Explorations into the Design of Mobile Police and Warning Information Application System under 4G Background

G. M. Kristina, C. E. Gooyers

Department of Kinesiol, University of Waterloo, Waterloo, Canada.

ABSTRACT: When the majority of policemen are executing police affairs, they will use widely the police affair information, such as the detection of cases, arresting fugitives, verification of vehicles, combat and crime prevention work. Public information security technology is vital to its application. The paper presents the design of the mobile police information application system based on 4G information technology and communication technologies, which effectively meets the requirements of the police security to make rapid responses to emergencies in the daily work. In addition, it has efficiently improved the combat capability of the public security system.

KEYWORDS: 4G mobile police; Mobile application; Public security.

1. PREFACE

The Golden Shield Project (Public Information Network Construction project) is a national public security information technology project. Its essence is to use modern information and communication technologies, and to enhance the rapid reaction of the public security organs and their collaborative combat capability. In addition, it aims to improve the work efficiency of the public security organ, and surveillance detection level, as well as to adapt to the dynamic management of the social order under the new circumstances. The aim is to achieve the information sharing and comprehensive utilization with the core of the China Crime Information Center (CCIC) and the basis of the public security business applications.

With the continued accumulation of the Golden Shield Project, the work of public security information technology has been promoted step by step. When the majority of policemen are executing police affairs, they will use widely the police affair information into such works as the detection of cases, arresting fugitives, verification of vehicles, combat and crime prevention work. The application of police information in the street and mobile has become the urgent needs of public security work. The mobile application system of public security information has become one of the main construction contents in the Golden Shield Project.

The practicality needs of the mobile office: First-line departments need real-time exchange with the public security data centers. Through the mobile police information application system, police officers can quickly inquire information on the permanent residents, temporary residents, important population information, escaped criminals' information, and vehicle information and so on. They can get access to the support of the public security of business information anytime and anywhere, especially the information source as well as the transmission applications of images, photographs, and video. In this way, it can improve efficiency and optimize the business processes of the public security system.

Unexpected emergency needs of security incidents: On the receipt of the request of the police, the police authorities will make responses for the first time to the incident area. They would make the designation, the regional topography, preliminary judgment of the police intelligence so as to reasonably and quickly distribute the police force. In this way they can reduce police time and reduce human losses, damage and casualties at the same time.

Simple operation and flexibility requirements: according to the actual situation and work characteristics of the front-line staff in the public security system, the operation interface of the system should be simple and easy to understand. The data input should be easy and quick. Only in this way can the police officers deal with related work in a quick and convenient manner.

The needs of system security: the public security information system is a large, complex system, while the information is requested absolute confidentiality. Therefore it has a high demand for the security of the system.

The needs for a good system scalability and compatibility: With the continuous development of information and communication technology, new technologies and equipments will arouse in large numbers. In order to protect the investments for the public security system from rapid depreciation, the system should have good scalability and compatibility.

The needs for advanced, mature and reliable technologies: The system should adopt the most advanced, sophisticated products and technologies to achieve the business functions, in order to guarantee the system stability and reliability.

With the rapid development of economy, technologies and the improvement of material and living standards, the public has brought higher and higher demands for the social environment. At the same time social crime means have shown more and more complex and diverse characteristics. In this case, the public security department is required to be more careful when processing daily work. Also, they should make quicker responses to emergencies. Relying on the traditional and single work means, the existing police force is far from satisfying these requirements. Only by relying on the modern IT and communication means can the combat capability of the public security system be improved so as to achieve the objectives and requirements of the modern society.

## 2. THE DESIGN OF THE MOBILE POLICE INFORMATION APPLICATION SYSTEM

According to the differences of the construction condition of public security information technology in all places, focused on the different needs of the users, we offer two different solutions.

1) Wired communications solutions (wired mode);

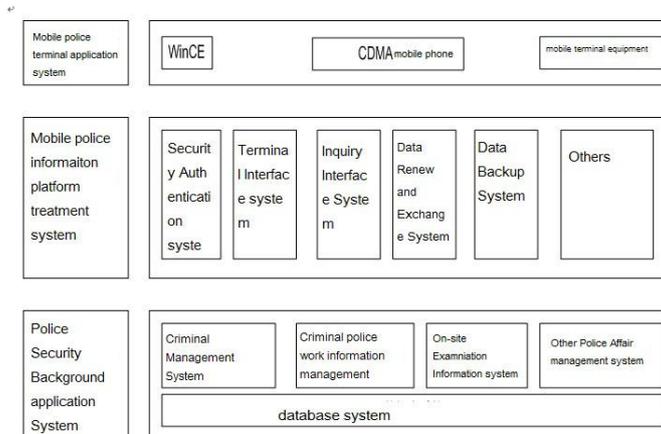2) Wireless communications solutions (wireless mode).

2.1 Wired communications
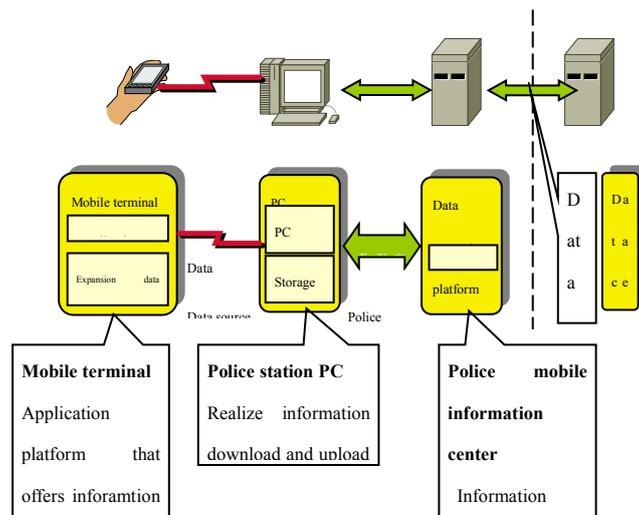
2.2 Wireless communications
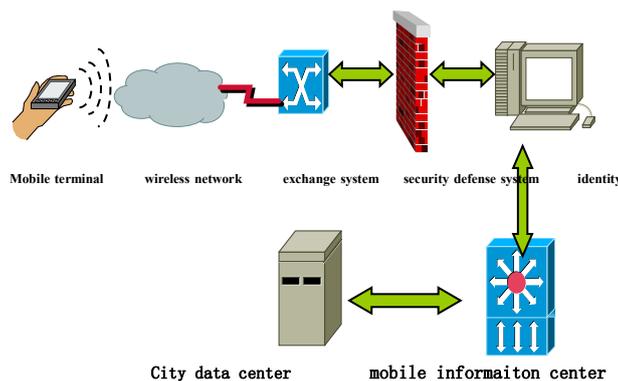
The program is the mobile terminal networking program. Through CDMA1X network, data communication is carried out to connect to the background mobile information center server and to realize real-time data transmission. It can realize functions such as real-time information announcement and inquiries and other complex.

Mobile police terminal application system	WinCE	CDMA mobile phone	mobile terminal equipment

Mobile police informaiton platform treatment system	Security Authentication syste	Terminal Interface syste m	Inquiry Interface e Syste m	Data Renew and Exchang e System	Data Backup System	Others

Police Security Background application System	Criminal Management System	Criminal police work information management	On-site Examniation Information system	Other Police Affair management system
	database system			

3. THE DESIGN OF THE BASIC FUNCTIONS OF THE MOBILE POLICE AFFAIRS INFORMATION APPLICATION SYSTEM

3.1 Inquiry function

3.1.1 Comprehensive query

Based on the comprehensive query of relevant elements, all related results can be obtained after one input. Avoid duplication of input and the trouble of multiple queries, which has greatly improved efficiency.

Person elements relation query

Material elements relation query

Cases elements relation query

Agency elements relation query

3.1.2 Automatic comparison alarm

When making the query at the same time, the system has the function of automatic comparison alarm. When the policemen input the query objects, they do not need to inquire professionally the escaped information, the illegal records and so on. The system will automatically compare the input and make alarms.

3.1.3 Business inquiries

In addition to the integrated query capabilities, the system can also make inquires on 26 kinds of individual business data, laws and regulations, police contacts, the offense queries and so on.

3.1.4 The multi-object checking

Continuously input more than one ID number and execute the query instructions. The background will automatically do the comparisons. If they are suspicious persons among them, such as a fugitive, the system will automatically compare and make alarms.

3.1.5 The national population query

It is able to realize the country's population query function. This function needs related leader departments to open the country's population business library.

3.1.6 Travelers query

It is mainly focused on the registration information for the hotel industry in system query. if it is the escaped criminals, the alarm system will make automatic comparisons.

3.2 Business functions

3.2.1 On the spot penalties

Retrieve in advance the personnel and vehicles. If it is found to be fugitives or robbery of vehicles, the system make automatic alarm.

Inform on the site the driver's license information and vehicle information

Driver, vehicle photographed

On-site wireless printing penalty decision and informed information

Punishment data realizes the real-time wireless upload illegal system

Ticket modify, complement playing function

3.2.2 Coercive measures

Retrieve in advance the personnel and vehicles. If it is found to be fugitives or robbery of vehicles, the system make automatic alarm.

Inform on the site the driver's license information and vehicle information

On-site wireless printing penalty decision and informed information

Payment options: when confiscated on the spot, the system provides a fixed invoice input function

Punishment data realizes the real-time wireless upload illegal system

Features: when the policemen make list documents and specifications, the results will be automatically handed up to the background system, which is quick and accurate. The way of site informed is efficient, fast and cost saving.

3.2.3 Electronic Police

Illegal photography is mainly used for vehicle illegal shooting. At the same time you can input the vehicle information such as the specific violation of time, place and behavior and so on. In addition, punishment data has failed to be uploaded to the illegal system in a real-time manner.

Through the police terminal, it has realized the collection of the simple accident scene photos and on-site information. Moreover, it has been wirelessly uploaded to the background.

Print a simple accident confirmation on site.

The accident brigade is ready to get access to evidence collected at the scene and make the appropriate treatment in the background.

Through a security quarantine measures, each insurance company can get access to the scene photos and the results and other information at any time via the Internet.

3.2.4 Simple incident handling

If the individual (vehicle) has the inventory records, the system will automatically pop-up alerts.

Persons, vehicles photographed.

3.2.5 On the spot inventory

On-site inventory on the suspicious persons, suspicious vehicles can be achieved through the police terminal.

3.2.6 The police management

Report Real-time the day-to-day work of the police.

3.3 Other extension functions of traffic police business

Police Inspector

Comprehensive Management

Manage real-time civilian police attendance

Service photo wirelessly upload to the police background real-time

Command scheduling function

Digital intercom function

Positioning

Video forensics

City TV monitors playback capabilities

3.5 Other police expansion services

3.5.1 Community Policing Management

Front-line police can realize the site information collection and management through mobile law enforcement terminal. When they have completed the information collection, they can also make comparisons with the fugitive library, robbery articles library and high-risk personnel library so as to make automatic alarm. It mainly includes:

Transient population information collected at the scene

Site rental housing information acquisition

On-site inventory features

The police log collection

Multimedia evidence collected at the scene

Temporary residence permit (with photo) on-site printing

The resident population of information query to change

The automatic than the alarm

Real-time wireless transmission

Integrated Query

3.5.2 Police force positioning

Center timing (fastest 1 minute) to locate configuration positioning the phone on duty police force, according to the positioning data service evaluation and dynamic police deployment monitoring, an incident according to the latest police deployment of efficient The police force command scheduler.

3.5.3 Public Security Administration

Law and order police can keep abreast of the flow of information in places within their jurisdiction by mobile device management and public places.

4. SYSTEM FRAMEWORK AND SECURITY DESIGN

4.1 Network topology
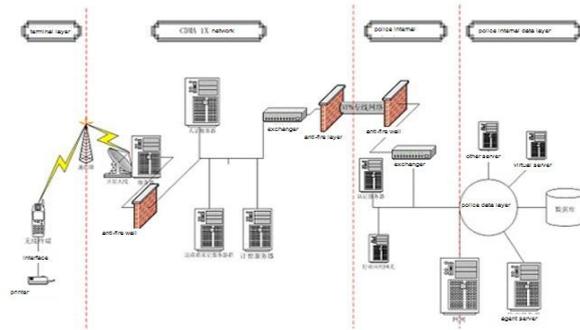
4.2 Safety design considerations

In addition to the regular security measures such as the firewall, login authentication, access control, and release control, the system professional design has adopted the multiple high-strength security measures in order to ensure the system information security.

The overall design: adopt internal and external network separation structure. Inside and outside the network forwarding isolation in high-speed data transfer at the same time to ensure the safety of the public security within the network data.

1) Self-certification: set up a self-certification system in the wireless access, such as RADIUS. Verify the machine number, user name, dial-up password when the telecommunications certified customers carry out the actual dial-up connection. In this way, it prevents unauthorized users from entering. Make sure that when the terminal loss occurs, it can log off at any time in Public Security Bureau management terminal.

2) Data Security: adopt RSA asymmetric encryption algorithm not less than 1024 to exchange a one-time key. For high efficient symmetric encryption and decryption in communication the content of subsequent sessions, and symmetric encryption algorithm is not less than 3DES. Content feature extraction and integrity of the test signature verification using the MD5 hash function.

3) Log management: audit of the system operation and user behavior, and form the normal log file to ensure that the system is safe to use. The system administrator can select the users and operations on which access to sensitive information need to log these events leave traces in the system.

4) The transmission network: mobile operators open the CDMA 1X Virtual Private Network VPN for the police. Only the police registered SIM card can get access to the VPN. Ensure the integrity of data transmission and the access to the legitimacy of the link layer.

5 CONCLUSIONS

Considering comprehensively the actual needs of the front-line police, combined with the mobile terminal, transmission network and various police operational characteristics safety requirements and timeliness requirements and many other factors. The implementation of applications in the system will achieve a comprehensive inquiry, the single business query, traffic enforcement, community management, security management, immigration management, patrol inventory, automatic alarm, real-time upload of data and functions.

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