



ISSUES WITH CYBER SECURITY IN INTERNET OF THINGS

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Abstract

IoT is the technology where a network of machines and devices are able to communicate between themselves and other internet-enabled devices over the Internet. They are embedded with software, sensors, and network connectivity that enables them to collect and exchange data. They have become a huge advancement in healthcare and medicine; helping monitor patients more closely and analyse the data. However, there are concerns about privacy and security since these devices constantly need to be connected to the internet. This paper covers the benefits of IoT in healthcare and the security issues that come along with it.

Keywords: *Internet of things, Healthcare, Medical devices, Privacy, Security*

INTRODUCTION

In the past few years, the internet of things has become very successful and attracted the attention of many. These devices contain sensors, which take in information about the object or its surroundings, and actuators, which convert the signals into physical action. For an IoT device to function, it should have a connection to the internet. IoT devices have the ability to Intake information on their own, without human interference. They can make coherent decisions by themselves, as well as communicate the information to other devices through the Internet and execute those decisions in the real world by themselves or through other internet-connected devices. When the devices have collected the data, they send it to a central location, often referred to as an IoT platform- typically hosted by the cloud. The data is organized and relocated here, the platform guides the device's response to the information it's received. For instance, it is used in;

- Smart city, for city traffic Management, Waste Management, Water Distribution, Electricity Management, etc. IoT makes people's lives easier.
- In automotive engineering; for self-driven cars.
- Industrial Application- Factory Digitalization, product flow monitoring, quality control of the product, manufacturing, energy management
- Farming and agriculture- Drip Irrigation, understanding crop pattern or using a smart greenhouse
- Smart Supply-chain Management



The flexibility of IoT technology and embedded devices cause them to be beneficial in a wide variety of applications and environments.

Literature review

Benefits of IoT devices in healthcare

IoT eHealth can effectively process, analyse, and manage multi-scale, multi-modal information, disbursed and heterogeneous data produced through connected sensors in less time. This permits to extraction of beneficial actionable records from health data. It can monitor patients providing effective emergency services to patients. It is likewise getting used as E-fitness utility on distinct aspects together with early detection of clinical issues, emergency notification. Another benefit of IoT is that it permits patient monitoring in real-time, as a result substantially reducing down unnecessary visits to doctors.

Patients can also receive comprehensive additive data on their past, present, and future health; Patients can fight illness better since continuous patient monitoring and real-time data helps in diagnosing diseases at an early stage or even before the disease develops based on symptoms. The chances of errors in the data are significantly less. IoT is easy to use and can be operated by users since it only requires a few clicks. Devices such as smartphones can be connected with the sensor to monitor health. This system provides efficient monitoring and tracking that helps to improve the resource management of people; as well as providing a data-rich personalized analysis of the health.

Some examples of IoT in healthcare include- wearables such as fitness bands, blood pressure, and heart rate monitoring cuffs, glucometers. Depression and mood monitoring can also be done by organizing and collecting data such as heart rate and blood pressure since it can be hard to interpret feelings precisely and relate it to mood swings and other symptoms. Another way IoT is used is in Robotic surgery- miniature robots' movements can be controlled from far away. However, IoT devices are far more expensive than the ones which do not require the internet.

Doctors can monitor a higher number of patients by relying on the healthcare IT systems, by tracking treatment plans, progress, and looking out for any immediate medical attention; basically, be able to connect with patients proactively since it is far more efficient. It also enables physicians to make evidence-based conclusions. Moreover, besides coherent decisions in healthcare, IoT can reduce the number of errors and make the diagnosis more accurate and precise.

IoT can be used in hospitals since the devices contain sensors that can track the present location of medical equipment for example- wheelchairs, oxygen pumps, and other healthcare devices. Another application is in hygiene monitoring devices which help prevent patients from infections. Apart from their use in noting patients' health, they are widely used in asset management as well; like pharmacy inventory control, environmental monitoring- which includes measuring temperature and humidity.

How IoT is used in healthcare during covid

IoT gives a platform that permits public-health corporations to get access to information for monitoring the COVID-19 pandemic. It offers possibilities for performing modelling research of viral activity and for guiding countries in healthcare to enhance preparation for the outbreak.



By using this technology, doctors will simply observe changes in crucial parameters of the COVID-19 patient, enhancing the detection and diagnosis of COVID-19. They can be utilized in elder care, which includes monitoring aged residence/patients at a nursing home and health facility as well as in data gathering, within the medical field.

IoT's focus is to assist perform the treatment of various COVID-19 cases. It makes the surgeon's job easier by reducing risks and increasing performance; Improving treatment systems in the hospital. Along with the advantages to the patient and the doctors, medical students can currently be higher trained for disease detection to reduce casualties. It can be tailored to observe calorific intake and treatment like asthma, diabetes, and inflammatory disease of the COVID-19 patient. Thus, improving the healthcare system during the COVID-19 days. In healthcare, it can be used for chronic disease, medical emergencies, creating better patient-care, fitness, blood pressure monitoring, health check system, measurement & control system, heart rate checking system, and hearing aids.

DISCUSSION

The Internet of Things brings many of the same security and privacy issues, but it is a much greater risk because these devices act automatically. Doctors are now able to program ICDs to monitor a patient's heart condition. These devices can deliver data about that person's heart rhythms to a doctor. It can also send the right level of electrical shock to get the heart beating properly. Researchers have been able to demonstrate how a malicious hacker can trigger the device to malfunction, delivering a dangerous shock; it alters the reading which can be fatal in some cases.

Unauthorized access can lead to misuse of personal information, it could expose individuals to the risk of identity theft. It can facilitate attacks on other systems and will put confidentiality, availability, privacy, and integrity at risk.

Personal medical devices can be either planted in patients' body or attached externally. These devices use a wireless system to interact. However, just like the other IoT devices, these devices constantly need to be connected to the internet, if the device is connected to multiple different networks, then personal information such as location and physical conditions can be easily accessed. Apart from the security concerns, the increased use of these devices also create traffic on the network

RESULT

IoT is used in so many industries, if the devices fail to function, it would cause a huge inconvenience, so there should be security measures taken. Security measures include conducting a risk assessment before the device is released for use in the market, authentication measures should be built into the device. Make sure that authentication is properly followed, firmware being sent to the device is verified, and device-to-device communication is monitored; an authentic mechanism should be used and the device access should be limited. It needs to be ensured that there is proper access control, so no unauthorized individual can access the data.

For safety there should be layers of security is in place to protect against risks.

There are numerous devices connected that process and transfer the medical data to the cloud. The most common attacks at device layer are tag cloning, spoofing, RF jamming, cloud polling and direct connection. In general, security measures at device layer include identity,



authentication, and authorization management, secure booting (i.e., prevent unauthorized applications to be executed), application sandboxing, whitelisting, fine-grained access control capability of resources, protection of data during capture, storage, and transit, traffic filtering feature, fault tolerance, password enforcement policies, secure pairing protocols, and secure transmission mechanisms.

At the network layer the most common attacks are Eavesdropping, Sybil attack, Sinkhole attack, Sleep Deprivation attack, and Man-in-the-Middle attack. To secure the network layer, it is very important to use trusted routing mechanisms, message integrity verification techniques as well as point to point encryption techniques based on cryptographic algorithms. This layer is important because it connects the device to the sensor.

The individuals controlling should be trained well on how to use the device to prevent disclosure of their critical medical data, and the device should be tested before going out in the market.

CONCLUSION:

IoT significantly helps various industries. It has numerous advantages as discussed in the paper, this paper mainly focuses on the healthcare aspect IoT. Although it is useful, safety measures should be prioritized because these intelligent devices could malfunction; it could be lethal because in healthcare even a small mistake could have severe consequences. Data security and privacy are huge concerns, considering how the number of smart devices has increased exponentially in recent years. Ways such as having layers of security so no unauthorized individual can access, should be used to reduce the risks.

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