

Everyone non-
invasive glucose
sensing on a real-
time basis.



**ASSIGN
BUSTER**

Everyone is agreed on one statement, that IoT is transforming the society. IoT is bringing new concept, applications and working approach at one platform that are not only providing better patient care and treatment, but are also bringing new proficiencies that are minimizing cost of healthcare. The IoT has been used inside healthcare facilities for quite some time, and the list of application is continuously growing.

It's the use of IoT that hospitals and doctor can monitor their remote patient outside hospital. This recent approach is getting a lot of attraction. The concept of "24*7" turn into reality when patients are being monitored to their home continuously. These remote monitoring devices are very much user-friendly and it looks more as the wearable technology than medical devices. Patients are more likely to wear it because it doesn't look like a heavy medical device. There is important use of medical grade wearables, which includes smart fabric, glucose monitoring devices, electrocardiogram patches, pulse oximeters and other devices that untether patients from healthcare facilities. The main target of companies is to make device more user-friendly so that remote monitoring is possible for healthcare providers and their patients.

Visiting hospital or doctor's office, it's better that patient monitors themselves by taking their own blood pressure, or measuring glucose or oxygen levels and other important test at their home environment. These wearable devices report automatically to the healthcare centers using Wi-Fi connection. Another application of IoT in healthcare is Clinical Drug Trials and improved patient engagement. In this case, connected devices are playing an important role in providing accurate readings of vital stats during the trial

<https://assignbuster.com/everyone-non-invasive-glucose-sensing-on-a-real-time-basis/>

period and allowing patient to remain at home instead of at a healthcare facility. IoT HEALTHCARE APPLICATIONS: IoT applications are directly used by user and patients. Various gadgets, wearables, and other healthcare devices currently available in the market.

In this section , application of IoT is discussed. 1. Glucose Level Sensing - Diabetes is a group of metabolism disease in which there are high blood sugar glucose (sugar) levels over a prolonged period.

Blood glucose monitoring reveals individual patterns of blood glucose changes and helps in the planning of meals, activities and medication times.

An IoT configuration method for non-invasive glucose sensing on a real-time basis. In this method, sensors from patients are linked through IPv6 connectivity to relevant healthcare providers. This device includes a blood glucose collector, a mobile phone or a computer and a background processor. A IoT based medical acquisition detector that can be used to monitor the glucose level.

2. Electrocardiogram Monitoring -

The monitoring of the electrocardiogram (ECG) , that is , the electrical activity of the heart recorded by electrocardiography, includes the measurement of the simple heart rate and the determination of the basic rhythm as well as the diagnosis of multifaceted arrhythmias , myocardial ischemia, and prolonged QT intervals. The application of the IoT to ECG monitoring has the potential to give maximum information and can be used to its fullest extent. An IoT- based ECG monitoring system composed of a portable wireless acquisition transmitter and a

wireless receiving processor. The system integrates a search automation method to detect abnormal data such that cardiac function can be identified on a real-time basis. 3.

Blood Pressure Monitoring - The question is has the combination of a KIT blood pressure (BP) meter and an NFC-enabled KIT mobile phone becomes part of BP monitoring based on the IoT is addressed. A motivating scenario in which BP must be regularly controlled remotely is presented by showing the communication structure between a health post and the health center. The question of how the Withings BP device operates depends on the connection to an Apple mobile computing device. A device is needed for BP data collection and transmission over an IoT network. This device is composed of a BP apparatus body with a communication module.

4. Body Temperature Monitoring - Body temperature monitoring is an essential part of health-care services because body temperature is a decisive vital sign in the maintenance of homeostasis. The m-IoT concept is verified using a body temperature sensor that is embedded in the TelosB mote, and a typical sample of attained body temperature variations showing the successful operation of the developed m-IoT system is presented. The temperature measurement system based on a home gateway over the IoT. The home gateway transmits the user's body temperature with the help of infrared detection. The main system components responsible for temperature recording and transmission are the RFID module and the module for monitoring body temperature.

5. Healthcare Solutions using Smartphones -Recent

years have witnessed the emergence of electronic devices with a smartphone- controlled sensor, which highlights the rise of smartphones as a driver of the IoT. Various hardware and software products have been designed to make smartphones a versatile healthcare device. An

extensive review of healthcare apps for

smartphones is systematically provided, including a discussion on apps for patients and general healthcare apps as well as medical education, training, information search apps. Few apps are available for general healthcare :

- Diagnostic apps - It is used to access diagnostic and treatment information.

- Drug Reference apps - It provides name of drug, their

indications, dosage costs and identifying

- Medical Education apps - It deals with

tutorials, training, various surgical

demonstration, Color illustrations of different

- Calculator apps -

It has various medical formulas as well as equations and

calculate respective parameters of interest (e.

g.

the body surface burn percentag

- e) · Clinical communication apps - It simplifies communication

between clinicians within a hospital.

BENEFITS OF HEALTHCARE IoT: 1. Reduced Healthcare

Cost - Remotemonitoring of patients become possible because of real time dataand wearable devices.

Doctors and healthcare centers can take better careof their patients remotely. It also helps them in minimizingthe overall healthcare cost, as doctors do not require to meetpatients at the regular basis. IoT has reduced the healthcare cost and alsohelped in speeding the delivery of care.

2. Better Result of Treatment - Connectivity of healthcare to cloudcomputing or other virtual infrastructure gives healthcare the ability to accessreal time data that provides informed decisions as well as offer treatment thatis evidence based. This enables healthcare provision is timely and treatmentoutcomes are improved. 3.

Improved Disease Management- In this technique, patients are continuously monitored andhealthcare centers are able to access real time data. With thehelp IoT disease are treated before they get out of hand. 4. Reduced Errors - Accurate collection ofdata, automated workflows combined with data driven decisionsare an excellent way of cutting down the costs.

Reducing system costshelps in minimizing on errors. 5. Better PatientEngagement - Healthcare is transforming from fee for service to value-basedcare. Effective patient engagement plays a key rolein the implementation of value-based care program. With the help ofIoT, patients can use apps and software which help inaccessing their own health data. In this way patient can be sure about theprogress in healthcare management.

Doctors and patients both can keep their eyes on their daily routine and diet chart. For old age patients, this app is a good engagement and through this they can monitor their health record. 6.

Real-Time Data and Information for Care Managers - With the advent of IoT in healthcare, care managers can get access to the real-time data of patients. There are so many health apps with the integration to wearable devices such as Apple Watch and other health bands; these apps can send patient's real-time data to the care managers and care managers can use this data to create a better care management program for patients. 7. **Increased Interest Level of Patients**- There is a sharp increase in the population of fitness freak people as healthcare apps with wearable devices (such as Apple Watch, fitness band etc.) have been launched. People have increased interest in healthcare matter which results in more educated patient population.

Educated patients understand the importance of good health. 8.

Meaningful & Timely Health Alerts- With the use of IoT care managers can get the access to real-time data and thus can send more meaningful health alerts to patients. Real-time data access can get the attention of care manager whenever particular health parameters go beyond the ideal limit and healthcare can send alerts immediately.

This technique can save lives of critical care patients.

9. **Helping Differently Able People** - The greatest benefit of IoT in healthcare is its ability to help differently abled people. IoT enabled wheelchair, hearing devices, eye glasses etc, which are helping the many needy people. The

<https://assignbuster.com/everyone-non-invasive-glucose-sensing-on-a-real-time-basis/>

combination of mobile apps and IoT has given birth to the stream gadgets that help differently abled people.

CHALLENGES OF HEALTHCARE IoT: 1. LACK OF EHR (ELECTRONIC HEALTH RECORD) SYSTEM INTEGRATION When data is collected from IoT device, it can save patient's important information, daily physical routine or glucose level. This information not automatically go to an EHR system until it is centralized. Some EHR systems allow patients to import data into their records. But still this remains relatively limited to a few dominant EHR players. Still many providers are uncertain of how to handle information that lives outside

of their record system.

2. LACK OF

INTEROPERABILITY WITH EHR (ELECTRONIC HEALTH RECORD) SYSTEM -

Patients are likely to collect different sets of data when using different medical devices depending on each device's purpose and, in some cases, the ordering physician.

A patient with diabetes may frequently collect glucose levels and report them back to their primary care physician while also potentially capturing data related to their asthma on a separate device, which may be going to their asthma and allergy care provider. In many cases, the information that the patient captures stays within the boundaries of each of the systems and IoT vendors and is not visible to other systems. Unfortunately, with the lack of wider adoption of adequate interoperability, data from different IoT devices may remain locked in each individual system and lose its potential value to the rest of a patient's care team. 3.

NEED OF FULL HEALTH RECORD OF PATIENT - IoT data alone may not be meaningful if it is not within the context of a full health record. Many service providers support the collection of meaningful patient data between every visit, but this data is only valuable within the context of a full patient chart and timeline. There are still many cases where the data collected from wearables and other medical devices stays locked in the IoT vendor repository or apps. For a doctor, that data may not be useful until patient's full record is visible. 4.

DATA SECURITY - Data security causes concern in the implementation of IoT in healthcare. From the time that the data is collected at the device level to the point that it is transmitted over to its final destination. But with the lack of common security standards and practices, many health IoT professionals have concern about the risks associated with IoT device. FUTURE OF HEALTHCARE IoT: There are countless applications for the IoT in healthcare, but the technology is still evolving .

One of the challenges of healthcare IoT is how to manage all of the data it collects, the future of IoT will depend on the ability of healthcare organization to turn that data into the meaningful insights.