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Research Paper on Challenges of 5G Wireless Systems

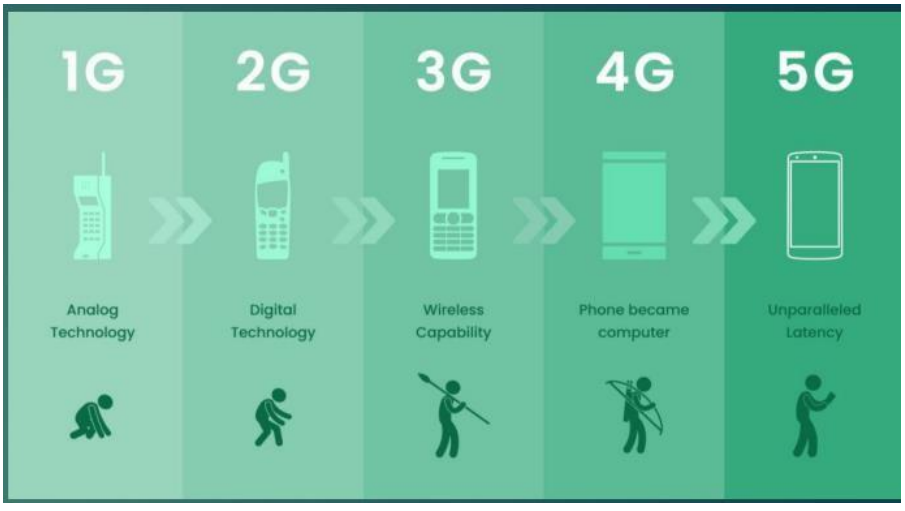
Shivam Deepchand Sahani
Student, Department of MCA
Late Bhausaheb Hiray S. S. Trust's Institute of Computer Application, Mumbai, India

Abstract: *5G Technology stands for 5th generation mobile technology,5G are changes the features of technology. 5G technology will change the way most high bandwidth users access their phones. Revolutionary development in electronic and communication, mobile and handheld devices become the part of our daily life it provide unlimited, uninterrupted services. 5G technology has changed the meaning to use mobile within very high bandwidth 5G network can provide better Quality of Service along with higher data rates than 4G network and have least latency. The 5G technologies include all type of advanced features which makes 5G technology most powerful and in huge demand in near future. 5G wireless networks will support 1000-fold gains in capacity connections for at least 100 billion devices.*

Keywords: 5G Technology.

I. INTRODUCTION

- 5G is the fifth generation of cellular networks,5G technology going to be a new mobile revolution in mobile market.
- 5G enables next generation wireless network is able to provide better End- to-End (E2E) connectivity in on-demand fashion.
- 5G technology has extraordinary data capabilities and has ability to tie together unrestricted call volumes and infinite data broadcast within latest mobile operating system.
- The scope of the 5G is not limited to the radio technology; it can also provide services to fixed host communication, cloud infrastructure, etc.
- The extension services of 5G mobile network improves the ecosystem of the telecommunication network and provide services to healthcare industry, agriculture industry, smart city project in an energy efficient manner.



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II. CHALLENGES

2.1 Environmentally Friendly

- 4G Radio Network (RN) is consuming approximately 65-74% of total power. This leads to emission of CO2 in a large amount and creates a negative impact on environment.
- It includes Cloud-Radio Network (CRN), Visual Light Communication (VLC), millimeter wave (mmWave) communication, D2D communication, Massive Multiple Input and Multiple Output (mMIMO) .

2.2. Network Performance Optimization

- The 5G network will have extremely low latency. It will directly affect the quality of service, end-to-end delivery, ease of connectivity, reliability etc., To improve QoS, delay bound QoS, intelligent equipment and load balancing schemes are incorporated.

2.3 Entertainment

- 5G network be able to support the immersive entertainment anywhere at any time due to low latency and big bandwidth offered by it
- 5G is able to project live virtual reality streams of sports, adventures, real world images on smartphone or head mounted display Augmented Reality.

2.4. Monitoring Environmental

- Monitoring the changes in environment is one of the most critical challenges to the world.
- Living being suffer from sudden change in the climate due to unknown natural and environmental disasters, e.g., storm, flooding, drought, T- sunami etc.

III. RESEARCH METHODS

3.1 Millimeter Wave

- Millimeter wave spectrum is the band of spectrum between 30 GHz and 300 GHz. Wedged between microwave and infrared waves, this spectrum can be used for high-speed wireless communications as seen with the latest 802.11ad Wi-Fi standard operating at 60 GHz.
- 5G networks continue to roll out around the world. This next generation of wireless communication is being powered, in part, by a new technology known as millimeter wave.
- The millimeter wave technology is just one technology that 5G networks can use.

3.2 Small Cellular Cells

- Small cells deliver high-quality, secure cellular coverage indoors and out, complementing the macro network to improve coverage, add targeted capacity, and support new services and user experiences.

3.3 Massive MIMO

- Massive mimo is the most captivating technology for 5G and beyond the wireless access era. Massive MIMO is the advancement of contemporary MIMO systems used in current wireless networks, which groups together hundreds and even thousands of antennas at the base station and serves tens of users simultaneously

3.4 Beamforming

- Beamforming is the ability of the base station to adapt the radiation pattern of the antenna. Beamforming helps the base station to find a suitable route to deliver data to the user, and it also reduces interference with nearby users along the route.

35. Full Duplex

- Full duplex refers to the simultaneous transmission and reception over the same frequency band and at the same time.5G networks will use full- duplex for the transmission of signals to potentially double the network capacity

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and is beneficial for higher layers

IV. CONCLUSION

- 5G technology promises to be revolutionary. Larger bandwidth and low latency times will allow the development of new services and the improvement of existing ones
- It can provide higher speed, lower latency and greater capacity than 4G LTE networks. It is one of the fastest, most robust technologies the world has ever seen. That means quicker downloads, upload.
- A high-speed data network is required for communication among these devices 4G is unable to meet the demand of bandwidth and latency.
- Industries and researchers presented 5G as an alternative of 4G,5G network are capable to meet industry requirements.

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