



COMPARATIVE STUDY ON DIFFERENT GENERATIONS OF MOBILE COMMUNICATION

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ABSTRACT

Humans are living in this world with the most important electronic gadget 'Mobile phone'. There is a constant change in mobile communication technology. This evolution is categorized as different generations and simply called as 'G'. In every generation the main motive was speed and new service features. In that circumstance new technologies were created and implemented effectively. At present the main motive is data protection from the hackers. This paper compares the insights of various generation developed so far and to be developed.

Key words – Mobile Communication, Wireless technology, 1G, 2G, 3G, 4G, 5G and 6G.

INTRODUCTION

Today's digital world is fully based on the mobile communication. The First Generation(1G) of wireless cellular technology provided only the analog voice. That means support the analog telecommunication standards introduced in 1980s. The maximum Speed of 1G technology is 2.4 kbps^[1]. The mobile networks based on GSM is the Second Generation (2G). In 2G it has the capability of Digital Voice (eg. Code Division Multiple Access). It enables the services SMS and MMS. The 2G bandwidth is 30 to 200 KHz. The Third Generation (3G) provides the main stream of Universal Mobile Telecommunication System and its core network technology. 3G brought the mobile data (eg. CDMA2000). It enables sending and receiving large email messages. Its speed is up to 2 Mbps. The fourth Generation(4G LTE) extends the era of mobile broadband. The mobile network based on the 4G technology enables the MIMO (Multiple Input Multiple Output) and OFDM (Orthogonal Frequency Division Multiplexing). 4G LTE overcomes with improvement of over 3G speeds. The features of 4G LTE are Multimedia, up to 20Mbps, Access to Global mobile networks, Ad-hoc and Multi-hop networks^[2]. The Fifth Generation(5G) has the essential part of providing the Ultra low latency, massive of Internet Of Things(eg. Automotive Industries), enhanced Mobile broadband, and Mission Critical Services. 5G is designed with high peak data speed with rating. It also provides the spectrum of Gigabit-class connectivity. Its main deployment is for packet switching, Wireless World Wide Web, High resolution Video Streaming, Robotics, 30 GHz to 300 GHz. The key technology of 5G is low latency, it is covered by OFDM. 5G is 10 times faster than 4G. Estimation of 5G is 60 to 120 times faster. 5G Cellular Network providing services using the SLA approaches^[3]. This research article analyzes the features of various generations of mobile communication.

LITERATURE REVIEW

M. Benisha, R. Thandaiah Prabu, et al. (2019), deeply focused on the advancements, adaptability and compatibility over the mobile services provided by various mobile generation technologies like 1G, 2G, 3G, 4G and 5G.

MD. Hasan Mahmud (2018), described the Multiple-Input Multiple-Output (MIMO) is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time. All wireless products with 802.11n support MIMO.

Nikhil Bhandari, et al. (2017), proposed a further with more advancements in mobile wireless technology 3G provided us with video conferencing and etc. With increasing demand 4G came into existence and provided us with ultra-broadband internet access. 5G will be able to provide us facilities that one has never experienced till date.

Ms. Lopa J. Vora (2015), explained the vast advancement in mobile wireless communication since the last few decades. This innovation consists of a number of generations and is still going on. The journey of mobile wireless communication began with 1G followed by 2G, 3G, 4G, and under research upcoming generations 5G.



Taranpreet Kaur (2012), pointed out the mobile wireless technologies have experience 4 or 5 generations of technology revolution and evolution. Currently 5G term is not officially used. At present, 3G mobile phone systems are sustaining IP connections worldwide for all real and nonreal time operations.

METHODOLOGY

In this research work, the features of different generations of mobile communications tabulated. The details were acquired from difference web resources (1-9). The main feature in all generation is speed. The speed of various generations are again tabulated and represented graphically for better understanding.

RESULT AND DISCUSSION

The following Table-1 shows the comparison of different generations from first to fifth generations.

Table 1: Comparison of different Generations (1G to 5G)

Mobile Generations	Introduced in the Year	Developed by	Technology	Speed	Service
1G	1979	Nippon Telegraph and Telephone	FDMA	2.4Kbps	Voice only calls
2G	1991	Radiolinja	TDMA-based GSM	50Kbps	SMS Picture Messages MMS Call and text Encryption
3G	1998	NTT DoCoMo	UMTS, CDMA	2Mbps	Video Calling, Mobile internet access
4G	2009	TeliaSonera	WiMax, LTE, OFDMA	1Gbps	Video conferencing, Gaming, HD mobile TV
5G	2016	3GPP	OFDMA	20Gbps	Advanced Gaming Fastest access, Supports AI
6G	Yet to launch	Many companies like Google, Apple, LG electronics etc.	OFDM-SPM	8,000 Gbps	connected machines by leveraging artificial intelligence (AI) and machine learning

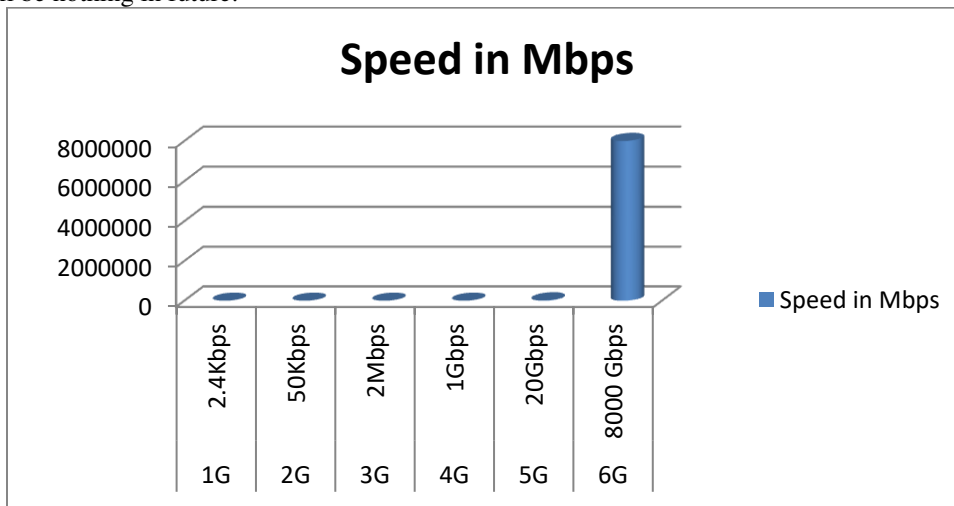


The following Table-2 shows the comparison of data transfer speed of different generations from first to fifth generations.

Table 2: Speed in different Generations (1G to 5G)

Mobile Generations	Speed	Speed in Mbps
1G	2.4Kbps	0.0024
2G	50Kbps	0.05
3G	2Mbps	2
4G	1Gbps	1000
5G	20Gbps	20000
6G	8000 Gbps	8000000

The following Figure-1 shows the graphical representation of the above Table-2. This graph clearly shows the speed today will be nothing in future.



CONCLUSION

In communication technology mobile phone plays a vital role. Understanding the features of various generations will be helpful to find the lacks and added features in communications technology. So, this research article gives a clear idea about all generations of mobile communication technology.

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