Online Crime Reporting and Management System using Data Mining

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Abstract - *The aim of this project is to develop an online managing crime report system which is accessible to the common public and the police department easily. The system provides users with the information about the crime rates of a desired area. This is useful for tourists who are entering in an unvisited area. If the user enters in 100 meter radius of a high alert area then he/she will be notified with an alert message. The user gets notified about the different crime rates in the area and can provide the safest path to the desired destination. Also, the system registers the complaints from the people through online web application where they can upload images and videos of the crime and it will be helpful for the police department in catching criminals. The person can give complaint at any time.*

Key Words: **KNN Algorithm, AES Algorithm, K-Means Algorithm.**

1. INTRODUCTION

Crime is a part of illegal activities in human life. The rise of population and complex society rises the range of anti-social conducts that must be restricted by the government through the military and different organizations particularly the Police Force. There are many current crime management systems which faces several difficulties, as there is no means to report crime instantly other than phone calls, messaging or face-to-face compliant filing. Hence, we have proposed an online crime reporting system which allows the user to file complaints or missing reports and keep a track of it. There are 3 categories that a user can file; Complaint, Crime Report and Missing Report and can see all the status of what action has been taken by the admin. To file any of the above 3 complaints, the user should register in to the system and provide his right credentials to file them. The crime reporting system project also allows other users who doesn't want to register but can check the crimes happening at his/her or any other area, has to just provide the pin code and in return the system displays the list of crimes if any filed. The offline i.e. the unregistered user can also take advantage of checking the missing person details, but he/she is refrained from getting complaints done by the users. The Front End of the crime reporting system is done using Android Studio and SQL serves as a backend to store books lists and inventory data. The system, has both the user as well the Admin Part, the role of admin is to just check all the 3 modules or categories and update their status likewise. This system helps the users in tracking any report filed to the law and take an advantage of reporting any complaint from anywhere bringing the whole system online.

1.1 Literature Survey

1. Sunil Yadav illustrate that how social development may lead to crime prevention so that to increase the predictive accuracy supervised, semi-supervised and unsupervised learning technique are used and also k-means is used to create number of clusters.

2. Rasoul Kiani Siamak Mahdavi, Amin Keshavarzi have analysed, the main objective of this paper is to classify clustered crimes based on occurrence frequency during different years. Data mining is used extensively in terms of analysis, investigation and discovery of patterns for occurrence of different crimes.

3. Shyam Varan Nath have used the clustering algorithm for a data mining approach to help detect the crimes patterns and speed up the process of solving crime. We will look at k-means clustering with some enhancements to aid in the process of identification of crime patterns.

2. Project Overview

The crime rates accelerate continuously and the crime patterns are constantly changing. According to National Crime Records Bureau, crime against women has significantly increased in recent years. It has become the most prior to the administration to enforce law and order to reduce this increasing rate of the crime against women. We illustrates how social development may lead to crime prevention. So we are developing the system which can used to detect and predict the crimes for the area where the person or user currently stand. Crime detection and analysis will be to generate the crime hot-spots that will help in deployment of police at mostly likely places of crime for any window of time, to allow most effective utilization of police resources. The developed model will reduce crimes and will help the crime detection field in many ways that is from arresting the criminals to reducing the crimes by carrying out various necessary measures. We add the woman safety module for security. When women press the power button of android mobile 3 to 4 times then help message send to relatives or police. Due to this we reduce crime in the society and in country. Here we use module of crime capture means user can capture the photo of crime send to police.

There is user or actors which are as follows,

1. User has the account and for accessing that he/she must be provide the correct username and password.

2. All use-cases for the software are presented. Description of all main Use cases use case template is to be provided.

3. A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

[A] AES Encryption Process

AES is an iterative rather than Feistel cipher. It is based on substitution permutation network. It comprises of a series of linked operations, some of which involve replacing inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations). Interestingly, AES performs all its computations on bytes rather than bits. These 16 bytes are arranged in four columns and four rows for processing as a matrix. Unlike DES, the number of rounds in AES is variable and depends on the length of the key. Each of these rounds uses a different 128-bit round key, which is calculated from the original AES key. In present day cryptography, AES is widely adopted and supported in both hardware and software. Till date, no practical cryptanalytic attacks against AES have been discovered. Additionally, AES has built-in flexibility of key length, which allows a degree of future-proofing against progress in the ability to perform exhaustive key searches. However, just as for DES, the AES security is assured only if it is correctly implemented and good key management is employed. The encryption process uses a set of specially derived keys called round keys. These are applied, along with other operations, on an array of data that holds exactly one block of data? the data to be encrypted. This array we call the state array.

You take the following AES steps of encryption for 128-bit block:

- Derive the set of round keys from the cipher key.

- Initialize the state array with the block data (plaintext).

- Add the initial round key to the starting state array.

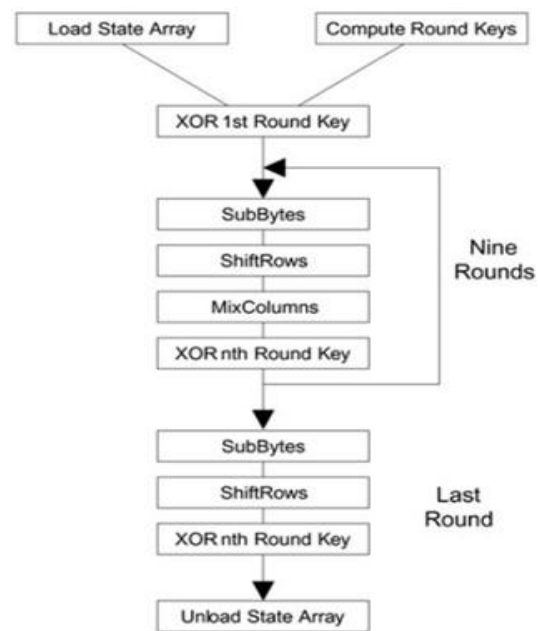- Perform nine rounds of state manipulation.

Fig-1: AES Algorithm

The reason that the rounds have been listed as "nine followed by a final tenth round" is because the tenth round involves a slightly different manipulation from the others. The block to be encrypted is just a sequence of 128 bits. AES works with byte quantities so we first convert the 128 bits into 16 bytes. We say "convert," but, in reality, it is almost certainly stored this way already. Operations in RSN/AES are performed on a two-dimensional byte array of four rows and four columns. At the start of the encryption, the 16 bytes of data, numbered D0 ? D15, are loaded into the array as shown in following

Table A. Each round of the encryption process requires a series of steps to alter the state array. These steps involve four types of operations called:

1. SubBytes

2. ShiftRows

3. MixColumns

[B] Data Mining

Data mining is a new technology, which helps organizations to process data through algorithms to uncover meaningful patterns and correlations from large databases that otherwise may not be possible with standard analysis and reporting. Data mining tools can helps to understand the business better and also improve future performance through predictive analysis and make them proactive and allow knowledge driven decisions. Issues related to information extraction fro large databases, data mining field brings together methods from several domains like Machine Learning, Statistics, Pattern Recognition, Databases and Visualizations. Data Mining fields find its application in

market analysis and, management like for example customer relationship, management, cross selling, market segmentation. It can also be used in risk analysis and management for forecasting, customer retention, improved underwriting, quality control, competitive analysis and credit scoring.

[C]System Architecture

Fig:2 System Architecture

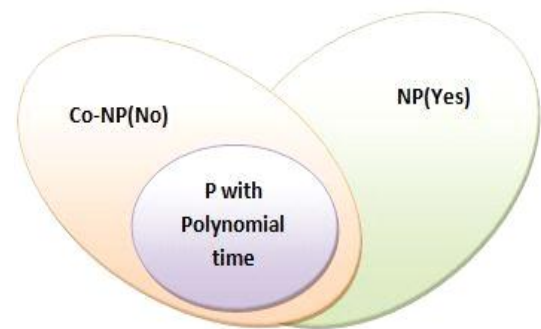[D]Feasibility Analysis

Np-hard Np-Complete:

• What is P?

P is set of all decision problems which can be solved in polynomial time by a deterministic.

Since it can be solved in polynomial time, it can be verified in polynomial time.

Therefore P is a subset of NP.

P: Crime is a matter of major concern to society, it must be checked. Although crime, being an integral part of civilization, it can definitely be kept within limits. The task of maintaining peace and order is delegated internally to the police.

What is NP?

"NP" means "we can solve it in polynomial time if we can break the normal rules of step-by-step computing".
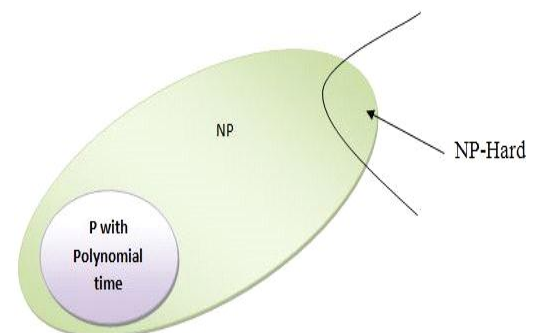
What is NP Hard?

A problem is NP-hard if an algorithm for solving it can be translated into one for solving any NP-problem (nondeterministic polynomial time) problem. NP-hard therefore means" at least as hard as any NP-problem," although it might, in fact, be harder.

NP-Hard: It would be very difficult to only go through the manual process of crime reporting to police portal.

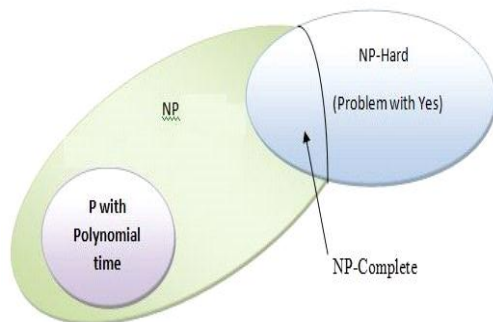So here in this case the P problem is NP hard.

 i.e. P=NP-Hard

What is NP-Complete?

- Since this amazing "N" computer can also do anything a normal computer can, we know that "P" problems are also in "NP".

- So, the easy problems are in "P" (and "NP"), but the really hard ones are *only* in "NP", and they are called "NP-complete".

- It is like saying there are things that People can do ("P"), there are things that Super People

can do ("SP"), and there are things *only* Super People can do ("SP-complete").

NP-Complete: Crime detection and analysis will be to generate the crime hot- spots that will help in deployment of police at most likely places of crime for any given window of time, to allow most effective utilization of police resources.

[E]K – Nearest Neighbor NP Analysis

K–Nearest Neighbor algorithm is a Machine Learning Classification Technique. It is used to classify a given element into one of the classes which is closest to the element. Consider a data set of 'n' samples and 'd' dimensions. There is a point of interest whose class we want to determine on a two-dimensional plot. We calculate the distance between the point of interest to all other points in the data set.. If the data set is small with less number of dimensions, this algorithm runs in a reasonable amount of time. Since the time complexity of K–Nearest Neighbor algorithm using Brute Force Approach is the algorithm runs in polynomial time and hence fall under P class of Problems.

3. CONCLUSION

The developed model will help reduce crimes and will help the crime detection field in many ways that is from arresting the criminals to reducing the crimes by carrying out various necessary measures. The project is helpful for general public in getting information about the crime status of the area and get a safe path to a desired destination.

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