

Chapter 1

IoT in Healthcare: Ecosystem, Pillars, Design Challenges, Applications, Vulnerabilities, Privacy, and Security Concerns

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ABSTRACT

One of the best-known features of IoT is automation. Because of this, IoT is a much-needed field for many applications, namely emergency and healthcare domains. IoT has made many revolutionary changes in the healthcare industry. IoT paves the way to numerous advancements for healthcare. The possibilities of IoT have reached their peak in the commercial industry and health sector. In recent years, serious concerns have been raised over the control and access of one's individual information. Privacy and security of the IoT devices can be compromised by intruders. Apart from the numerous benefits of IoTs, there are several security and privacy concerns to consider. A brief overview of different kinds of security attacks, solution for the attacks, privacy and security issues are discussed in this chapter.

INTRODUCTION

Internet of Things (IoT) is one of the emerging technologies of the present era with a combination of several different computing devices, physical object, Human beings, and animals. Every object in the IoT system is provided with a unique number to represent every individual object is called unique identifiers. IoT can transfer the data from one object to another over the network without any centralized system. Our day to day life is gradually led to an imaginary world with the arrival of computer technology. From anywhere and anytime people can do their daily chores in the virtual world provided by the network. New advancement necessitated the integration of imaginary space and the real-world

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on the same platform is called as IoT. Based on available low-cost sensors, wireless sensor networks, and wireless communication puts forward a new demand for IoT. Internet technology-based products enrich and simplify human's daily life through connected smart devices and make context-aware. IoT has diminished the manpower in many fields. IoT can improve efficiency in transportation, manufacturing, enacted advanced technologies in hospitals and developed a new education system. Development in IoT accelerates the growth of new industries and start-ups in manufacturing, cloud computing, automation, machine learning, artificial intelligence, and cyber-security. One of the largest obstacles in IoT is adoption. There are numerous definitions and descriptions for IoT by different authors, companies, and researchers (Berte, D. R. 2018).

IoT earns its full potential support by utilizing the key role of smart objects which use numerous actuators and sensors. Objects in the system can perceive the situation of the environment. Through the perceived data, the networking capability is established to the open-source internet services and interact with the human world (Kumar, J.S., and Patel, D. R. 2014). IoT constructs the entire world as connected at the same time safe and comfortable. IoT has influenced many applications among that IoT plays an eminent role in the field of healthcare. Several IoT healthcare products like the wearable health bands, fitness tracking shoes, smart meters, RFID based smart devices, real-time monitoring equipment's, and other smart objects embedded with IoT. Also, the smart-phone based application helps in tracking a medical record with real-time alerts and facilitate to provide emergency services. Smart hospitals consist of a complete system that communicates between network connected systems, apps and devices. Interaction among healthcare professionals, patients, and smart devices is established through the network is improved day by day. These advancements provide easiness to patients as well as to doctors. IoT based healthcare system can help the care-takers of patients and doctors to monitor, track, record patient's essential, sensitive medical information. The power of IoT made the possibility of collecting real-time data from various sources and several types of patients over a long period of time has become very easy and fast. The potential of IoT for medical devices and health care services are established by bio-sensors and other smart sensors (a microcontroller and sensor). Basic and essential biological signal recording sensors such as heart rate, pulse rate, oxygen, the glucose level in blood and blood pressure. These sensors can accurately measure, analyze and monitors a diverse health status of every individual patient.

The healthcare services are getting better and cost-efficient when healthcare is incorporated with ever-growing technology IoT in the real world (Gupta et al., 2016). For example, various smart medical devices have smart sensors embedded into the IoT device that allows collecting the raw data through sensors from physical objects that will be stored, analyzed and conduct tests. Results obtained from the test are used by medical experts to take proper decisions. In healthcare, the consumers, patients, and other health experts need to think of some innovative and more reliable methods to accomplish the technology as the real-time to take the full advantage of IoT and make sure reliable results with reduced time which will be of maximum benefit. The potentials of IoT are unlimited and ever-increasing. IoT will bring enormous changes to future society and can change the way of lifestyle, business strategies as well as the style of business. Internet of Things offers potentials to recognize and hook up the worldwide physical objects into a combined system (Kumar, J.S., and Patel, D. R. 2014).

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