Crime and Criminal Information System

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Abstract - There has been an enormous increase in the crime in the recent past. Crime deterrence has become an upheaval task. The cops in their role to catch criminals are required to remain convincingly ahead in the eternal race between law breakers and law enforcers. One of the key concerns of the law enforcers is how to enhance investigative effectiveness of the police. There is need for user interactive interfaces based on current technologies to give them the much needed edge and fulfill the new emerging responsibilities of the police. The paper highlights the existing systems used by Indian police as e-governance initiatives and also proposes an interactive query based interface as crime analysis tool to assist police in their activities. The proposed interface is used to extract useful information from the vast crime database maintained by National Crime Record Bureau (NCRB) and find crime hot spots using crime data mining techniques such as clustering etc. The effectiveness of the proposed interface has been illustrated on Indian crime records. An interactive interface as crime analysis tool has been designed for this purpose.

Keywords: E-governance, Information System, Crime Data Mining and Police System.

1. Introduction

Criminology is an area that focuses the scientific study of crime and criminal behavior and law enforcement. It is a process that aims to identify crime characteristics. It is one of the most important fields where the application of data information techniques can produce imp ortantresults. Crime analysis, a part of
criminology, is a task that includes exploring and detecting crimes and their
relationships with criminals. Applying data mining techniques made criminology an appropriate field due to the high volume of crime datasets and also the complexity of relationships between these kinds of data. The first step is the identification of crime characteristics for developing further analysis. The knowledge gained from data information approaches is a very useful tool that helps and supports police forces. Solving crimes is a complex task that requires human intelligence and experience and data information is a technique that can assist them with crime detection problems. The criminals are becoming technologically aware in committing crimes. Therefore, police needs such a crime analysis tool to catch criminals and to remain ahead in the eternal race between the criminals and the law enforcement. The police should use the current technologies to give themselves the much-needed edge. In crime investigation and detection of criminals, availability of relevant and timely information is of utmost necessity in conducting daily activities by the police stations. The crime analysis should be able to identify crime patterns quickly and in an efficient manner for future crime pattern detection and action.

The applications of crime and criminal information technology can discovery important knowledge about crime and criminals. It is always desirable to have a crime analysis tool that can discover the necessary crime knowledge from the huge database and aid to identify crime details accurately in a time efficient manner. It can improve the most challenging decision-driven criminal investigations. The discovered knowledge can then be used for future crime pattern detection and action. Presently, there are several crime analysis tools that help police officials. The main goal of this paper is to discuss the current status of the crime analysis tools available all over world with particular emphasis to Indian state of affairs.

2. Indian Police System: An Overview

To propose any intelligent system as crime analysis tool for police, it is required to understand Indian Police structure, responsibilities of the police, key changes and challenges the police.

2.1. Police Structure- Superintendence over the police force in the State is exercised by the State Government. The head of the police force in the State is the Director General of Police (DGP). States are divided territorially into administrative units knows as districts. A group of districts form a range, which is looked after by an officer of the rank of Deputy Inspector General of Police (DIGP). Some States have zones comprising two or more ranges, under the charge of an officer of the rank of an Inspector

General of Police (IGP). A Senior Superintendent of Police (SSP)/Superintendent of Police (SP) is the head of the district police administration and is assisted by an Assistant Superintendent of Police (ASP) and few Deputy Superintendents of Police (DSP). A district may have many Police Stations that are manned by Inspectors, Sub Inspectors, Assistant Sub Inspectors, Head Constables and Constables. Police Station is the basic unit of police administration through which both crime and non crime duties are discharged. Police Stations are the places where complaints and First Information Reports (FIRs) are lodged. Police Stations also serve as the window of 'citizen interface' for the police. Common people approach Police Stations for assistance. Therefore, public expectations from police stations are more direct, pressing and at times extremely demanding. Operationally, police stations are at the nucleus of all policing activities. All important operational duties – be it duties to the State or services to other government departments or citizens- are executed and coordinated through police stations.

2.2. Role of Indian police- With time, the role of the police has expanded and is expanding steadily to areas having larger public interface. The major existing roles of police are prevention of criminality, repression of crime, apprehension of offenders, regulation of non-criminal conduct and recovery of stolen property etc. Whereas, the emerging police roles are to protect life and property, to reduce the opportunity to commit crimes, to maintain social order and to protect the individual freedom and privacy etc. The concept of proactive policing is fast catching up the imagination in modern times across the globe. This includes emphasis on community policing and problem solving policing At the level of State police, State Crime Record Bureaux (SCRBx) are playing key role in pushing the e-governance agenda. Most of State police administrations have appointed senior level officer for implementation of e-governance. Apart from the Crime Criminal Information System (CCIS), State police computerization programmers include many local initiatives mainly for internal operations such as Village Information System and Sewa-100 etc.

3. Existing Indian Crime Criminal Information System (CCIS)

CCIS is a national project of sharable database on crime and criminals at district, state and national level for assisting investigating and supervising officers and police planners to formulate crime-control strategies.The application has been web-enabled so that field level investigating and supervisory officers can access the CCIS databases at national and State levels through internet anywhere – anytime.

The main objectives of the CCIS are -

•Computerize crime and criminal information collected by Inquiry Officer
• Link a crime to criminal and property
• Link a criminal to crime
• Link a property to crime
• Link unidentified dead bodies, kidnapped persons, missing etc.
• Generate vital reports from database
• Reduce manual effort and increase efficiency, of police
• Restoration of stolen property to legitimate owner

4. CRIME AND CRIMINAL INFORMATION SYSTEM

In today's world criminals have become techno savvy and they make maximum use of all the modern technologies and methods in committing crimes. This has facilitated them in operating over the length and breadth of the country also. If we have to effectively meet out challenges of crime control and maintenance of public order, creation of databases on crimes & criminals in digital form for sharing by all, an intelligent police information system.This section highlights the need for Crime Analysis Tool as interactive interface and describes the Intelligent Crime Information and Analysis system based on Crime Data Mining.

4.1 Crime Data Entry Module

Crime data entry module deals with entering data about the crime like name and address of the criminal, type, description, time and date of crime, etc.

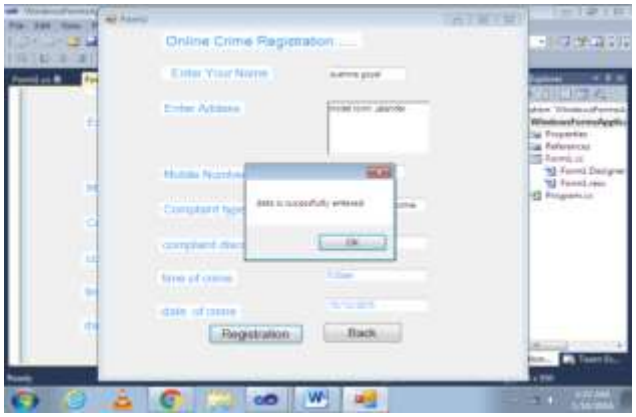

fig. no.: Crime Data Entry Module

Once the data is entered successfully, it is being stored in the database from where the relevant and useful information can be retrieved whenever required

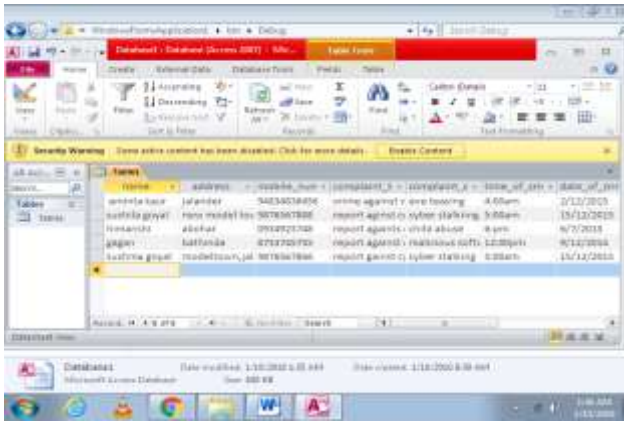

fig. no.: 2.Stored data Module

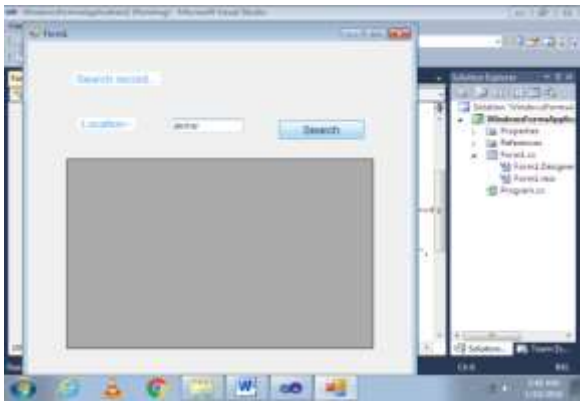

Fig. no.: 2.Crime Information Retrieval and Analysis Module

A user can also search records of any year as well as multiple years with the help of Year Selection Input Dialog Box, which will appear after selecting a year. The module has also provided the facility to select crime types which helps the user for analyzing crime hot spots and crime zones of general type of crimes without going into the specific details. The results of query consist of crime hot spots, high crime zones, moderate crime zone and low crime zones based on the average density of these crime. Cluster center as average density of various crime zones are also given in the results of the query interface. The results obtained using proposed adaptive query interface will be helpful in identifying the crime hot spots, predicting crime trends for the crime hot spots which will ultimately help in controlling the crime. The user can also save the results of specified query into a text file and also analyze the results by using Data mining tools. The system is faster to implement and easier to use. It will give an edge to the police to respond and thereby serve the people better. The system provides a user-friendly environment to analyze huge crime database. The traditional way of executing the queries is the extraction of records and aggregates them for every execution. This is more time consuming process because of rescanning of database every time and required a specialized user to extract the information from the database. The proposed crime analysis tool eliminates the rescanning of the database for every new query as well need of skill users. It provides the user an interactive and fast way to carry out process of identification of crime hot spots and crime zones as well as data comparison among various area of interest. Interaction of many relational tables is required for analyzing crime data since not all information required for crime analysis is stored in a single table. The system extracts the records from these tables and aggregates them for further online querying.

5. Conclusion and Future Scope- As the crime data is increasing in very large quantities globally as well as in India, thus motivating professionals to use advanced and efficient techniques for analysis and identification of crime. Data mining as an analysis and knowledge discovery tool has immense potential for crime data analysis. As is the case with any other new technology, the requirement of such tool changes, which is further augmented by the new and advanced technologies used by criminals. All these facts confirm that the field is not yet mature and needs further investigations. Another point noted is that the crime rate is increasing and crime prevention has become an upheaval task. The legal force departments around the world are required to remain ahead in the eternal race between law breakers and law enforcers. Various software discussed in this paper has all been adapted for use in crime analysis but were not created specifically for that purpose. These applications designed specifically for crime analysis have been created to perform functions that are not available in other existing software. Thus, it can be understood that, even though several solutions to solve the problem has been proposed it can be seen that a perfect solution to each city, state and country is still elusive. Moreover, usage of existing data mining techniques is extensive in creating crime analysis tools. As research in improving data mining techniques like clustering and classification is still active, the tools developed can also be improved by improving the underlying data mining techniques.

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