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SURVEY ON 5G TECHNOLOGY

Asmita, Priyanka Sharma, Kirti Agrawal

Computer Science Dept., GLA University Mathura

Email: asmitait3@gmail.com

ABSTRACT:

This paper explains the concept behind the 5G technology. In the first part of this paper all the generations of technology were introduced briefly starting from 1G to 5G which is the latest technology and in the development phase. Second part of this paper consist of review literature which shows all the related researches carried out with respect to fifth generation. Next how 5G evolution happened is briefly explained along with its advantages with respect to modern technology like artificial intelligence, internet of things, self-driving cars and smart city project which is still in progress. Whereas disadvantages of 5G technology are also considered in this paper with respect to health risk which is at utmost priority and still researches are going on this factor.

Keywords: 5G, technology, evolution, technology, speed.

I. INTRODUCTION

We have seen great innovative changes in the era of communication .Nowadays, we depend on mobile phones instead of landlines .so, in most of the places, and landlines are of no use. If we talk about an entertainment mobile phone is the largest entertainment gadget providing people with almost every mode of entertainment in their hands. The world of telecommunication has paved the way and has transformed 1G to2.5 G and from 3G to 5G and it has reached the era of high technological advancement. Though 5G has not been common yet but with 5G, the users can access a lot more than the previous generations. Today, people want different features in a mobile phone with affordable price and package. The leading motive of the mobile phone manufacturers is the creation of best with other companies. Instead of having several mobile phones in the market, Apple has remained successful in the iPhone market.

Huge features are indulged in such small electronic devices. People are expecting more to get in new mobile phones within their budget. Getting people's demands in tracks, the manufacturers are making mobile phones according to the people's expectation.

At present, mobile phones have so many remarkable features like WLAN adapter. People may expect that in the later years, mobile phones will have wax adapter too besides the implemented features. We are using IP for all the existing generation. Concerning the 4G,its towards flawless implementation of all the other networks.Multi mode consumer terminals are mandatory for 4G but special security system support in special wireless technologies remain a test. Nowadays, practice of using various technologies has been implemented.

Combination of different wireless technologies are not there for a same session. The OWA is used to offer open baseband processing modules with the other parameters. It is also related to MAC/PHY layers.5G allows

new modulation scheme to enhance the downloading speed from the Internet. The 5G mobile allows access to different wireless technologies. It will make the utmost selection for a particular service. This paper gives the concept of intelligent internet phone where the mobiles can prefer the appropriate connections.

II.LITERATURE REVIEW

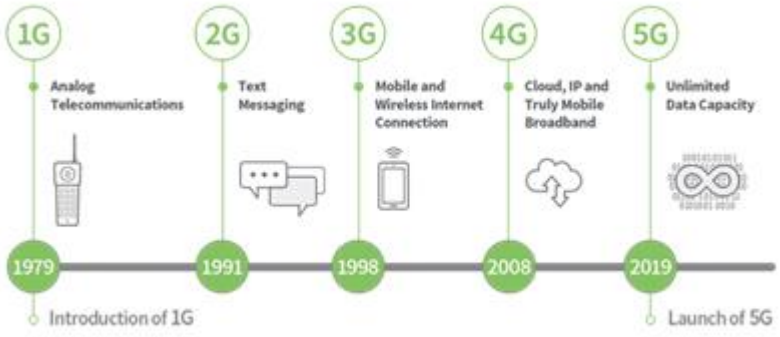
Wireless communication has evolved over the past three to four decades with each new generation providing an advancement over the previous one(s). Mobile wireless communication started with 1G, gradually evolved into 2G, 3G, 4G, and presently at the fifth-generation (5G). (1)provided in-depth knowledge on how mobile wireless communication has evolved from one generation to the next which includes improvement a successive generation has over the previous. The first generation (1G) was successful in establishing the basic mobile voice, while the capacity and coverage of communication networks were introduced in 2G technology. 3G was particular about providing increasing the speed at which data is sent which led to having a "mobile broadband" experience, which emerged by 4G. 5G's goal is to provide user terminals that can simultaneously access different wireless technologies. Generations of communication systems that will succeed 5G are presumed to make use of a satellite network. In the case of 6G, there is a presumption that mobile-calls cost will be relatively expensive. Although, in the 7G, low-income users will benefit from the decrease in cost of mobile calls. (2) compared the 5G network with previous generations of wireless communication technologies and opined that the 5G will be the fastest technology (yet developed), having no access or zone limits. The proposed features and architecture of 5G will increase the quality and capacity of the system within available frequency spectrum, the frequency band is said to be 3 to 300GHz and Data Bandwidth is 1Gbps and probably higher (as demanded) successively.

IP-based design model of the 5G mobile network architecture and its mobile networks interoperability. The model comprises of several independent, autonomous radio access technologies, and a user terminal which is a major key factor in 5G architecture. There must be significant differences between the generations before 5G and 5G itself other than an increase in throughput,such as better coverage, Lower battery consumption and high data rates available at unit area (that is, high system spectral efficiency). 5G is expected to provide a data rate of around 1Gbps in mobility, cheaper traffic fees due to low infrastructure deployment causing an increase in peak bit rate and better cognitive radio security. Also, it is expected to provide a high capacity that allows more devices to connect concurrently, a larger number of supporting devices, better connectivity irrespective of the geographic region, and higher reliability of the communications (3) 5G has been assigned a new spectrum in mm Wave bands that helps to increase its throughput, while its network capacity will significantly expand using Multiple Input Multiple Output (MIMO). The increase in demand for faster access to media services and the rapid growth of IOTs prompted the move for the development of 5G wireless communication. This development is being led by communications companies such as Intel, Qualcomm, Nokia, Ericsson, BT, Verizon, AT&T, and Samsung (4). The mobile wireless communication journey is an everevolving one and recent research on future generations distinguished the distinct improvements that 5G, 6G, and 7G will provide. According to [3], the goal of 5G technology is to have a world void of any wired networks. The hybridization of 5G and Satellite

networks will lead to 6G technology but roaming or handoff will be a challenge as a result of variable technologies and standards. Hence, this challenge will lead to the development of 7G with the sole purpose of providing space roaming. 5G technology is intended for mobile users to enjoy a World Wide Wireless Web (WWWW) which is network access management-based as against using IPv6 which based onlocation management. A survey report by Advanced Computer Network Lab on the generations of the wireless network indicates that it will cause resource waste of 5G.

III.EVOLUTION OF 5G

Wireless technology's first generation, retroactively named 1G, launched in 1979 before arriving in the US in 1983. It used frequencies in the 800 MHz spectrum, and it helped usher in the first analog cell phones. 2G came in 1991, and with it came expansion into the 1.9 GHz spectrum and such features as SMS (simple text messages), MMS (multimedia messages) and voicemail. This bandwidth expansion marked a significant shift in the capabilities of cellphones—the wider the frequency range, the more data that's able to transfer—and is a hallmark of delineating the different generations3G was introduced in Japan in 2001 and in the US in 2002 by Verizon, expanded the frequency range into the 2.1 GHz spectrum, providing the network speeds that smartphones need. The core technology of this generation was MIMO (multiple-input multiple-output), which expanded the network's bandwidth and upped its device capacity. 3G could theoretically reach speeds of 40 Mbps, and its higher data-transfer rates enabled now-standard functionalities like mobile web browsing, image sharing and GPS location-tracking.



4G was introduced commercially in 2009 and added frequencies in the 600 MHz, 700 MHz, 1.7 GHz, 2.1 GHz and 2.5 GHz spectrums. 4G network speeds could reach up to 400 Mbps, which has facilitated high-definition video gaming, video streaming and video conferencing. 4G LTE, which most networks currently use, further reduced latency and increased efficiency. (LTE, by the way, is not a technology—it stands for Long Term Evolution, denoting the road to 4G.)Millimeter wave-based 5G is anticipated to provide very high levels of peak downlink throughput performance--ranging approximately from 4 Gbps on the lower end to 20 Gbps on the higher end, all under ideal channel conditions. These speeds represent a massive opportunity for practically

every industry and vertical. Expect real-time monitoring, low-latency communication in remote areas, the development of "smart cities" and so much more in the very near future.

IV. FACILITATOR OF 5G TECHNOLOGY

The complexities and applications of 5G networks will bring about step-by-step innovations that will procedurally add unprecedented functionality to our public spaces. Some building block of 5G technology are as follows:

More than 30 years ago, 1G delivered analog voice, but it was limited due to the phones' primitive ability to change frequencies between cellular towers. Phones had to work harder to keep connected when moving between service towers, shifting from the frequency of one to another using microprocessors without dropping the call.[1]

2G instantly rendered the processes of 1G obsolete by introducing digital voice. Time-division multiple-access (TDMA) RF technology in the 1990s allowed mobile phones to maintain connections to numerous frequencies simultaneously, eliminating the need to reconnect from one signal at a time to hold a call. Network capacity also significantly grew, so many users could be connected with little issue.[2]

4G ushered in the era of true mobile internet, breaking the speed barrier into megabytes per second. 4G also gave way to a new IP-based, consolidated network. For carriers, embracing 4G meant further digitizing voice by moving calls to VoIP. In the beginning, typical 4G speeds began at around 4 Mb/s, with the latest LTE-A speeds reaching 200 or even 300 Mb/s.[4,5] Mobile bandwidth that can support all standard internet practices is now commonplace, with 5G set to open the floodgates to myriad new applications—incrementally.

The FCC established a 5G standard in June 2018, marking a significant stepin the adoption process. It later announced and held two auctions for high-band frequency spectrum in the fall of 2018 in order to facilitate the deployment of 5G technology.[6] to design engineers, this means that the proliferation of 5G IoT devices is around the corner, and the miniaturization of millimeter-wave(mm Wave) components is beginning to become more urgent.

V.FUTURE SCOPE

5G enthusiasts, however, understand infrastructure costs are a small price to pay in comparison to the massive potential that 5G-powered innovation holds in transforming our world. The network is positioned to set forth a full-scale deployment of low-latency, massive IoT throughout practically every industry. Enterprises will experience large-scale process automation with the advent of massive machine-type communication (mMTC), mobile robotics and cloud robotics, to name a few.The platform will also reshape the consumer experience of electronic goods, unlocking a new era in mobile videos and introducing massive growth in IoT and smart devices, as well as greater AR/VR capabilities. Global 5G implementation requires a complete overhaul of communications infrastructure, but the revolution 5G promises far outweighs its obstacles.

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