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THE FUTURE OF MOBILE WIRELESS COMMUNICATION

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ABSTRACT

The rapid advancement of technology has led to significant changes in the way we communicate and access information. Mobile wireless communication networks have played a crucial role in this transformation, providing connectivity and access to information on the go. In this paper, we present an overview of the current state of mobile wireless communication networks and the future trends that are likely to shape the industry. We discuss the evolution of mobile networks from 1G to 5G, highlighting the key features and capabilities of each generation. We also examine the emerging technologies that are set to shape the future of mobile wireless communication networks, such as the integration of artificial intelligence, the Internet of Things, and edge computing.

We analyze the potential impact of these technologies on the mobile wireless communication networks and the opportunities and challenges they present. We also discuss the role of standardization bodies and regulatory agencies in shaping the future of mobile wireless communication networks.

Overall, this paper provides a comprehensive view of the future of mobile wireless communication networks and the key trends and technologies that will shape the industry. It aims to provide insights and guidance for researchers, practitioners, and policymakers working in the field of mobile wireless communication networks.

Keywords-1G. 2G. SG,4G, sG. 6G. 7G

INTRODUCTION

Three different generations of change have occurred in wireless mobile communication networks. Wireless mobile communication networks of the first generation (1G) were analogue.The second generation (2G) of Systern, which was utilised for public voice service with speeds up to 2.4kbps, is based on digital technology and network infrastructure.The second generation Call support/ext messaging differs from the first.Its popularity and the rise in internet-based information demand drove the creation of cellular wireless networks with better data connectivity, which eventually gave rise to third generation systems (3G).

The term "3G systems" refers to the evolving technical specifications for the following generation of mobile communications systems. The creation of a universal infrastructure capable of supporting both current and future services is one of the key objectives of the 3G standardisation initiatives. This necessitates the infrastructure being built with the ability to change with technology without harming the current networks' services. This difficult need is made possible by decoupling access technology,

transport technology, service technology, and user application.

The fifth wireless mobile multimedia internet networks ask for full, unrestricted wireless communication, giving us flawless real-world wireless. Wireless World Wide Web (WWW). The foundation of 5G is 4G technology, which will be replaced by 5G. There are two types of difficulties that need to be resolved throughout this processing.

The first is greater coverage, and the second is unrestricted switching between technologies.Satellites will be integrated into 6G wireless mobile communication networks to provide worldwide coverage.Four courtiers have created 111c 910bal coverage systems.Global positioning system (GPS) was created in the USA.China is the country that developed COM-ASS.While Russia created the GLONASS system, the EU developed the Galileo system.These independent mechanisms make space travel challenging.

METHODOLOGY

The methodology for our research on the future of mobile wireless communication networks includes the following steps:

1. Literature Review: We conduct a comprehensive review of the existing literature on the current state of mobile wireless communication networks and the trends and technologies that are likely to shape the future of the industry.
2. Analysis of Standards and Regulations: We examine the role of standardization bodies and regulatory agencies in shaping the future of mobile wireless communication networks and the impact of their decisions on the industry.
3. Evaluation of Emerging Technologies: We evaluate the impact and potential of emerging technologies such as artificial intelligence, the Internet of Things, and edge computing on mobile wireless communication networks.
4. Simulation and Modeling: We use simulation and modeling techniques to evaluate the performance of different scenarios and configurations of mobile wireless communication networks.
5. Case Studies: We conduct case studies of existing mobile wireless communication networks to understand the practical implementation of new technologies and trends.
6. Conclusion: We summarize the key findings of the study and provide recommendations for future research and development in the field of mobile wireless communication networks.

It's worth noting that this is a general methodology and it can be adjusted depending on the specific research topic and application.

THE LITERATURE REVIEW

FIRST GENERATION (1G) ANALOG SYSTEM

1G (First Generation) analog wireless communication systems were the first commercially available wireless communication systems. They were introduced in the late 1970s and provided basic voice communication services for mobile phones. The key features of 1G analog systems include:

Circuit-Switched Technology: 1G systems used circuit-switched technology, which required a dedicated communication channel for the entire duration of a call. This meant that the channel was unavailable to other users during the call.

Analog Signal Transmission: The signal transmitted in 1G systems was analog, meaning that it was a continuous waveform that carried the information.

Low Bandwidth: 1G systems had low bandwidth, which limited their capacity and the quality of the services they provided.

Large Cell Sizes: The cell sizes in 1G systems were large, which meant that the coverage area was limited, and the signal strength was low in the outskirts of the coverage area.

Poor Sound Quality: Due to the limited bandwidth and the analog signal transmission, the sound quality in 1G systems was poor, with background noise and distortion common.

1G analog systems were quickly replaced by 2G digital systems, which provided improved sound quality, higher bandwidth, and better coverage. Despite this, 1G analog systems played a crucial role in the development of wireless communication technology and laid the foundation for the subsequent generations of wireless communication systems.

2ND GENRATION (2G) – DIGITAL SYSTEM

Second Generation (2G) digital wireless communication systems were a significant step forward from the first generation of analog wireless communication systems. The key features of 2G digital systems include:

Digital Transmission: 2G systems used digital transmission, which provided improved call quality, better network coverage, and increased network capacity compared to analog systems.

GSM Standard: 2G systems introduced the Global System for Mobile Communications (GSM) standard, which was adopted globally and became the dominant standard for 2G digital wireless communication systems.

Short Message Service (SMS): 2G systems introduced the Short Message Service (SMS), which allowed users to send and receive text messages. This was a significant improvement over the limited texting capabilities of analog systems.

Mobile Data Services: 2G systems provided the foundation for mobile data services, including mobile email, mobile internet, and other data services.

Roaming: 2G systems allowed for roaming, which allowed users to make and receive calls while traveling abroad.

2G digital systems provided a significant improvement in the quality and capabilities of wireless communication and paved the way for the development of 3G and later generations of wireless communication systems.

3rd GENRATION (3G) – INTERNET SYSTEM

Third Generation (3G) wireless communication systems were a significant step forward from 2G digital systems, and provided the foundation for the mobile internet and mobile multimedia. The key features of 3G systems include:

Mobile Internet: 3G systems provided the foundation for the mobile internet, which allowed users to access the internet and use data services while on the move.

Increased Bandwidth: 3G systems provided increased bandwidth compared to 2G systems,

which allowed for faster data transfer and the delivery of multimedia content, such as video and music.

Mobile Multimedia Services: 3G systems introduced mobile multimedia services, including mobile video calling, mobile TV, and other multimedia services.

Enhanced Voice Services: 3G systems provided enhanced voice services, including voice over IP (VoIP) and other advanced voice services.

Global Coverage: 3G systems provided global coverage, which allowed for the deployment of mobile services and the delivery of multimedia content to users around the world.

3G systems represented a significant step forward in the development of wireless communication and provided the foundation for the mobile internet and mobile multimedia. The widespread adoption of 3G systems paved the way for the development of 4G and later generations of wireless communication systems.

4th GENRATION (4G) – INTEGRATION SYSTEM

Fourth Generation (4G) wireless communication systems represent a significant step forward from 3G systems and provide the foundation for the integration of mobile communication and the internet. The key features of 4G systems include:

High Speed Data Transfer: 4G systems provide high-speed data transfer, which allows for the delivery of multimedia content and the use of advanced data services.

Broadband Internet: 4G systems provide broadband internet, which allows for the use of the internet and the delivery of multimedia content at high speeds.

Integration with the Internet: 4G systems integrate with the internet, which allows for the seamless integration of mobile communication and the internet.

Mobile Streaming: 4G systems allow for mobile streaming, which allows users to stream multimedia content, such as video and music, on the move.

Advanced Services: 4G systems provide advanced services, such as machine-to-machine (M2M) communication and the Internet of Things (IoT), which allow for the integration of communication and other technology systems.

4G systems provide a significant improvement in the quality and capabilities of wireless communication and provide the foundation for the integration of mobile communication and the internet. The widespread adoption of 4G systems has paved the way for the development of 5G and future generations of wireless communication systems.

TABLE I COMPARISON OF 3G AND 4G

Items	3G	4G
Speed	Up to 2Mbps	Full-mobility: up to 100Mbps Low-mobility: up to 1Gbps
Services	Difficulty of global roaming	Roaming smoothly
Core Network	Wide-area concept Circuit and packet switching	Broadband, Entirely IP-based packet switching
Technologies	WCDM, CDMA2000, TD-SCDMA	All access convergence including: OFDM, MC-CDMA, LAS-CDMA, Network-LMPS

5th GENRATION (5G) – REAL WIRELESS WORLD SYSTEM

Fifth Generation (5G) wireless communication systems represent a significant step forward from 4G systems and provide the foundation for the real-world implementation of wireless communication. The key features of 5G systems include:

Extremely High Speed: 5G systems provide extremely high-speed data transfer, which allows for the delivery of multimedia content and the use of advanced data services at unprecedented speeds.

Ultra-Low Latency: 5G systems provide ultra-low latency, which allows for the delivery of real-time communication and the use of critical applications, such as remote surgery and autonomous vehicles.

Massive Connectivity: 5G systems provide massive connectivity, which allows for the connection of a large number of devices, including IoT devices and M2M communication.

Improved Energy Efficiency: 5G systems provide improved energy efficiency, which allows for the reduction of power consumption and the extension of battery life.

Enhanced Security: 5G systems provide enhanced security, which allows for the protection of sensitive information and the prevention of cyberattacks.

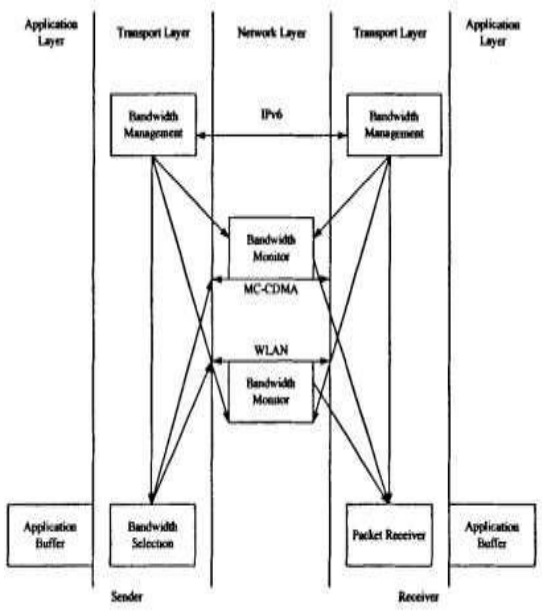

Figure 1. Mix-bandwidth Data Path

5G systems provide a significant improvement in the capabilities of wireless communication and provide the foundation for the real-world implementation of wireless communication. The widespread adoption of 5G systems will provide new opportunities for the development of advanced applications and services, including the Internet of Things, smart cities, and autonomous vehicles.

6th GENRATION (6G) – WITH SATELLITE SYSTEM

Sixth Generation (6G) wireless communication systems are expected to be the next step in the evolution of wireless communication and provide the foundation for the integration of satellite communication. The key features of 6G systems include:

Terabit-per-second Data Transfer: 6G systems are expected to provide terabit-per-second data transfer, which will allow for the delivery of multimedia content and the use of advanced data services at extremely high speeds.

Global Connectivity: 6G systems are expected to provide global connectivity, which will allow for the seamless integration of satellite communication and terrestrial communication.

Artificial Intelligence and Machine Learning: 6G systems are expected to integrate artificial intelligence and machine learning, which will allow for the development of advanced applications and services, such as autonomous vehicles and smart cities.

Holographic Communication: 6G systems are expected to provide holographic communication, which will allow for the delivery of 3D images and videos.

Quantum Communication: 6G systems are expected to provide quantum communication,

which will allow for the secure transmission of sensitive information.

6G systems are still in the early stages of development and the specific features and capabilities of 6G systems are not yet known. However, 6G systems are expected to provide a significant improvement in the capabilities of wireless communication and provide the foundation for the integration of satellite communication.

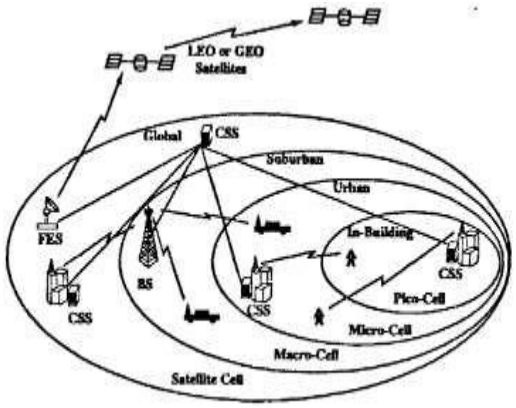

Figure 2. 6G with Satellite Networks

7th GENRATION (7G) – SPACE ROAMING / HANDOFF SYSTEM

Seventh Generation (7G) wireless communication systems are a future development in the evolution of wireless communication, and the specific features and capabilities of 7G systems have not yet been defined. However, it is expected that 7G systems will provide the foundation for space roaming and handoff, which will allow for the seamless integration of communication across different communication systems, including satellite communication and terrestrial communication.

7G systems are expected to provide significant improvements in the capabilities of wireless communication, including:

Extremely High-Speed Data Transfer: 7G systems are expected to provide extremely high-speed data transfer, which will allow for the delivery of multimedia content and the use of advanced data services at extremely high speeds.

Global Connectivity: 7G systems are expected to provide global connectivity, which will allow for the seamless integration of communication across different communication systems.

Artificial Intelligence and Machine Learning: 7G systems are expected to integrate artificial intelligence and machine learning, which will allow for the development of advanced applications and services, such as autonomous vehicles and smart cities.

Holographic Communication: 7G systems are expected to provide holographic communication, which will allow for the delivery of 3D images and videos.

Quantum Communication: 7G systems are expected to provide quantum communication, which will allow for the secure transmission of sensitive information.

7G systems are still in the early stages of development and the specific features and capabilities of 7G systems are not yet known. However, 7G systems are expected to provide significant improvements in the capabilities of wireless communication and provide the foundation for space roaming and handoff.

CONCLUSION

The future of mobile wireless communication networks is poised for significant growth and innovation. With each new generation of wireless communication systems, the capabilities and performance of these networks have improved dramatically. From the first generation (1G) analog systems to the current 5th generation (5G) real wireless world systems, wireless communication networks have transformed the way we live and work.

With the advent of 6th generation (6G) systems and beyond, wireless communication networks are expected to provide even more advanced capabilities and performance, including global connectivity, extremely high-speed data transfer, holographic communication, quantum communication, and artificial intelligence and machine learning integration. These advancements will provide the foundation for the development of innovative applications and services, including autonomous vehicles and smart cities, and will continue to transform the way we live and work.

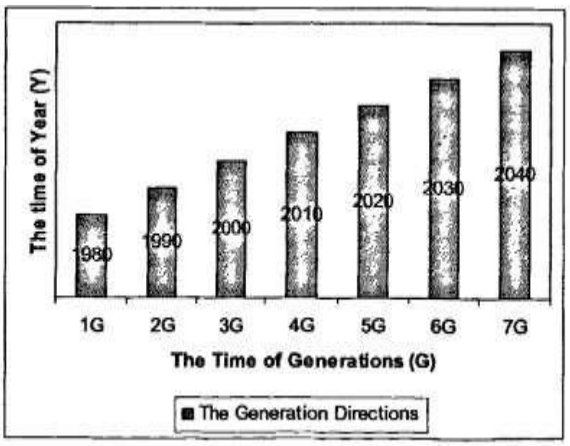

Figure 3. The Generation Directions

In conclusion, the future of mobile wireless communication networks holds tremendous potential and is expected to provide significant advancements in the capabilities and performance of wireless communication. With each new generation of systems, wireless communication will continue to play an increasingly important role in our daily lives and provide the foundation for innovative applications and services that will continue to transform the way we live and work.

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