Wireless Criminal Tracking System using Mobile Computing

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ABSTRACT
This paper describes Wireless Criminal Tracking System which is aimed to apply mobile information system in the police department. The main goal of this system is to enhance the process of police department according to constraints of accuracy, timeliness and continuity of data. The system introduces development of central data to be accessed on mobile phones by police and users which is maintained by administrator at each police station. System is designed in such a way to offer efficient solution to accidental and terrorism cases in police department. It will not change the current procedure of police department working beside it will promote the current procedures enabling more effective communication between the common public and the policemen and among the policemen themselves.

Keywords
Mobile Computing, GPRS network, Criminal Database, Smart Phones, midlets

1. INTRODUCTION
Now day's information is the nucleus of today's interconnected economy. We need to be able to exchange and retrieve any kind of information quickly and securely at any time. Internet has become the primary mode for disseminating rapidly changing information about traffic conditions, weather, business application and news reports. One way of exchanging such dynamic conditions is through pervasive networks with the help of mobile device. The system produced will exploit rising mobile communication technologies which will be implemented in the police department. The scope is more generalized but limited to availability of networks. What system does is:

- Maintain Logs of user.
- Maintain criminal database controlled by administrator.
- Information to-n-fro transfer using GPRS network.
- Restricted access to civilian users.
- Controlled updating of database.
- Connecting police stations and their data with network.

2. OVERVIEW
In this system police officer enters the criminal name, photo, thumb print, date of birth and address in the smart phone accessing remote database through a wireless connection. The system will check if there is any previous criminal record matching with the data if yes system will retrieve the information immediately to the police officer. Else if the data does not match with any previous record, system will ask the police officer whether he wants to create the new one. New records added to the system will be first checked and verified by an administrator based on clue and investigation report reached at police station and then he will approve the criminal data to be added in system. The administrator will have rights to add, edit, update or remove the criminal data in the system. Common public has the facility of viewing the data about the criminal which will make them aware and also they can give any secret information to be feed in the system.

3. LITERATURE SURVEY
Some of the launched IT projects of police department in India are as follows –

3.1 Crime and Criminals Information System (CCIS) –
CCIS is a National Crime Records Bureau driven program and has been launched in 1990. Since then, it has been implemented in 35 states and union territories and spans over 700 locations. Most of the COPS police headquarters and district headquarters are covered by CCIS and now the 14,000+ police stations are connected in the country using CCIS [1].

3.2 Common Integrated Police Application (CIPA) -
A feature common to most of the early efforts has been a predominant focus on collection of data as required by the monitoring agencies and on specific functions such as records management, statistical analysis and office automation [1]; rather than on police stations, which are the primary sources of crime and criminals-related data generation.

3.3 Crime and Criminal Tracking Network System (CCTNS) –
The Crime and Criminal Tracking Network Systems (CCTNS) was conceptualized by the Ministry of Home Affairs [1] in detailed consultation with all stakeholders and will be Implemented as a "Mission Mode Project (MMP)" and will adopt the guidelines of the National e-Governance Plan (NeGP).

"Wireless Criminal Tracking System" is first one of its type which makes criminal database available on mobile. Now a day's lack of mobile data makes criminal tracking more cumbersome for the policemen. There are problems in identifying criminals/terrorists due to lack of instant data about them. These problems can be solved by making the required data available on mobile. This will reduce policemen's labor work and precious time. Hence they can divert the energy and time in other productive work.

4. NEED OF SYSTEM
The police department should be a relatively active area as a application in information technology. But the actual situation is different; currently the police department is still using the traditional process which results in lower

operational efficiency, higher error rate and also high cost of management

Some of the problems which still persist and need to be resolved are:

- The number of crimes is rapidly increasing day by day. Hence it is very difficult and cumbersome for the police department to create and maintain a database.
- Some criminals escape just due to lack of appropriate information about the criminals.
- Due to lack of strong clues criminals find way to escape easily from our law system.
- It is not possible for the common public to visit the police station frequently to get information about the criminals and contact the police in case they have any useful tip [2].

5. SOFTWARE REQUIREMENT SPECIFICATIONS

5.1 System Context :

1) Mobile information server: the application server will be responsible for handling user request and realization of the relevant application models.
2) Wireless /Mobile Access system: GPRS technology will be employed and tested to provide wireless access.
3) Mobile information system terminals: the smart phones will be used to access the mobile information system.

5.2 Software Requirements :

1) J2ME Framework (i.e. JVM enabled phone) for Mobile device application.
2) O.S. Windows XP or vista.
3) HTML, PHP, XML for client website construction.
4) PHP and MySQL for database creation and accessing.
5) Servlet for handling data request and response, on mobile device.
6) TOMCAT a open source servlet container.

5.3 Hardware requirements :

1) Intel p4 processor.
2) RAM of minimum 512 Mb.
3) Internet Connection.
4) Smart phone.

6. ASSUMPTIONS AND REQUIREMENTS

6.1 Assumptions :

1) The mobile phone is embedded with Multimedia, GPRS and Wi-Fi.
2) The mobile phone used for communication is java enabled i.e. Java Based.

6.2 Requirements :

1) Performance requirement: the main requirement is a consistent and good GPRS connection. This is because real time communication is required.
   If the connection lags, the objective of system is unachieved.
2) Less Delay in Communication: we provide high speed communication using MTNL protocol there by reducing delay.
3) Safety Requirement: this system does not impose any safety concern. The user and his device will not harmed by the software.
4) Security Requirements: Security here involves a login screen with username and password. A timeout option can be helpful. Voice recognition, photo ID, Thumb recognition can be a good option for achieving high security.

7. ARCHITECTURE CONCEPTS

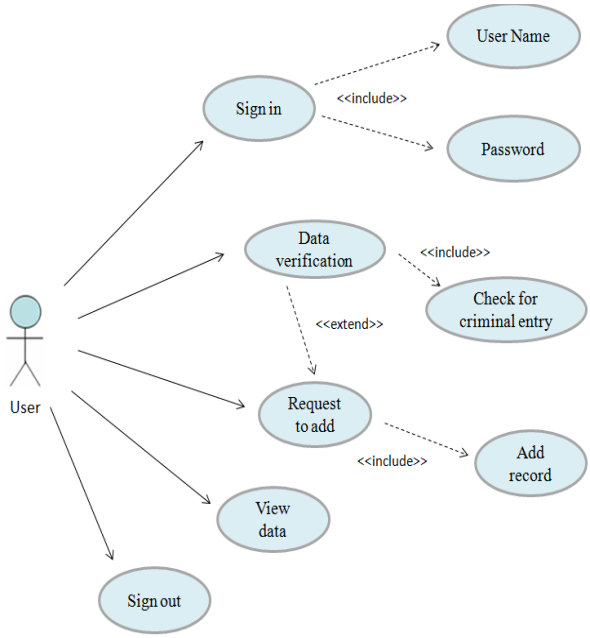

Fig 1: User use case diagram

User can be policemen, authorized person or civilian user. User is able to view data. Authorized user and policemen can be able to add criminal data to database as temporary data, (See Figure 1) which moved to permanent data by administrator based on strong clues and investigation.

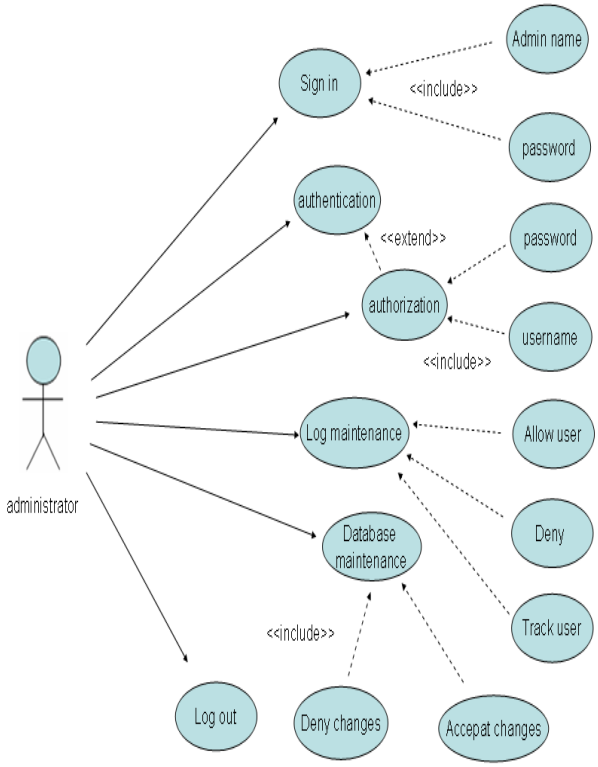

Fig 2: Administrator Use case diagram

The above diagram (Figure 2) is of administrator role. It has authority of authentication, authorization, log maintenance and network monitoring.

- The administrator has to maintain access control list to authorized access for users. Users can be a registered user or authorized policemen.
- Access to system shall be given as per user Id. Each user has different id and password.
- Civilian users can have access to use mobile site (.M site) to obtain criminal data on mobile such facility will be provided.
- Administrator has to maintain the logs for users to decide which user to allow or deny access.
- Administrator has total authority for maintenance of criminal database containing criminal data. It can be possible for administrator to accept or deny changes or request that are stored in temporary database about criminal information.

Administrator is there at each police station with unique Id. and password.

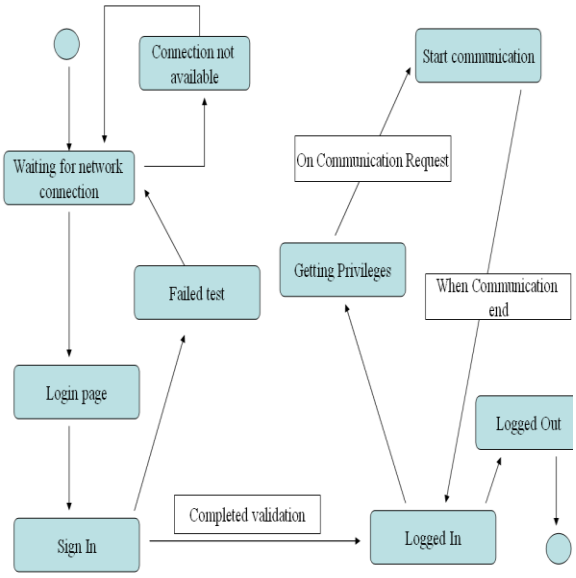

Fig 3: System state chart diagram

The state chart diagram (See Figure 3) shows the state of the client in the communication process. When the network connection is not available, it waits for the network services. When it finds service, it sends the login details to the server. When the details are corrected and verified, the client is in the logged in state. It requests the Privileges List from the server which is provided to it. Thus it goes in a communication state. When the client is done with communication. He opts for the option of logging out. After doing so, he is in the Logged out state.

8. IMPLEMENTATION DETAILS

This system consist of three modules

8.1 Module 'A' :

In first module we would create a criminal database at server. There is web compatible smart phone consisting of J2ME application. The data entered in the application like criminal name, fingerprint recognition, birth data, and location so on. The smart phone having face recognition capability, fingerprint scanning will helpful in critical cases. The data is then transferred to server using GPRS network. At Server data is tallied with available database. If similar match is found the user is responded with appropriate alarming signal. If there won't be any match the received data is stored in temporary database which would later transferred into permanent database with support of supporting clues and documentation by administrator.

For *module A* we create application *midlet* [4] at smart phone using J2ME programming [5]. The data entered by user is sent to server as servlet. The servelets are handled by TOMCAT which is act as middleware. The servelet act as data transmitter between mobile device and TOMCAT. The TOMCAT is then used to exchange data with MySQL database through MySQL API.

8.2 Module 'B' :

In this module we are creating accessible and updatable website. Such website would be accessible by appropriate authority and such users would act as administrator. Administrator has total control over database creation and modification. This website would be accessible at each police station.

At *module B*, we have to create a web application which communicate MySQL database API efficiently. We are using HTML for creation of Web site GUI and PHP for data handling work.

8.3 Module 'C' :

In this part we are making part of database available to general public by creating website with universal access. General people can get the details about criminals but not has authority to make changes or notify modifications. A general public can be an authorized user by registering himself at website and can have some restricted privileges.

At *module C*, we can create a general website using HTML or XML to provide users a convenient access.

9. FEATURES OF SYSTEM

- The system makes it easy, fast and effective to communicate between the common public and policemen and also among different layers of police administration department.
- Using wireless system it leads less implementation cost and also required software is available easily.
- The system makes most of the manual work done by policemen computerized, hence reducing paper work to great extent.
- System can be maintained easily .
- There are very rare chances of the system being crashed.
- The users of the system do not require technical knowledge in order to use it.

10. BUSSINESS OPPORTUNITY

- This system will make availability of urgent and important criminal data on different mobility, which will helpful to intelligence organizations like CID, Interpol, CBI, ATS, army force.
- It is useful for civilian users who accidentally meet criminal and willing to have information or identification about criminal.

- Reduction of workload of on-spot data validity by policemen.
- Mobility comfortable and favorable by user.

11. FUTURE SCOPE

- There is wide scope for enhancement in mobile information system domain by including features like face recognition, thumb detection, retina scan and so on. The accuracy of the system can be extended to great level.
- Criminals usually change their identity and name for the sake of escaping from their old crime records; with above enhancements it is possible to capture such criminals.
- If used at a national level , the system can be very useful to the police department as they can share the data instantly and also data from every corner of the country is available wherever and whenever needed.
- The criminal database can be maintained at international level.

12. CONCLUSION

In this paper I have presented wireless criminal tracking system using mobile computing as a way to make criminal information available on mobile for capturing criminals. This system though a small project, but can be very useful tool for the police department to keep track of the criminals and their activities. It is also helpful in finding out a general pattern about the way criminals work which may help policemen to predict the next action of the criminals.

Although, in this paper I have discussed the implementation details centered on J2ME, PHP, GPRS and Servelet, the concept presented can be extended to other programming languages and technology support in order to provide same capability.

13. ACKNOWLEDGMENT

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