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Crime Area Detection and Criminal Data Record

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***Abstract*-In 21st century where mobile and information technology have become an integral part of our lives. A new area where mobile integrated with technology is useful for crime reporting since readily accessible information is not available at any point in investigation this is a key drawback for communication in police department. Thus, using cloud, we will try to make all the information related to the criminals available on the Android Application to the police during their investigation which would speed-up the entire process of tracking down the criminals. A mobile application is made available to the common people in order to track down the safest path to reach their destination by giving notifications when chosen a crime affected area and also providing an alternate route.**

***Keywords*-Crime Detection, Crime Reporting, Mobile Application, Android, Cloud Computing, Police, General User. SHA-1**

I. INTRODUCTION

Today's era is seeking a great scope in mobile technology. This technology can be used in many other fields and application such as Gaming, Maps, E-mail, Messaging, Photography and so on. One such area is crime area detection and storing criminal data record. A recent mobile application named Mobile Vic PD, released by the Victoria police in Canada for fighting crime. The mobile application can be used to report minor crimes, offer anonymous tips to police, stay updated on crimes in progress, receive missing child reports or check on stolen property. As the criminal data is not available remotely there is a communication gap between the police officials investigating any case. The disadvantage of this application was that it was prone to fake reporting of crime and there was no other way to verify that the incident was true. This caused chaos among the general public [1, 2]. This paper focuses on overcoming this disadvantage by providing a method for verifying the incident.

This application will be useful for the remote access of criminal data which will be helpful for the investigations carried by police department. Also, it will provide the general users with the facilities like reporting any incidents which would lead to traffic jam. Moreover, it will also provide an alternate safe path on user's demand before entering the crime area. The database for this project will be stored on cloud to gain remote access. For avoiding any false incidence to be notified to other user, the information provided will be first verified by the police officials. After approval of the information it will be broadcasted to other users using the application.

This paper is further divided as follows:

General User Android Application: This consists of following functionalities:

- Report Incident
- View traffic alert notification
- View Alternate path
- If approved by police then visible by other users

Police Android Application: This consists of following functionalities:

- Verify user reported incident
- Provide alternate path to user
- Update incidents
- Criminal Database manipulations

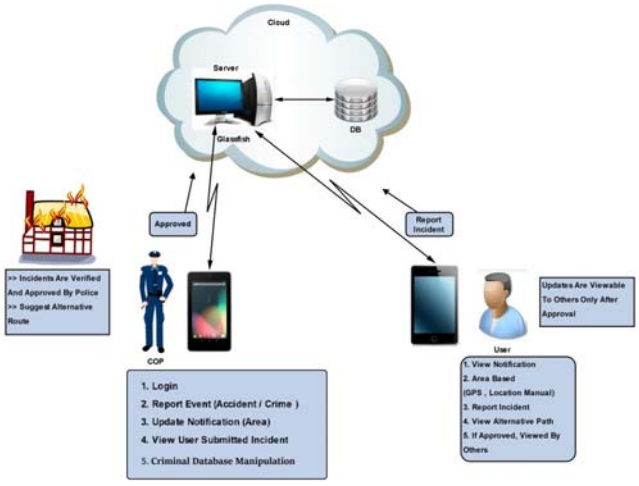

Fig. 1 Overview of the project

II. LITERATURE SURVEY

This paper includes several pieces of key Literature in the area of android applications for crime area detection. Reference [1] proposes a design for mobile communication infrastructure to help the police and general public fight the crime within a metropolis. The infrastructure serves as a common platform for both the police and general public to interact and exchange information about criminal activities and to track criminals. The three categories of information that the police can upload on the server are:

i. Description of people on police wanted list and their related crime information
ii. Description of missing items and their related information
iii. Information about latest arrest made by police

It provides a common platform between police and general public to share crime related information. Here, information

provided by general public is directly available to the other users of the application without verification from the police [1]. Therefore uploading of false information is also possible. Reference [3] proposes the implementation of location based services through Google web services and walk Score Transit APIs on Android phones to give multiple services to the user based on their location. Location based service (LBS) provide the clients personalized services according to their current location. In [4] it shows the design and development of mobile location based service to optimize the workflow for handling emergency services. Two methods of Emergency call and location based SMS. The spatial location is widely using the co-ordinate system or being understood as longitude-latitude and altitude. Based on tracked location of the user, emergency numbers such as near-by police station details and other help can be provided to the user. The massive growth in digital data, changing data storage requirements, better broadband facility cloud computing has led to the invention of cloud database. Cloud storage, Data as a Service (DaaS) and Database as a Service (DBaas) are the different terms used for data management in the cloud. Cloud storage is virtual storage that enables user to store documents and objects and can be accessed from any geographical location [5].

III. PROPOSED SYSTEM

The purpose of this paper is to develop an android application for crime area detection and store criminal records. It provides an application for the user that would provide an alternate path for the users passing by crime area. It allows user to report incidents and get it verified by the police officials. It will consist of an application for police officials which can perform database operations on criminal record and allows efficient retrieval of required information from the centralized database present on Cloud. The application targets general public and police officials for managing the incidents and crime without consuming much time. This proposed system will be divided into three major modules.

A. Police Application

This module will be leading to the development of police android application which would work as follows. First and foremost, the police needs to login with the username and the password provided to him, as this application is not publicly available for the general users. After logging into the application, police will be provided with the features like reporting incidents (crimes and incidents causing traffic jam), view user reported incidents. After the verification of the incident, the database will be updated and the notification will be broadcasted to all the users who will be using this application. Police will be given privilege to do the criminal database manipulations.

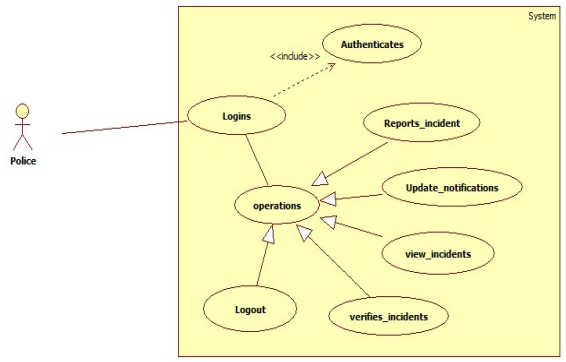

Fig 2. User Case Diagram of Police Application

B. General User Application

This module will be leading to the development of the general user application which would work as follows. First and foremost, the users will need to do one time registration before using the application. After registration, user will be provided with the facilities like report incidents, view the notifications and popups that will contain the information such as telephone number and address of the nearby police station, hospital, fire station. Moreover, choice to view the alternate path will be provided by the police officials. User will not be given any privilege to make changes in the criminal database. User will need to keep the GPS activated always. Physical location of the user will be tracked with the help of GPS which is inbuilt in the cellular phone. The location will be saved in the database along with the incident reported by the user. To avoid crime affected area, user can request a safest alternate path that will be provided by police through the application.

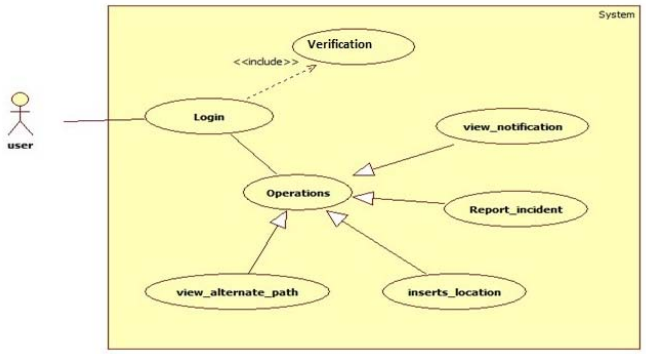

Fig 3. Use Case for General User

C. Cloud Database

In this paper, cloud will be used for storing the database to provide the facility of remote access. As mentioned in the police user application, the username and the password used by the police will be cross-verified with the ones stored in the database. The complexity of the crime will be decided on the first come first serve basis. In order to provide the security to the database SHA-1 algorithm will be used.

i. SHA-1 Algorithm

Secure Hash Algorithm is a cryptographic hash function. It produces 160-bit hash value. No two messages can produce similar hash function. It is not possible to obtain the original message from a given hash value.

- Block size- 512-bits
- Maximum Message Size- (2)^64 -1-bits
- Number of rounds- 80
- Output size- 160-bits

ii. Working of SHA-1 Algorithm[6]

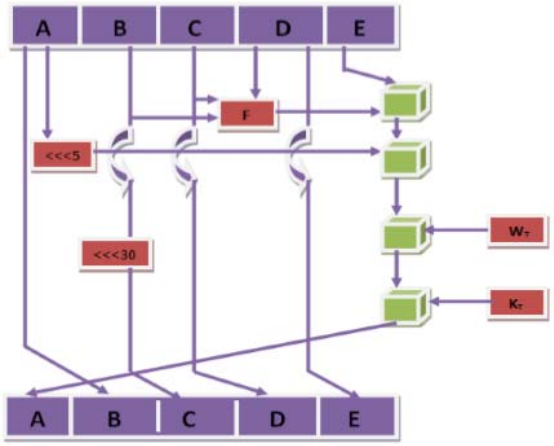

Fig 4. SHA-1 Algorithm

Step-1: Append padding bits

For any message of length less than 64-bits, it is necessary to pad the message. We do it by appending the message with 0's and 1's to bring it to an even multiple of 512.

Step-2: Append length

The padded message is appended with 64-bits. The length of the original message is indicated with the 64-bits which is in binary format.

Step-3: Prepare processing functions

80 processing functions are defined under SHA-1 which are as follows:

f (t;B,C,D)=(B AND C) OR ((NOT B) AND D) (0<=t<=19)

f (t;B,C,D) = (B XOR C XOR D) (20<=t<=39)

f(t;B,C,D) = (B AND C) OR (B AND D) OR (C AND D) (40<=D<=59)

f(t;B,C,D) = (B XOR C XOR D) (60<=t<=79)

Step 4: Prepare processing constants

80 processing constant words are required by sha-1 which are defined as follows:

K(t) = 0x5A827999 (0<=t<=19)

K(t) = 0x6ED9EBA1 (20<=t<=39)

K(t) = 0x8F1BBCDC (40<=t<=59)

K(t) = 0xCA62C1B6 (60<=t<=79)

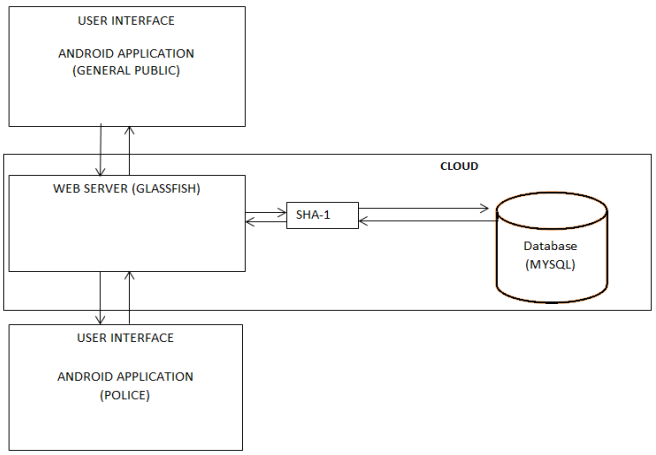

Fig 5. Architecture of the system

The architecture diagram of the proposed system consist of two user interfaces one for the general public and the other for the police. The data of these android applications will be stored on the cloud. Cloud will consist of the server and database which will be created in MY SQL.

IV. Conclusions

In this paper we have overcome the problem of communication gap between the police during their investigation. We also provide solution to bridge the communication gap between police and general user. Also, the criminal information will be readily accessible to the police officials as it is stored on the cloud. The problem of reporting fake crimes will be overcome as this application will need the verification of police to report incidents reported by user to broadcast it to other users using the same application.

In future, some other security algorithms can be used to provide better security measures for the criminal database. The only challenge of this proposed system is that GPS and the Internet connection has to be activated 24x7. Future research can be dedicated for these challenges.

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