

A Review on Future Trends in 4g Networks Information Technology.

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Abstract:

The purpose of this study is to identify the latest trends in Mobile communication, which is continuously one of the hottest areas that are developing at a booming speed, with advanced techniques emerging in all the fields of mobile and wireless communications. Current times are just the beginning for deploying 4G mobile communication systems, hike research on the next generation of mobile communications, 4G Wireless and mobile networks begin to pave the way for the future. This paper studies the visions of 4G from a technical perspective. After a brief review on the development history and status of mobile communications and related 4G perspectives, present an overall 4G feature framework based on the kernel concept of integration, in hitch to key features (diversity and adaptability) of the three targets (terminals, networks, and applications) are described in detail. The concepts of both external an internal diversity of each target are defined to illustrate the causes and solutions of the adaptable feature. Then, along the entire 4G domain, each feature in the framework is deeply discussed from a technical standpoint, in which promising techniques and possible research issues for sufficient support of adaptability are also proposed. Finally, a short summary on 4G visions is presented as a continuum of features in the development of the mobile communications world. In this technology, we go in for a new motive so as to help the deaf people to communicate as efficiently as the normal human being. This could be well achieved by means of introducing new software called the voice to text converter (VoTC).

Key words: Voice Convertor, Communication,

1 INTRODUCTION

Mobile communications and wireless networks are developing at an astounding speed, with evidences of significant growth in the areas of mobile subscribers and terminals, mobile and wireless access networks, and mobile services and applications. The present time is just right to start the research of 4G mobile communications because of Possibility, according to the historical indication of a generation revolution once a decade, and now we are near the end of 3G standardization phase and the beginning of 3G deployment [1].

According to 3G goals, 3G is necessary but not sufficient to the mobile communication strategy, in which many problems are only partly solved and there are still many problems left to be solved in the next generation, i.e. 4G.

2. LITERATURE REVIEW

There is plenty of related research on the next generation mobile communications. However, most of the ongoing research can be classified into two different classes:

1) Many of the related 4G research focuses mainly on one specific technical area, such as distributed computing, mobile agents, multimedia services, or radio air interfaces, etc.

2) Some pieces of research are interested mainly in 4G scenarios from the standpoints of service provider or user, or a market analyst, from a less or non-technical viewpoint.

The difference of this paper to other related pieces of research is that we are going to present overall visions on the features of 4G

mobile communications, based on a feature framework and provide detailed proposals to respective support techniques and research topics.

This paper is organized as follows. The next section consists of a brief review in the development history and status of mobile communications, together with an analysis of the problems of 3G and developing trends summarized. The following text is comprised with, after a survey of related 4G perspectives, we present an overall 4G feature framework based on the key concept of integration, and then describe each of the two features (diversity and adaptability) of the three relevant targets (terminals, networks, and applications) in detail. The heart of this paper deeply discusses the adaptability feature of each three targets in the entire 4G domain from a technical standpoint, in which promising techniques and possible research issues are proposed. The skeleton of this paper figures out a short summary on 4G visions. The declining part concludes the paper.

We summarize our proposal of 4G features with one sentence, or even more simply, with one word: integration, i.e. seamless integration of terminals, networks, and applications (together with users) [3].

A more detailed analysis and explanation of the definition is as follows.

1) The discussion domain includes three relevant targets, i.e. terminals, networks, and applications. Out of the 4G domain, the user is the only target.

2) The kernel word of the definition is so-called integration, which means the convergence of first the three different targets; second the various modes of each target, which lead to the feature of diversity.

3) The modifier "seamless", which means the character and requirement of integration, implies the support of the adaptability feature between the three targets, each one of which is largely miscellaneous.

In order to clarify the concept, we define two kinds of diversity:

3. EXTERNAL DIVERSITY AND INTERNAL DIVERSITY.

External diversity is outside the target, which brings along the demand of the adaptability feature to all targets.

Internal diversity is inside each of the targets, and it acts as the solution for adaptability requirements [2].

In short, the need for adaptability is caused by external diversity, and it is solved by internal diversity [1].

Here both the external and internal diversity of users are the cause of all adaptability requirements, which implies that the user is out of the technical domain of 4G visions.

The two main features diversity and adaptability of the three targets terminal, network, and application are described in detail in the next section [3].

4. FEATURE DESCRIPTION

4.1 User Diversity:

The external diversity of users, i.e. people in different situations, includes e.g. culture, educational background, economic capability, physical property, personal preference, etc. The internal diversity of users, i.e. people with different interfaces, include e.g. vision, hearing, speech, touch sense, hands and fingers, body, etc [3].

Note that as for users, both their external and internal diversity are to be adapted by the other two targets: terminal and application. Moreover, for adapting the two kinds of user diversity, both the external and internal diversity of terminals and applications are the solution.

4.2 Terminal Diversity and Adaptability:

The terminals' external diversities are the differences of terminals in both static and mobile attributes. Static attributes include e.g. functionality, weight, size, battery life, human interface, antenna, processing capability, security, style, and cost. Mobile attributes include dynamic attributes of both temporal and spatial features. The former category contains e.g. moving speed and acceleration, along with stationary, pedestrian or vehicular qualities, while the latter is connected to spatial range, e.g. indoors, on-campus, in urban and rural environments, and also direction. The internal

diversity of terminals means that one terminal may integrate multiple functions, modes, interfaces, flexibilities, etc [3].

There are three targets for terminal adaptability. For users, it includes the provision of different terminals to satisfy different users and an individual user's various requirements. As for applications, we hope that miscellaneous services can be delivered to one single terminal. When networks are concerned, a single terminal can reach a wide range of networks despite of location and mobile rate.

4.3 Network Diversity and Adaptability:

The external diversity of networks is obvious. Internet is assorted by nature, while wireless networks keep the same property. For instance air interfaces can integrate all kinds of standards and work on different frequencies. Moreover, multiple operators deploy networks with multiple standards and protocols. The internal diversity of networks means that one network can interconnect with other different networks and transfer various kinds of loads, e.g. cellular systems with various coverage [4].

Three targets are related to network adaptability. In reference to terminals, network adaptability aims to make multifunctional mobile devices with a wide range of moving speeds and mobile areas connectable to wireless networks. For applications, there is a requirement that any type and/or quality of service can be delivered through diverse fixed and mobile networks in the most suitable and efficient way. The target for networks themselves is to make it easy to build a 40 feature framework in order to be transmitted correctly and efficiently [2].

We present the support techniques for each of the above features in the next forthcoming text.

5. 4G TECHNICAL PERSPECTIVES

It is obvious that 4G, just like all the previous generations, is driven not only by technology, but also by market requirements. This section mainly discusses, from a more technical perspective, possible topics for research and promising techniques of 4G, and focuses mainly on those techniques that give support to the main feature of adaptability by internal diversity of targets in the 4G domain. Fig. 2 gives an illustration of the discussion domain of 4G. Technical details are ignored here because of the length limitation of the paper. The various possibilities of competition among services are illustrated above.

5.1 TERMINALS

In order to adapt to the diverse applications and networks, together with the various requirements of users, the terminal domain must possess both internal and external diversity.

Support techniques of the field may include the following:

1) User interfaces of terminals vary from traditional keyboard, display, and tablet, to new interfaces based on Lasers, Speech, touch, vision, soft buttons, etc. This will be common at a time when one terminal has multiple user interfaces.

2) Adaptive techniques such as smart antennas, software radio, and smart transceivers, enhance interoperability through simultaneous support of several radio interfaces in a single terminal. This makes a terminal roam able across any air interface

standard and connectable to any wireless access point by exchanging configuration software. These approaches can also be used on wireless access points as an advanced smart base station.

3) Terminals will be aware of location and context, often based on some wireless low power sensors that are human- sensitive and/or environment-sensitive in order to monitor and interact with the physical world to report the human and/or environmental factors. The advances in this area have been used in e.g. wearable computers as a novel terminal type.

4) An intelligent terminal is able to dynamically improve its processing capability in order to contain various services. Some function modules can even be downloaded to a terminal when needed.

5.2. NETWORKS

More advances in networks are needed to keep pace with the rapidly changing terminals and applications, as follows:

1) Smart antenna, software radio, together with advanced base station are the key techniques to achieve adaptability of wireless access points to diverse terminals, i.e. to make radio systems and air networks re-configurable.

2) Hierarchical and ubiquitous as well as overlay cellular systems, including Pico cell, micro cell, macro cell, and mage cell ones, implement seamless network interconnection of both symmetric and asymmetric nature, and seamless terminal handoff of both horizontal and vertical levels respectively.

3) Network layer hierarchical mobility management based on Mobile IPv6 and Cellular make networks portable and adaptable of self-deployed wireless networks to introduce this concept IP brings quick and seamless handoff to terminals. The Mobile IPv6 also presents a great contribution to the adaptability of heterogeneous networks.

4) Ad hoc wireless networks are a kind, and thus dynamically share unlicensed radio spectrum 4G Mobile Communications

5) Network reconfiguration can be obtained by the reconfiguration of protocol stacks and programmability of network nodes. Thus, it can adapt dynamically to the changing channel conditions and low or high data rate users.

6) Miscellaneous services can be delivered through a mixture of transmission networks including unicast, attribute, importance, bandwidth demand, or data stream type, multiple levels of Quos can be defined for various services, multicast, and broadcast ones. According to the service types, e.g. real-time

7) Network resource can be dynamically allocated to cope with varying traffic load, channel condition, and service environment. Traffic conditions will be dynamically monitored and controlled via techniques such as distributed and decentralized control of network functionalities [3].

5.3. APPLICATIONS

Adaptability will be one of the basic requirements to the development and delivery of new mobile services. Promising techniques and possible topics may include:

1) Mobile application should refer to a user's profile so that it can be delivered in a way most preferred by the subscriber, such as

context-based personalized services. This also brings the applications with adaptability to terminals that are moving in varying locations and speeds. Micro-sensors and GPS receivers are the main driven techniques.

2) Techniques such as adaptive multimedia and unified messaging take the terminal characteristics into account and ensure that the service can be received and run on a terminal with the most suitable form to the host type.

3) Intelligent mobile software agent is a common technique to all of the three targets, which act as a platform for service development, delivery, and auto-configuration.

4) Applications can negotiate with networks so that they can be transferred with the most efficient channel, e.g. indoor networks or WLAN or cellular systems in a wide area. Services will be tailor able in order to fit the different network environments and the varying traffic conditions.

5) Services and applications can also be smoothly delivered across a multiple domain of operators and service providers [4].

6. 4G VISIONS SUMMARY

This paper presents 4G visions from a technical perspective. After a brief review of the history and status of mobile communications, we propose a 4G feature framework, in which features of 4G mobile communications are defined. The framework is based on the key concept of integration, and it has the following characteristics:

1) Targets in the framework include users, terminals, networks, and applications, which compass the entire technical domain and operating environment of 4G.

2) Core features of 4G are described as diversity and adaptability of the targets, leading to seamless integration.

3) The feature of diversity includes both external and internal diversity, in which adaptability is caused by external diversity and is solved by internal diversity.

Technical perspectives are presented for each of the features in the paper, in which also some promising techniques and possible research issues of 4G are introduced. The proposed framework provides a layout view on future communication systems, and challenging research topics are figured for guiding systematic research of 4G

Various Properties of 4G can be summarized as below:

- Starting Time- 2010-2012
- .Driven Technique- Intelligent-software, Auto configuration
- Representative Standard OFDM, UWB
- Radio Frequency (HZ)- 3G-5G
- Bandwidth (bps)- IOM-20M
- Multi-address Technique FDMA, TDMA, CDMA
- Cellular coverage-Mini area
- Core networks-All-IP networks.

Customers must be encouraged to come forth with products that did not deliver as promised and the results should be made known in public.

Marketers should also realize that false information does not always stay hidden. They should thrive for ethical practices in advertisements and the same agencies should be awarded for being the beacon in providing true and accurate information to the consumers.

So, next time you pick a chips packet that claims zero cholesterol; think twice before falling for it. The seller has least concern for your health. He just wants to ensure that his chips are sold and the money keeps rolling in.

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