The Future and Past of 5G Technology

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**Abstract**

5G is the newest generation in wireless technology. Improving upon 4G, 5G brings three new features to the table: lower latency, bigger channels and the ability for more devices to be connected at the same time. Lower latency allows the network to be more responsive, bigger channels allows data transfer to be sped up and more devices means more sensors/smart device communication. Knowing more about how 4G technology changed the world is important to understand the potential 5G technology has.

**Introduction**

With the release of the newest batch of smartphones, 5G technology is now in the hands of millions of people. With most apps released on the App Store relying on internet connection for functionality, it is remarkable to see what the future of mobile application development holds now that 5G is widely accessible. It is important to know more about the history of cellular technology before diving into the future, so the technological breakthroughs that were achieved from 4G capability will be discussed. Potential uses for 5G will be highlighted throughout as well. This will allow insight into the future of this technology but also give an understanding of possible drawbacks.

**Technical**

4G technology was a monumental moment for mobile computing. With the technology originating in Scandinavia, it began to trickle into the United States by the early 2010s. (1) Prior to 4G, there was 3G. 3G allowed internet access, but streaming music, television or movies was a painful experience. With the introduction of 4G, all of this and more was possible. The famous saying “there’s an app for that” originated with 4G technology, and when taken literally, is very true. Popular apps like Instagram, TikTok and Snapchat all exist due to 4G technology. Live video communication apps like Apple’s FaceTime were possible to use without being connected to a home network. An enjoyable experience on FaceTime requires high definition video to be received and sent. This would not be possible on previous 3G technologies. Before 4G technology, social media was mostly desktop based. Without having the network to support the heavy data transfer requirement social media apps require, it makes sense that social media was only able to be accessed at home. But due to 4G, social media apps are accessible wherever and whenever. Not only has this changed how people interact with each other, it has created a vast online culture responsible for the growth and development of an entire generation.

Although 4G brought many technological breakthroughs, there were many instances in the past decade where it proved to be harmful. With 4G leading to more social media use, the rate in which information spread severely increased. Using the 2016/2020 election as an example, where the phrases “fake news” and “fact checking” originated. These phrases were

created directly from the spread of misinformation on social media. (4) A research team at the University of Oxford conducted a study on social media and the election and found that “33% of pro-Trump 33% of pro-Trump traffic was driven by bots and highly automated accounts, compared to 22% for Clinton.”(6) Without 4G network capability, the information created by these bots would reach actual humans much slower.

As one can see, there are always positives and negatives to any new technology. With 4G allowing apps like FaceTime, TikTok and Twitter to thrive, one can only wonder what new advancements 5G technology can bring. But before real life applications can be discussed, it is important to understand how 5G technology functions. Technically speaking, the most notable difference between 4G and 5G is that 5G is compatible with “high band”, or short-range airwaves which aren’t compatible with 4G technology. This allows 5G to function with low, middle and high experiences. Low-band 5G is most similar to 4G networks. Low band is the oldest cellular frequency and was most widely used due to the fact that the frequencies are able to travel long distances. Mid-Band 5G is carrying most of the 5G cellular frequencies. The range on this network is up to half a mile from towers, which allows it to be a reliable step up from Low-Band 5G. And lastly, High-Band 5G, also known as “millimeter-wave”. High-Band 5G would be the first consumer application to make use of these airwaves, allowing speeds to reach up to 800MHz. With the maximum distance being around 800ft away from a tower, these frequencies are going to be the hardest for companies like Verizon and AT&T to get into their customers' hands. PC magazines’ “Fastest Mobile Networks 2020” test showed that “Verizon's network had as little as 4–5% coverage on our citywide drives.” (3)

5G technology will most likely kick off the next generation of mobile applications. Due to the speed of 5G, new opportunities will arrive everywhere. An example being the Internet of Things (IoT). The IoT is a network of physical objects. Objects like a smart fridge, or a smart lamp are examples of objects that are connected to the IoT. Most IoT functionality requires the user to be on the same wifi as the objects are, but with the introduction of 5G, users will be able to access these objects from anywhere. 5G also has potential for global connectivity. (2) Meaning that countries with limited internet access will now be able to access the internet, and with the internet comes jobs.(5) 5G will allow communication between devices to be instant and wireless meaning that there could be an entire factory full of autonomous robots communicating with each other with minimal delay, so practically in real time. (2) Due to the speed of 5G, data has potential to be processed much more quickly. (5) This will lead to rapid developments in AI as well as deep neural networks. (5) But along with any new emerging 21st century technology, there are also concerns. Privacy is a big worry among skeptics, especially regarding the IoT. Cybersecurity will begin to grow increasingly more important with the risk of severe data breaches looming.

## Conclusion

Thinking about life before 4G is like thinking about prehistoric times. In just a decade, everyday life was completely changed with the addition of apps like Uber, FaceTime, TikTok and Snapchat. With the rollout of 5G starting to begin, developers are beginning to think of the

possible capabilities of the technology. In just a few years, the power of our mobile phones will increase exponentially, allowing communication levels to increase to a level that has never been seen before. Like any new technology, this will arrive with a level of skepticism and fear. But if put into the right hands and managed correctly, 5G has the potential to change life forever and for the greater good.

## References


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