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Is the Wireless and Multimedia Networking important in life

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Abstract –

This paper reviews the research Wireless and Multimedia Networking important in life?...
Its research lines include broadband wireless networks, video streaming and multimedia traffic analysis, Software Defined Networking, Quality of Experience, Wireless Local Area Networks and Data Distribution Service
Current wireless network systems (e.g. metropolitan cellular) are constrained by fixed bandwidth allocations and support only a narrow range of services (voice and low bit-rate data). To overcome these constraints and advance the state of the art in wireless multimedia communications, we are developing variable-rate video and speech compression algorithms, and wireless node architectures that will enable peer-to-peer multimedia networking even with very low bandwidth.

With the acceleration of information and the coverage of wireless networks, homes, conferences, schools and other places have a higher pursuit of the wireless transmission capabilities of electronic devices. Wireless screen transmission technology is used more frequently in life, work and study. This article mainly discusses the practical application of network multimedia courseware in college basketball teaching. This article first elaborates the teaching plan of multimedia courseware, including teaching content, teacher guidance, student learning and multimedia courseware The results show that wireless network multimedia computer-assisted teaching has a positive effect on improving students' interest in learning.
5G mobile communication architectures based on Software Defined Networking and Quality of Experience for multimedia services.
Teaching activities of the group members as well as a short bios are also included.

Key Words: Wireless, Multimedia, Networking, 5G, wireless systems etc.

1. INTRODUCTION

Current wireless systems (e.g. metropolitan cellular) are constrained by fixed bandwidth allocations, fixed network configurations, and reliance on a tethered infrastructure. In addition, existing systems support only a narrow range of services (voice and low bit-rate data). To overcome these constraints and advance the state of the art in wireless multimedia communications, we are developing new multimedia applications, video/speech compression and network control algorithms,. To support this objective, each wireless node must support the functionality, i.e. new applications (for multimedia), advances in networking to support mobility and multimedia under limited bandwidth conditions (wireless), advances in physical layer design to support robust, low power, high packet throughput links, low power DSP for multimedia compression.

In the field of multimedia communication, various technologies are developing rapidly. Whether problems can be discovered and raised in time is related to whether they can take the initiative in this field. As a current technology hotspot, artificial intelligence is playing an increasingly important role in various industries and fields. The discovery, proposal and solution of many problems are inseparable from the development and progress of artificial intelligence technology. Therefore, in the artificial intelligence environment, we must learn to discover and ask questions from the perspective of artificial intelligence. The introduction of methods and ideas in the field of artificial intelligence into the "wireless multimedia communication" course can transform the classroom form into a problem-oriented approach, and cultivate students' ability to find and ask questionsin an artificial intelligence environment.

Therefore, the main operations of the algorithms used in the wireless communication and multimedia fields are finally boiled down to the processing of matrices and vectors. At present, in order to pursue higher performance and efficiency, the above algorithms are widely used in a variety of different hardware environments. Under the effect of network multimedia courseware teaching, the more difficult a bstract thinking, language expression, logical thinking obstacles, etc., can be easily resolved, fully mobilizing students' enthusiasm for learning, guiding students' interest in thinking and exploring, and creating a learning atmosphere that is eager to learn.

A .Broadband wireless networks

The area of broadband wireless communication networks is devoted to research and design of 4G (namely, LTE and LTE-Advanced) and 5G mobile networks. Its core objective includes the research of coverage improvements and capacity enhancement solutions that are essential for broadband wireless networks in order to deliver cost-efficient wireless services. Additionally, we investigate the satisfaction of future mobile communication networks requirements through the adoption of an SDN-based design of a hierarchical architecture for the 5G packet core.

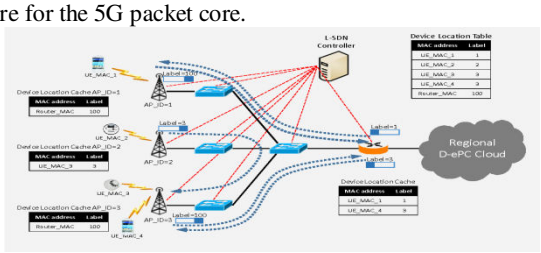


Fig 1.1 5G Access Cloud Architecture.

5G packet core design– The future data traffic load estimations forecast x1000 bandwidth increase in wireless networks by 2020. It will be caused by enriched and augmented new applications in smartphones, as well as massive deployments involving huge number of smart devices using Machine Type Communications (MTC). This disruptive demand is considered a major challenge for future mobile networks. Analysis of this traffic increase reveals new types of applications with extremely challenging requirements, such as vehicular communications or medical applications. The challenges that future 5G systems must address can be summarized as: 1) system capacity and data rate x1000, 2) massive number of connections due to MTC,

B.Software Defined Networking

The Information and Communication Technologies (ICT) industry is witnessing a radical paradigm shift with the commoditization of

hardware resources and the adoption of cloud computing. In the computer networking field, Software Defined Networking (SDN) and Network Function Virtualization (NFV) are achieving significant success. In particular, both SDN and NFV are expected to play a relevant role in 5G networks [3].

Design and evaluation of OpenFlow services for the provision of QoE– Although SDN is been embraced to provide great flexibility at low expenses, at this moment it has not standardized QoS support. However, SDN allows the development of agile and dynamic services which could benefit the overall QoE assessment of the multimedia services in a network.

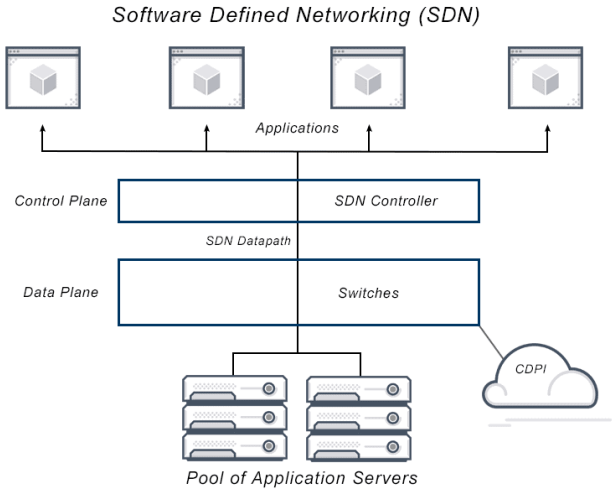


Fig 1.2 Software Defined Networking

To validate this thesis, we are designing and implementing a service which creates QoS-aware routes as part of the OpenDayLight controller. To that end, the controller uses the payload type of a RTP (Real-Time Protocol [18]) flow, calculates an optimal route based on de delay, bandwidth and packet loss rate requirements of the type of content (video streaming or voice over IP). When the network topology changes, the routes for the active flows are updated. Additionally, we are designing and evaluating several schemes for providing QoS and quality of experience (QoE) to several popular multimedia services in SDN networks, while maintaining the compatibility with legacy (nowadays) networks. To this end, we will define network elements (that will be referred to as middleboxes hereafter) which can be integrated into present and SDN networks.

C. Video streaming and multimedia traffic analysis

Although we have several contributions related to multimedia services, such as e.g. automatic protocol selection [9], low-latency packet inter-leaver for VoIP using active networks, or service enhancements using active queue management , our most remarkable contributions in this field are related to the analysis of traffic patterns from YouTube servers. In particular, we have provided traffic models when the video is downloaded from a computer or to a mobile (iOS and Android) device.

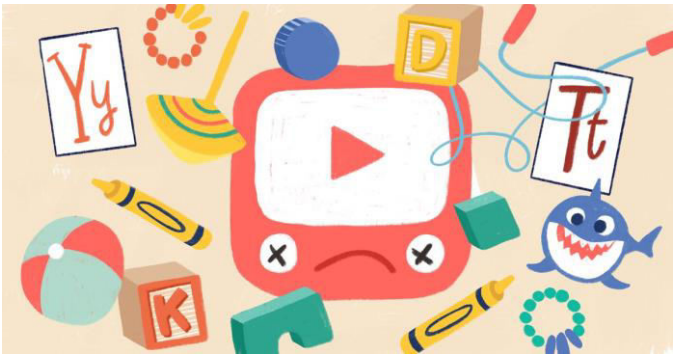


Fig 1.4 Overview of the operation of the YouTube service.

In addition, we have proposed a simple model for predicting the number of rebuffering events and their duration in progressive downloads from YouTube. These metrics are necessary to predict the quality perceived by YouTube users. The proposed model can be easily implemented in simulation tools. In we present an example of its use in a Long-Term Evolution simulator.

We also studied the performance of the YouTube service over 3G Long Term Evolution (LTE). We considered a typical configuration of an LTE network for TCP traffic and the traffic generation model for YouTube 'Flash' videos downloaded onto a personal computer (PC).

D. Quality of Experience

Emergent multimedia applications and services, such as VoIP, audio and video streaming, etc., have to face the impairments that IP networks impose (jitter, unbound end-to-end delays, consecutive packet losses, etc.). These impairments can degrade rapidly the quality of the aforementioned services, even making them unusable. Therefore, mitigating the impact of the network impediments and the measurement of such impact, is a must in IP networks.

From the point of view of the network service provider, one of the most important measures of the service performance is the final user satisfaction level.

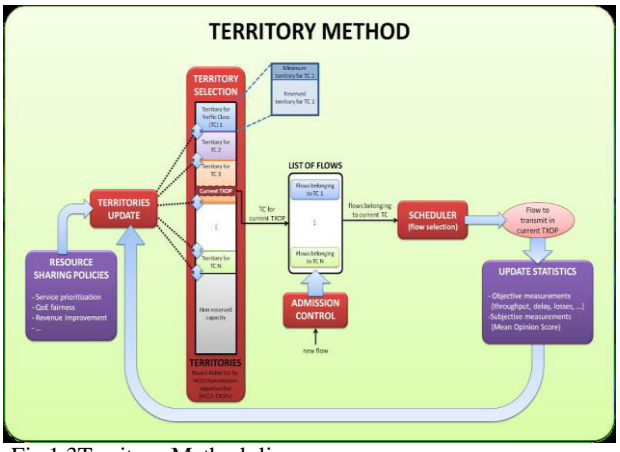


Fig 1.3Territory Method diagram

The modeling of the Quality of user Experience (QoE) implies the mapping of objective metrics (such as network impairments, signal degradation or service performance) into an opinion score. These models, tailored for each class of service, may serve to assess the QoE of a service performance in an automatic way. Moreover, using the QoE models as utility functions, we can devise automatic adaptive algorithms to control protocols

E. Data Distribution Service

The Data Distribution Service (DDS) is an OMG standard for data centric publish-subscribe (DCPS) communication systems. Our research in this field is focused in improving some aspects of the DDS middleware such as discovery, scalability, cloud monitoring, and the use of this technology for real-time multimedia streaming. Our laboratory is partner of Real-Time Innovations Inc., which is "*the most influential industrial Internet of Things company*" [23]. We are also members of the RTI Research Community.

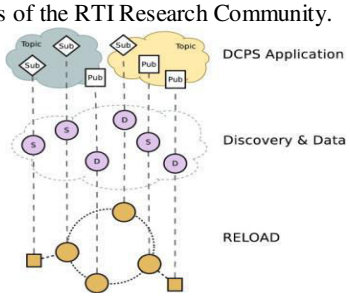


Fig 2.1 RELOAD-based Discovery for DCPS.

same time a low overhead. In addition, DARGOS is flexible and adaptable and allows defining and monitoring new metrics easily.

Multimedia over DDS– DDS is a good candidate for multimedia (such as audio and video) content delivery. The rich set of QoS defined by the DDS standard have to be tuned to enable DDS to distribute multimedia data. Our research is aimed to determine the optimal QoS policies settings (Fig. 12) that can improve the multimedia experience in complex scenarios such as reduced bandwidth environments without the need of classical centralized services [28][29].

Fig 2.2 DDS data-spaces allow sharing rich multimedia content.

DDS scalability – Initially DDS systems were restricted to a single, isolated, specific Domain, which was usually confined to a LAN and rarely exceeded one thousand computers. To overcome this restriction, we proposed the DDS Routing Service (DDS-RS) [30]. The DDS-RS (Fig. 13) is a generic service capable of transparently bridging DDS Domains as well as adapting among different data schemas. A key benefit of our approach is that the service can interoperate with existing DDS applications, bridging them without requiring them to be modified. We also showed that the impact of the service on the communications performance is well within the acceptable limits of most real-world uses of DDS. DDS-RS was adopted as a product by RTI DDS Connext © implementation.

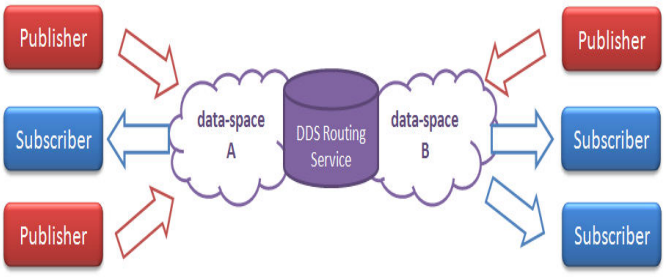
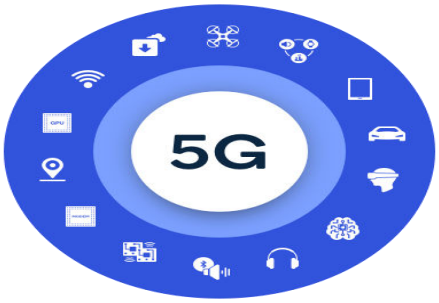


Fig 2.3 The DDS-RS transparently bridges DDS domains

2. 5G network technology

The fifth generation of wireless technology promises more than just a faster network. It will help redefine the network, establishing a new global wireless standard for speed, throughput and bandwidth. A 5G network builds a bridge to the future.



5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.

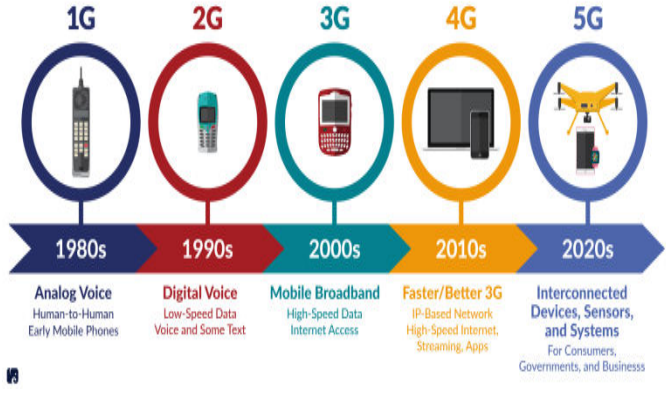
2.1 How does 5G work?

Like 4G LTE, 5G is also OFDM-based (Orthogonal frequency-division multiplexing) and will operate based on the same mobile networking principles. However, the new 5G NR (New Radio) air interface will further enhance OFDM to deliver a much higher degree of flexibility and scalability.

5G will not only deliver faster, better mobile broadband services compared to 4G LTE, but it will also expand into new service areas, such as mission-critical communications and connecting the massive IoT. This is enabled by many new 5G NR air interface design techniques, such as a new self-contained TDD subframe design.

2.3 Reasons 5G is important

5G is not only important because it has the potential to support millions of devices at ultrafast speeds, but also because it has the potential to transform the lives of people around the world.



Improving accessibility

Improvements in 5G technology can help make life better. For example, significant advances in autonomous vehicle technology are possible with 5G, creating the potential for people to have new levels of personal and professional freedom. Connected appliances can help automate tasks around the house, which can not only improve personal convenience but also help those who need assistance with everyday tasks.

Extending the reach of mobile broadband

5G can power technology well beyond what current mobile technology permits. Thanks to its speed and bandwidth, 5G promises to make significant improvements in 3D holograms, virtual reality and augmented reality, creating opportunities to connect people far beyond what current cellular technology allows.

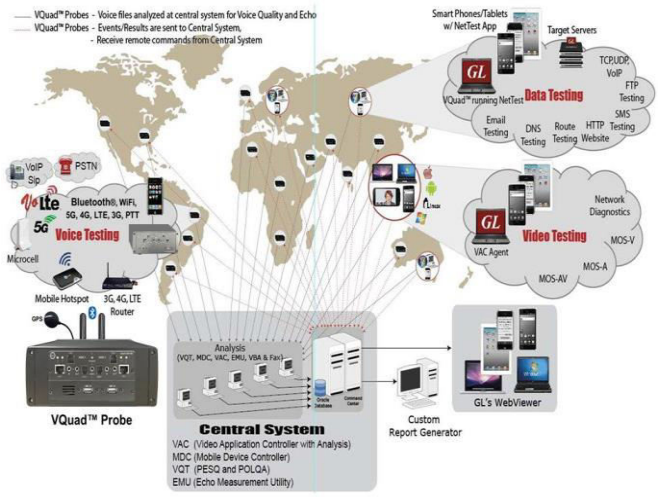
Improving safety, health and security

Access to 5G technology promises to improve mission-critical services that affect safety and security of services today. Opportunities include smart cities with 5G in public spaces, the potential for remote surgery, better traffic control and many other applications that depend on nearly instantaneous response time.While many of the applications for 5G are expected to directly impact how businesses run, the implications for accessibility, the reach of mobile broadband and the improvements in society's safety, health and security have the potential to be farther reaching. 5G technology is important for consumers as well as businesses as we move into the Fourth Industrial Revolution and explore all that 5G has to offer, including things we likely have not thought of yet.

2. APPLICATIONS

Video/data networking

Video Talk (VTalk) is a multimedia application implemented on WAMISNOS, which can set up a video and data transfer link between a pair of nodes in the wireless network. The video is sent using the User Datagram Protocol (UDP) which is a connectionlessnon-guaranteed delivery (but error free) transport protocol. Specification on the rate and size of the video image are accepted and statistics about the link and video rate are shown in the upper right hand corner of the display. Below the video display, there are two boxes in which a "chat" session can be conducted that uses TCP for transfer of the characters typed in at the keyboard



. TCP packages a set of characters together into a packet and sends it on the link. TCP is a connection-oriented guaranteed error-free transport protocol. This protocol uses a built in flow control sliding window protocol which helps to adapt for congestion in the network during such peak traffic conditions as file transfers.

4.Wireless communication

With the rapid development of the information industry, the integration between remote wireless transmission technology and computer technology is bound to be a trend. The popularity of the Internet has accelerated the integration of these two technologies, and the rapid development of mobile communications has proposed wireless remote transmission higher requirement. Wireless remote transmission can transmit various forms of information such as image, audio and video. Its characteristics are high speed, multimedia support, and multiple service channels. In terms of

transmission speed, it is no less than the traditional data transmission method, and it can also expand other businesses. Compared with traditional data transmission methods, remote wireless data transmission has broader application prospects

With the advent of the 5G era, it will surely be able to provide users with efficient transmission speeds and high-quality multimedia services.

(1) Bluetooth technology

Bluetooth technology is a protocol wireless network technology, which enables various communication devices and even household appliances to connect wirelessly. But because of its frequency hopping technology, its battery life can only last a few days. In addition, the scalability of Bluetooth is not very good, and a network can only support a few devices at most.

(2) WIFI technology

The communication of WIFI technology is more convenient, its transmission rate is faster than other technologies, and its advantages are more obvious. However, its battery usage is not optimistic, and some will even run out within a few hours, which cannot meet our requirements for low power consumption and low cost.

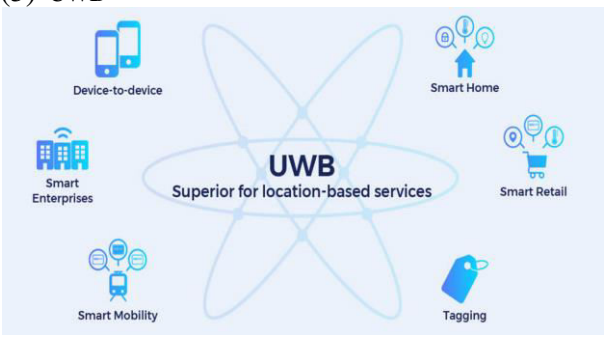
(3) Wireless USB technology

Wireless USB technology is developed based on UWB. It is different from WIFI and Bluetooth, it is a kind of non-carrier communication. It has the characteristics of low cost and long battery life, but it is not suitable for long-distance transmission, and it also lacks in safety and scalability.

(4) NFC technology

NFC technology is the product of the modification and integration of interconnection technology and radio frequency identification technology. Its operating frequency is 13.56 MHz. Compared with several other wireless communication technologies, its reliable transmission distance is shorter, but its speed and stability are better than infrared.

(5) UWB



UWB is also known as impulse radio, which communicates in impulse mode. Although this technology has strong anti-interference performance and has great advantages in bandwidth, power consumption, and safety performance, it is inconvenient to use in long-distance applications due to the limitation of transmission distance.

5.Conclusion

Networked multimedia is to build the multimedia on network and distributed systems, so different users on different machines can share image, sound, video, voice and many other features and to communicate with each under these tools 5G will be able to sustainably satisfy the requirement of the 1000-time traffic growth. 5G will provide users with fiber-like access data rate and “zero” latency user experience. 5G will be capable of connecting 100 billion devices Wireless communications have enabled the connection of billions of people to the Internet so that they can reap the benefits of today's digital economy. ... It also enables economies of scale by reducing the cost of network equipment and user devices enabling affordable services.

Acknowledgement

It gives me a great pleasure to present my research paper on “Is the Wireless and Multimedia Networking important in life”. I would like to express my deepest appreciation to all of the teachers who have supported me in the study and given sufficient guidance.

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