

# Adapting 5G Technologies into Medical Assistance

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**Abstract:** This paper emphasis on to help to Health care centers, increases the availability of curative data, and accelerates the development of analytics techniques. AI technology is being developed to overcome some of the challenges in the healthier system. The new era of 5G brings together the improved connectivity of devices and sensors. Enables advance in Healthier. Adding a high-speed 5G network to the existing architecture can support medical consultation to improve access to care and quality of care. 5G can be embedded in MRI for faster transmitting of image files to the target, extending telemedicine, augmented reality, virtual reality (VR) and spatial computing. The 5G network is important for reliability, real-time remote monitoring and artificial intelligence. 5G wireless transmission technology is improving patient experience and quality of services. In this review, we have focused on the adoption of 5G wireless transmission technology in healthcare. The target of this application is to help the health care centers to send the reports of the patients on time. It is hoped that the potential benefits of 5G may be significant for healthcare and that 5G and compatible emerging technologies can alleviate some of the current challenges of health care and rebuild the system.

**Key Words:** AI, 5G, embedded, virtual reality (VR), Healthcare.

## 1. INTRODUCTION:

Imagine a world where you can download an interactive 3-D video in a few seconds, a smart home anticipates your needs, and autonomous vehicles take you to your destination safely. This is the world of fifth-generation (5G) broadband technology. It promises speeds of more than 100 megabits per second, more data bandwidth, and fewer delays due to built-in computing intelligence that handles data very efficiently. With its superfast connectivity, intelligent management, and data capabilities, the 5G network enables new possibilities in terms of health care, including imaging, diagnostics, data analytics, and treatment. Part of the so-called “internet of medical things,” it includes devices such as clinical wearable and remote sensors as well as many other devices that monitor and electronically transmit medical data such as vital signs, physical activity, personal safety, and medication adherence. These devices will provide never before seen telemedicine diagnosis and treatment services as well as high resolution video conferencing, all the while delivering quality care at affordable prices. The Healthcare segment may be a rapidly expanding market with the rise in the number of applications using the network - different types of data in different sizes and formats, which consistently deliver complex demands on the network in terms of bandwidth, rate and latency. Other factors, it starts with sensor devices in health centres running on existing technologies like Wi-Fi, Bluetooth and low power related technologies. As this market grows, the need for connectivity to the explosive growth of devices and machines with sensor-based applications in large hospitals will stimulate the growth of mass-machine communication (MMTC). Most use cases, such as Tactile Internet and Robotic Remote Surgery, increase the need for Critical Machine Type Communication (CMTC) or Ultra Reliability and Low Latency Communications (URLC). 5G networks provide fast data transfer speeds. Large data files of medical imaging can be moved quickly and reliably, leading to improved quality of care. By adapting Fifth Generation Technologies in medical devices easily can make the test with less time and getting transferring that report into particular department or persons in a smart way on time, with networks capable of delivering the high speeds required for high-quality videos, telemedicine is able to provide care in places where it was not possible before. Current medical application providers have developed applications that allow paramedics to alert their pending arrival emergency department with high accuracy using the ambulance's GPS information, and send ECG, personal data, pictures and any shock information that can help the ER. Team members must be prepared to receive patients with the right staff and equipment. In addition, 5G networks can support 4K body cameras that have direct contact with ER doctors or specialists, help guide EMT through field procedures, or help diagnose, treat, and prepare an injured patient. The network technology required to support these high-definition streaming video feeds requires high capacity and low latency, which can only be done with 5G. In addition to the need for a quick response time, it is essential to provide occasional awareness to public safety dispatch officials with the right resources and tools.

## 2. EXISTING SYSTEM:

In the present system we are using 4G technology in medical devices. And having lots of demerits, 4G networks are not suitable for remote surgery and patient care because the lag time between input and output can sometimes be as

long as 2 seconds a delay long enough to prove devastating in an operating room. In 4G latency is low compared to 5G. So with the medical aspects we need 5G. The lag is not only the most frustrating for those using it, but the poor quality can delay the patient care, which could hurt for the outcomes in the long run. Compare to 5G 4G bandwidth is less. So these problems we need to implement the 5G network in medical devices and generate the tested reports with less time it helps in transferring into respective department.

### 3. PROPOSED SYSTEM:

The Proposed system solves above stated problems. With the development of medical technology along with the 5g the disease prevention will be improved noticeably. Telemedicine is good choice to solve this problem using remote audio, remote video and other techniques, higher ranked medical institutes. The potential benefit of 5G to health care could be significant, and it is hoped that 5G and concomitant emerging technologies can overcome some of the current challenges of healthcare and reconstruct the system, eventually its significant influence in many aspects of contemporary society in the health care. The important characteristics of 5g technology are the data transfer rate, latency, coverage, power and network energy usage. Nowadays the technology is still not mature and there exists the several constraints in limiting the clinical possibility. Some new improved functions will be possible to implement within the future of the 5g infrastructure which will be open for the higher communication bandwidth, and for the improved security. This Applications transfer generated reports in a smart way along with the digital images and videos to the health care centres on time.

#### 3.1 Features and benefits for healthcare using 5G Technology:

Has 5G technology been overhyped? Perhaps. But the 5G cellular network could provide some significant benefits for healthcare

- Increased speed and bandwidth
- More medical device connections
- Better battery life for remote IoT devices
- Low-latency capabilities
- Enhanced real-time remote patient monitoring
- Greater video resolution capabilities for telehealth
- Enable futuristic capabilities like remote surgery, haptics
- Mobilizing wireless medical imaging devices

#### 3.2 Objectives:

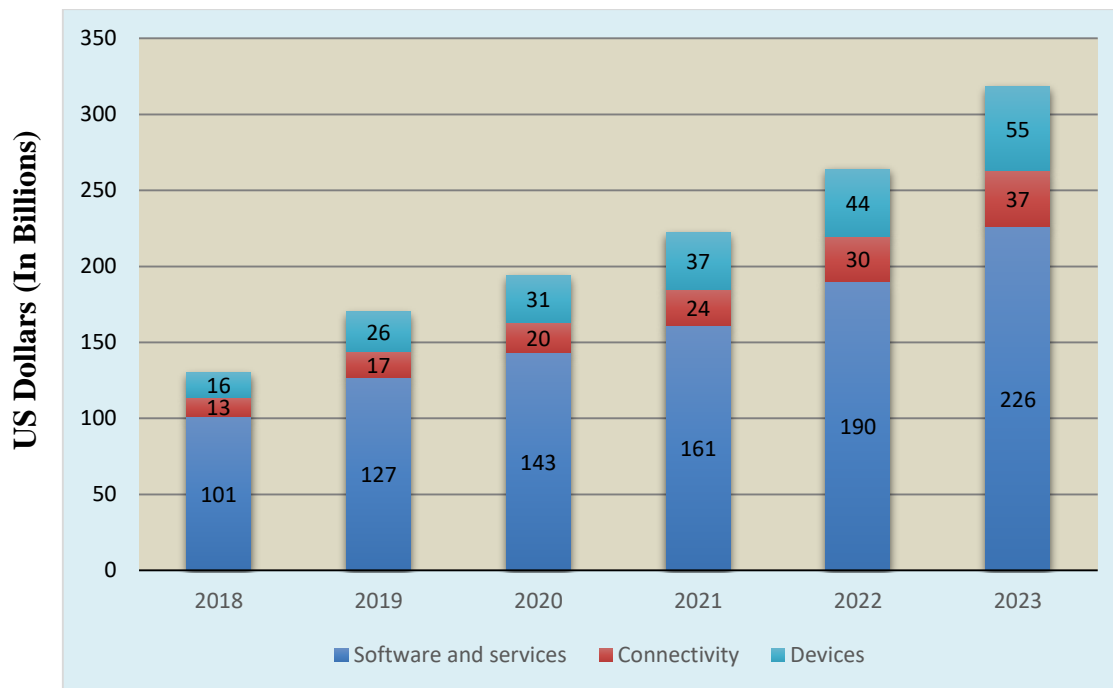
- All information regarding to reports and disease obtained easily.
- Doctors will be able to utilize the high speed and low latency of the 5G network to efficiently and quickly access pathological data obtained during surgery
- Access relevant materials and files from anywhere in the world, which ensures better medical services.
- 5G, on the other hand, aims to reduce latency to an almost instantaneous 2 milliseconds between devices. This is used for remote surgery.
- It reduces the patient and doctors time.

#### 3.3 Advantages of IoT in healthcare include:

- **Cost Reduction:** IoT enables patient monitoring in real time, thus significantly cutting down unnecessary visits to doctors, hospital stays and re-admissions
- **Improved Treatment:** It enables physicians to make evidence-based informed decisions and brings absolute transparency
- **Faster Disease Diagnosis:** Continuous patient monitoring and real time data helps in diagnosing diseases at an early stage or even before the disease develops based on symptoms
- **Proactive Treatment:** Continuous health monitoring opens the doors for providing proactive medical treatment
- **Drugs and Equipment Management:** Management of drugs and medical equipment is a major challenge in a healthcare industry. Through connected devices, these are managed and utilized efficiently with reduced costs
- **Error Reduction:** Data generated through IoT devices not only help in effective decision making but also ensure smooth healthcare operations with reduced errors, waste and system costs

### 4. RELATED WORK AND MOTIVATION:

Growth Rate of IoT Devices, Software's from 2018-2023



Source: Compiled From Global Data, Technology Intelligent Centre.

Table.1. Applications of Ai and Ai in Healthcare

Ai in Healthcare	Applications of Ai
Managing Medical Records and other data	Healthcare and Medicines
Doing repetitive jobs	Automotive
Treatment Design	Finance and economic
Digital Consultation	Video Games
Virtual Nurses	Heavy Industries
Medication Management	Robotics
Drug Discovery	AI In Artificial Creativity
Precision Medicine	AI In Space Exploration
Healthcare Monitoring	AI In Autonomous Vehicles

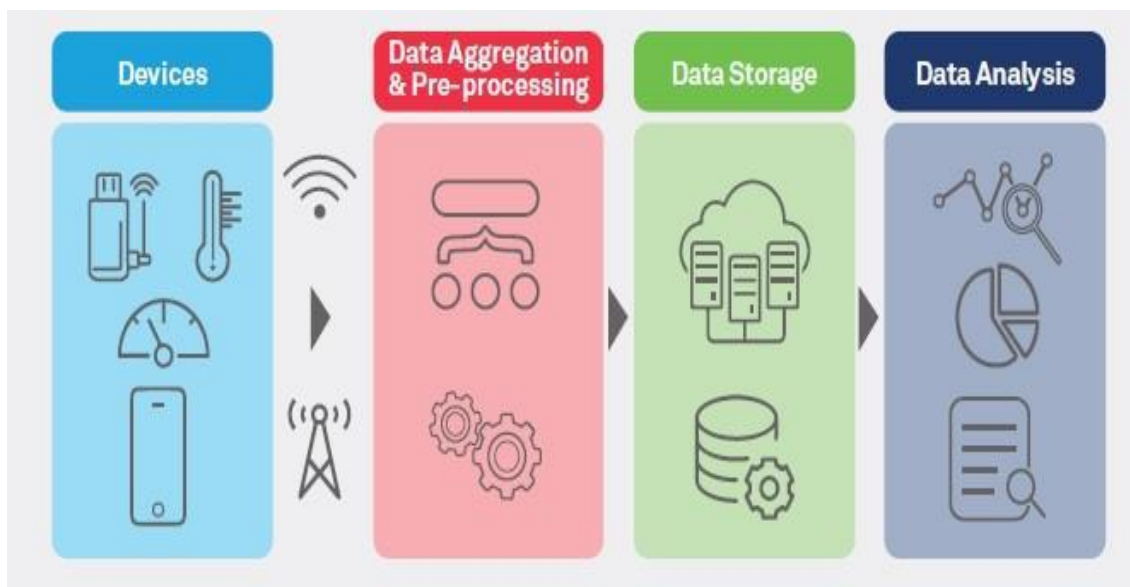


Figure 1. Different Stages of IoT Solutions



**Figure 2.** 5G technology in different fields of medical care

Finally, 5G promises to transform the medical field by drastically increasing the amount and quality of valuable medical data that can be gathered and processed at high speed. From medical records to larger image files from MRI or CAT scans, a single patient can generate hundreds of gigabytes of data each day. The transfer of this data can be hugely aided by the implementation of a 5G, improving care by reducing the time it takes to reach a diagnosis and to begin treatment. In addition, surgeons can receive real-time data from their patients during surgery, and medical specialists will all be able to work together from across the world.

## 5. CONCLUSION:

There are tremendous opportunities through 5G across a variety of sectors to connect the health care world in creative ways. The use of mobile devices, sensors, and remote monitoring equipment is going to grow and there will be a dramatic advancement in patients receiving imaging, diagnosis, or treatment through digital technology. To ensure all of this becomes a reality, though, work needs to be done to facilitate an end-to-end system. Devices must connect to networks and the cloud in ways that are interoperable and secure. That will enable health providers and patients to receive the benefits of digital innovation for wellness and health care. If we can overcome these barriers, both health care consumers and providers will see substantial advances in medical treatment. We are cautiously optimistic about these changes, but we still have a long way to go to achieve the goal of smart healthcare. Low latency periods and increased image quality and definition will allow doctors to make vital decisions in a short time and with the most accurate information available.

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## REFERENCES:

1. Ian King, "5G Networks Will Do Much More than Stream Better Cat Videos," Bloomberg News, May 2, 2016.
2. Numbers cited in Carrie MacGillivray, "The Internet of Things Is Poised to Change Everything, Says IDC," *Business Wire*, October 3, 2013 and Charles McLellan, "The Internet of Things and Big Data," *ZDNet*, March 2, 2015.  
Tom Peters, "FCC Workshop Reveals Secrets of 5G," Hogan Lovells, March 15th, 2016.
3. Numbers cited in Carrie MacGillivray, "The Internet of Things Is Poised to Change Everything, Says IDC,"
4. *Business Wire*, October 3, 2013 and Charles McLellan, "The Internet of Things and Big Data," *ZDNet*, March 2, 2015.
5. Mark Scott, "What 5G Will Mean for You," *New York Times*, February 21, 2016.

6. Robert Hume and Jeff Looney, "Telemedicine and Facility Design," HFM Magazine, February, 2016.
7. Eric Dishman, "Getting to the Next Step with Personalized Medicine," Intel Blog, February 25, 2016.
8. National Institutes of Health, "Precision Medicine Initiative Cohort Program", undated.
9. Jocelyn Kaiser, "NIH's 1-Million-Volunteer Precision Medicine Study Announces First Pilot Projects," Science, February 25, 2016.
10. Gaston Crommenlaan, "5G and e-Health," 5G Infrastructure Association, September, 2015.
11. Tadilo Endeshaw Bogale and Long Bao Le, "Massive MIMO and Millimeter Wave for 5G Wireless Het Net: Potentials and Challenges," *IEEE Vehicular Technology Magazine*, October 21, 2015.
12. Sandeep Vashist, Peter Lupp, Leslie Yeo, Aydogan Ozcan, and John Luong, "Emerging Technologies for Next-Generation Point-of-Care Testing," *Trends in Biotechnology*, 2015.
13. Sandeep Vashist, Peter Lupp, Leslie Yeo, Aydogan Ozcan, and John Luong, "Emerging Technologies for Next-Generation Point-of-Care Testing," *Trends in Biotechnology*, 2015.
14. A. Darkins, P. Ryan, R. Kobb, L. Foster, E. Edmonson, B. Wakefield, and A. Lancaster, "Care Coordination/Home Telehealth: The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Condition," *Journal of Telemedicine Health*, December, 2008. Also see iGR, "IoT for Healthcare Forecast, 2015-2020: Lowering Costs While Increasing Patient Satisfaction," undated.
15. Majbah Uddin, Nathan Huynh, Jose Vidal, Kevin Taaffe, Lawrence Fredendall, and Joel Greenstein, "Evaluation of Google's Voice Recognition and Sentence Classification for Health Care Applications," *Engineering Management Journal*, November 22, 2015.

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