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ATTENTION: Prof. Yaojun Qiao

RESEARCH STUDY REPORT
the Introduction of 4G Technology

INTRODUCTORY SUMMARY

Dear Professor, recently I have been doing some research, mainly about the 4G Technology. Since this aspect is relative to our major courses, I think do some advanced studies is beneficial to our employment in the future.

In addition, with the development of data communication and increasingly multimedia service demand, the past mobile communicatio n technology could not satisfy the current speed of information communicating. So the fourth generation mobile communication techn ology is developed and used.

THE BACKGROUND OF MOBILE COMMUNICATIONS

The mobile communication is a telecommunication connection technology between mobile users, other mobile users and the fixed users. With the development of electronic technique, especially the innovation of semiconductors, integrated circuits and the development of computer science, mobile communication have been rapidly developed. In addition, with the expansion of its applications and the requirements has risen in many fields, the mobile communication technology also has been improved to a higher level of development. Since the 1980s, the mobile communication technology has become indispensable in modern communication networks, as one of the fastest means of daily communication.

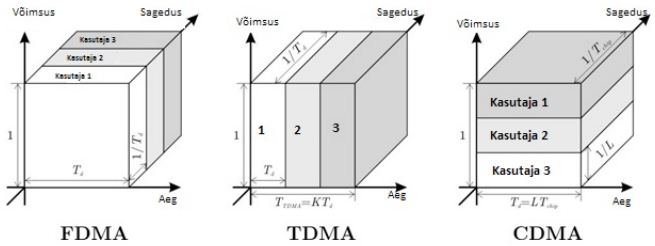
THE DEVELOPMENT OF PAST MOBILE COMMUNICATIONS TECHNOLOGIES

A. the First Generation of Mobile Communication Technology（1G）

It mainly uses simulation technique and Frequency Division Multiple Access (FDMA) technology. Due to the limited transmission bandwidth, the mobile communication temperature cannot travel long distances. It can only be a regional mobile communication system.

B. the Second Generation of Mobile Communication Technology（2G）

It mainly uses Time Division Multiple Access (TDMA) technology and Code Division Multiple Access (CDMA) technology. The primary business of 2G technology is voice business, and its main function is to provide digital voice services and low-speed data services. It overcomes the weakness of simulation mobile communication systems, and the voice quality has been greatly improved.



"Simple Introduction of FDMA, TDMA, CDMA"

C. the Third Generation of Mobile Communication Technology（3G）

Compared with the previous analog technology of the first generation and the second-generation mobile communication technology, which is currently in use, 3G technology has wider bandwidth. It not only can transmit voice signals, but also can transmit data to provide fast, convenient wireless applications, such as wireless access to Internet. Another key feature of the third generation mobile communications is that it enables high-speed data transmission services.

INTRODUCTION OF 4G MOBILE COMMUNICATION

The concept of the fourth generation mobile communication technology is also called broadband access network, having a non-symmetrical than 2M bit/s data transfer capability. It includes fixed broadband wireless access, broadband wireless LANs, mobile broadband systems, and interactive broadcasting networks.

The fourth-generation mobile communication standard has more features than the third generation standard. It can provide wireless service in different fixed platforms and across different network frequency band. It can connect to the Internet (including satellite communication layer communications advection), it also can be provided at any location where data acquisition, remote control and other integrated functions needed.

In addition, the fourth generation mobile communication system is an integrated multi-functional broadband mobile communication system providing greater bandwidth to meet the quality need of the third generation mobile communication cannot reach.

4G SYSTEMS NETWORK ARCHITECTURE

4G mobile system network architecture can be divided into three layers: physical network layer, intermediate environment layer, and the application network layer.

Physical network layer provides access and routing functions, which is done by a combination of radio and core network format. The functional intermediate layer has the function of QoS environment mapping, address translation and complete management. The interface between the physical network layer and the intermediate environment layer with its application environment is open; it makes the development and delivery of new applications and services easier, provides seamless high-data-rate wireless service and runs on multiple bands.

This service can automatically adapt to multiple wireless standards and multi-mode terminal capabilities across multiple operators and services, providing a wide range of services.

CONCLUSION

In order to make the fourth generation mobile communication system into practical application, it is necessary for the existing mobile communication infrastructure to be transformed, at first we need to solve the problems of wireless system mobility management and mobile IP core network technology.

However, for the fourth generation mobile communication system, it lacks support for real-time position management and fast seamless handover mechanism. To solve these problems, we must adopt a new structure and management of the network routing optimization projects, which requires the use of highly efficient transmission and switching protocols, which are good solutions to the problem of data loss and delay.

4G is the most complex technical system in mankind's history. To successfully implement a comprehensive communications 4G systems, it will encounter some difficulties, and its development will face tremendous market pressure. Currently many developed countries in the world are actively promoting the development of 4G technology specifications, including the implementation of the program system research network structure, user switching and roaming mobile environment and so on. So it is reasonable to expect that this fourth generation mobile communication technology will bring us a better future.

Sincerely,

Junchen Jiang