4], systematically searched the literature using supervised learning and unsupervised learning technique to predict the crime data. Data mining techniques easily examine the large existing database and summarize useful to the organization. The police station and criminal justice agencies hold many large databases of information predict criminals in society. Their systematic review several methods for identification criminals include Text/ NLP based methods, crime patterns and crime evidence-based methods, spatial and geo location-based methods, communication-based methods and finally Prisoner based methods.

Snehal Dhaktode et al [5], the main aim of their approach is the prevention of viral task. Implementation of Data mining techniques, performing analysis, investigation and check patterns in crimes were the various steps involved in it. Stored data were analyzed by K- mean algorithm. Their result provides locations, particular, state, region predict the crime as an application.

Omkar Vaidya et al [6], aimed to track criminal activities and incidents using prediction algorithm to solve the crime case at faster rate. The main objective using Data clustering algorithm and data mining information convert raw data into useful information. Crime patterns change over time different clustering technique used K-Means; Fuzzy C, etc. overall techniques provide accurate result.

Khushabu A. Bokde et al [7], discussed about the impacts of world security, given higher priority by political and government target reduce crime incidence. Data mining is applicable in various fields of large volume crime dataset and knowledge gained will be useful for police force. K-means clustering act as a rapid miner tool deploy on web server. Crime homicide and plotting it with due to year and conclusion that homicide is decreasing from 2009 to 2018, In future clustered result easily identify overall years.

Than Win et al [8], proposed a systematic approach that support K-mean clustering algorithm. Now a day's computerized system data help full for Law enforcement officers to speed up the process of solving crimes. K-means Clustering algorithm was used by them by partitioning the data that is useful for the identification of crime. Crime detection is machine learning task support police enforcement in solving crimes. Their modeling technique is easy to identify the crime patterns from a large number of crimes making the job for crime detection in an easier way. Their current method reduces the current complex crime and act as an effective tool by Myanmar police and enforcement of law organizations for crime detection.

Ch. Mahendra et al [9], their approach used machine learning as the main technology to detect Crime rate mainly based on robbery. Using the linear searching algorithm they predicted the percentage of the crime rate in the future by using the previous crime data information. Consider input is algorithm and output is the percentage calculate crime rate for particular year. Generating graph include bar, line and scatter graphs understanding different crime data set help for keeping society safe.

III. EXISTING METHOD

There exist various limitations in the existing system. Mostly, such crime cases are handled in such a manner, a person has to go in person and carry out various operations manually as giving complaints, reporting and the action that is taken against criminals. It may lead to further problems that also need to be considered. The approach was not found to be secure, there may be chances for threatening the victim by the criminal, possibility to track and destroy the proof of the victims and so on. The approach was also not found to be user friendly. Hence in order to overcome some of these issues, the authors proposed a new approach based on clustering approach.

IV. PROPOSED METHOD

In order to overcome some of the existing issues, we proposed a new approach based on clustering algorithm.

Step 1: As a first step crime details were analyzed and based on that data was collected including the following information like Source, Destination, Stop, Type of crime, Date, etc. All the information regarding the criminal will fed into the system including, criminal hair color, skin color, face type etc,

Step 2: Collect details about the criminal from the victim and trace the dataset trained with the system.

Step 3: After the mapping process, if there exists a match the criminal can be traced and caught easily. The following figure 1 shows the workflow of each step in the module.

Figure 1: Workflow of the steps.

V. RESULTS AND DISCUSSION

The results obtained from the proposed method were as shown below.

Step 1: Initially the system was trained with the sample data of the criminals.
Step 2: Information about the criminal from the victim was collected.
Step 3: Questions were generated and given to the victim, in order to trace the culprit.

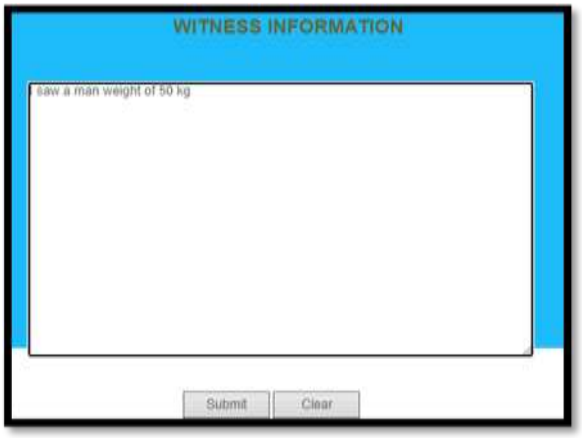

Figure 2: Witness information.

Figure 3: Question Generation/Selection

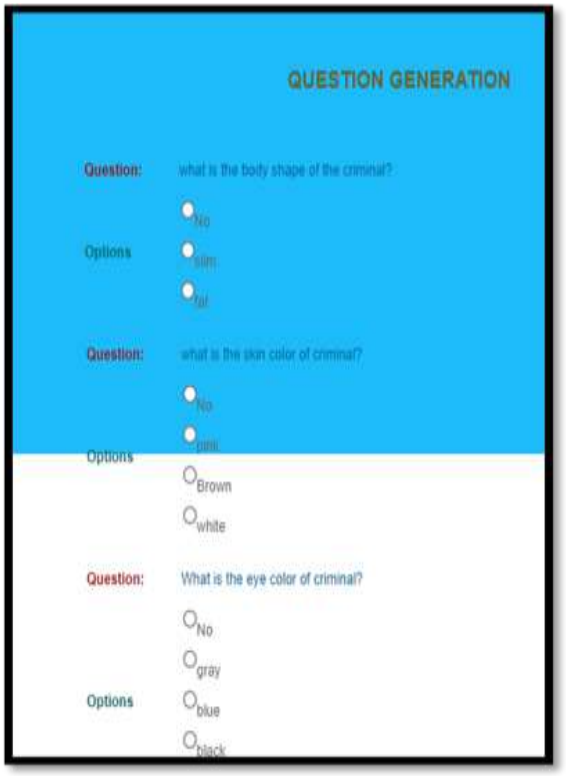

Figure 4: Criminal view Sheet

Step 4: Based on the details given by the victim, the algorithm searches the details from the dataset and identify the victim and deliver it as a report. It is as shown in figure 4.To carry out the process K-Means clustering algorithm was used. The steps involved in the mapping and searching process is as follows.

a) Select and choose the number of clusters K.
b) Select appropriate K-points as centroids (It is another form of input dataset)
c) Allocate each data point to their nearest centroid, which will form the prearranged K clusters.
d) Initialize and load centroids by first mixing the dataset and then randomly selecting appropriate K data points for the centroids without any replacing.
e) Compute the variance and place a new centroid of each cluster.
f) Enumerate the centroids of newly formed clusters in group.
g) If any reselected occurs, then repeat the process.

Step 5: Based on the result, crime mapping is then carried out and is as shown in figure 5.

Figure 5: Crime Mapping

Step 6: Once after identifying the details, the crime data was then added with the crime dataset. It is as shown in figure 6

Figure 6: Add Crime.

Step 7: Finally statistical report of the crime was constructed as a graph. It is as shown in figure 7

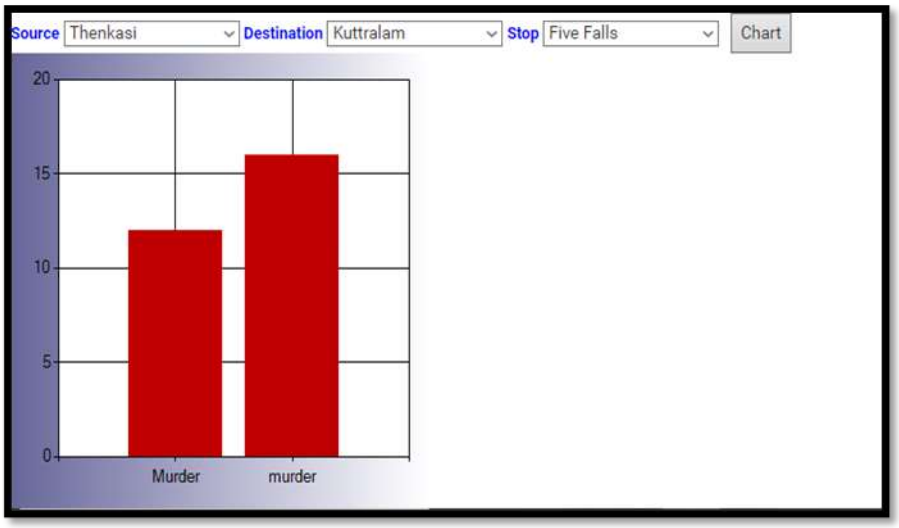

Figure 7: Statistical Report of Crime

VI. CONCLUSION AND FUTURE WORK

The proposed system termed as "Online Crime Investigation" was developed as a Web enabled application. It is more helpful to the public. User can give complaint at any time about the criminal. Crime reporting is possible for 24/7. Internet based crime reporting allows victim information and witness of crime report data helpful to police and process 24/7 from any location. This leads to better communication, better leadership to the society and also reducing time and cost for the user. It provides more safety and security to the user. The proposed system mainly helps to reduce complex investigation. In Future Work, the System may be utilized in various types of Auditing Operations via Network Auditing or Similar Process/ Work Flow Based Applications.

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