

# [Everyone non-invasive glucose sensing on a real-time basis.](https://assignbuster.com/everyone-non-invasive-glucose-sensing-on-a-real-time-basis/)

Everyone is agreed on one statement, thatIoT is transforming the society.  IoT is bringing new concept, applicationsand working approach at one platform that are not only providing betterpatient care and treatment, but are also bringing new proficiencies that are minimizingcost of healthcare. The IoT has been used inside healthcare facilities forquite some time, and the list of application is continuously growing.

It’s theuse of IoT that hospitals and doctor can monitor their remote patient outsidehospital. 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 thewearable technology than medical devices. Patients are more likely to wear itbecause it doesn’t look like a heavy medical device. There is important use ofmedical grade wearables, which includes smart fabric, glucose monitoringdevices, electrocardiogram patches, pulse oximeters and other devices thatuntether patients from healthcare facilities. The main target of companies isto make device more user-friendly so that remote monitoring is possible forhealthcare providers and their patients.

Visiting hospital or doctor’s office, its 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 usingWi-Fi connection. Another application of IoT in healthcare is Clinical DrugTrials and improved patient engagement. In this case, connected devices areplaying an important role in providing accurate readings of vital stats duringthe trail period and allowing patient to remain at home instead of at a healthcarefacility. IoT HEALTHCARE APPLICATIONS: IoT applications are directly used byuser and patients. Various gadgets, wearables, and other healthcare devicescurrently available in the market.

In this section , application of IoT isdiscussed. 1.        Glucose Level Sensing – Diabetes is agroup of metabolism disease in whichthere are high blood sugarglucose(sugar) levels over a prolonged period.

Blood glucose monitoringreveals individual patterns of blood glucose changes andhelpsin the planning of meals, activities and medication times. Anm-IoT configuration method for non-invasive glucose sensing ona real-time basis. In this method, sensors from patients are linked through IPv6connectively to relevant healthcare providers. This device includes ablood glucose collector, a mobile phone or a computer and a backgroundprocessor. A IoT based medical acquisition detector that can be used tomonitor the glucose level.

2.         Electrocardiogram Monitoring –  The monitoring of theelectrocardiogram (ECG) , that is , the electrical activity ofthe heart    recorded by electrocardiography, includesthe measurement of the simple heart rate and thedetermination of the basic rhythm as well as the diagnosis of multifacedarrhythmias , myocardial ischemia, and prolonged QT intervals. The applicationof the IoT to ECG monitoring has the potential to give maximuminformation and can be used to its fullest extent. An IoT- basedECG monitoring system composed of a portable wirelessacquisition transmitter and a wireless receiving processor. The system integrates a search automation method to detect abnormal data suchthat cardiac function can be identified on a real-time basis.   3.

Blood Pressure Monitoring – The questionis has the combination of a KIT blood pressure(BP) meter and anNFC-enabled KIT mobile phone becomes part of BP monitoring basedon the IoT is addressed. A motivating scenario in which BP must beregularly controlled remotely is presented by showing the communicationsstructure between a health post and the health center. The question of how theWithings BP device operates depends on the connection to an Applemobile computing device. A device is needed for BP data collection andtransmission over an IoT network. This device is composed of aBP apparatus body with a communication module.

4.     Body Temperature Monitoring – Bodytemperature monitoring is an essential part of health-careservices because bodytemperature is a decisive vital sign in themaintenance of homeostasis. The m-IoT concept is verified using a bodytemperature sensor that is embedded in the TelosB mote, and a typical sample ofattained body temperature variations showing the successful operation of thedeveloped m-IoT system is presented. The temperature measurement system basedon a home gateway over the IoT. The home gateway transmits the user’s bodytemperature with the help of infrared detection. The mainsystem components responsible for temperature recording and transmissionare the RFID module and the module for monitoring body temperature.

5.     Healthcare Solutions using Smartphones –Recent years have witnessed the emergence of electronicdevices with a smartphone- controlled sensor, which highlights the rise ofsmartphones as a driver of the IoT. Various hardware and software products havebeen designed to make smartphones a versatile healthcare device. An extensivereview of healthcare apps for smartphones is systematicallyprovided, including a discussion on apps for patients and general healthcareapps as well as medical education, training, information search apps. Few apps are available for general healthcare :  ·       Diagnosticapps             –        Itis used to access diagnostic and treatment information.·       Drug Reference apps     –        Itprovides name of drug, their indications, dosage costs and                                                    identifying features. ·       Medical Educationapps –   It deals with tutorials, training, varioussurgical demonstration,                                            Color illustrationsof different images and medical books.·       Calculatorapps                -It hasvarious medical formulas as well asequations and calculate                                        respective parameters of interest (e.

g. the body surfaceburn                                                                         percentage)   ·       Clinicalcommunication 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 theirdaily routine and diet chart. For old age patients, thisapp is a good engagement and through this they canmonitor their health record.   6.

Real-Time Dataand Information for Care Managers –  With the advent of IoT in healthcare, care managers can get access to the real-time data ofpatients. There are so many health apps withthe integration towearable devices such as Apple Watch and other health bands; these apps can send patient’s real-time data to the care managersand 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 fitnessfreak people as healthcare apps with wearable devices (such as Applewatch, fitness band etc.)  have been launched. People has increasedinterest in healthcare matter which results in more educatedpatient population.

Educated patients understands the importance of goodhealth.   8.     Meaningful & Timely Health Alerts-  With the use of IoT care managers can get the accessto real-time data and thus can send more meaningful health alertsto patients. Real -time data access can get the attention ofcare manager whenever particular health parameters go beyond theideal limit and healthcare can send alerts immediately.

Thistechnique can save lives of critical carepatients.   9.     Helping Differently AblePeople – The greatest benefit of IoT inhealthcare is its ability to help differently abled people. IoT enabledwheelchair, hearing devices, eye glasses etc, which are helping the many needypeople. The combination of mobile apps and IoT has givenbirth to the stream gadgets that help differently abledpeople.

CHALLENGES OF HEALTHCARE IoT:  1.     LACK OF EHR (ELECTRONIC HEALTH RECORD)SYSTEM INTEGRATION When data is collected from IoT device, it can savepatient’s important information, daily physical routine or glucose level. This information not automaticallygo to an EHR system until it is centralized. Some EHRsystems allow patients to import data into theirrecords. But still this remains relatively limited to a few dominant EHRplayers. Stillmany providers are uncertain of how to handleinformation that lives outside of their record system.                                 2.      LACK OF INTEROPERABILITYWITH EHR(ELECTRONIC HEALTH RECORD) SYSTEM –                        Patientsare likely to collect different sets of data when usingdifferent medical devices depending on each device’s purpose and, in somecases, the ordering physician.

A patient with diabetes mayfrequently collect glucose levels and report them back to theirprimary care physician while also potentially capturing data related to theirasthma on a separate device, which may be going to their asthma and allergycare provider.  In many cases, the information that the patient capturesstays within the boundaries of each of the systems and IoT vendors and is notvisible to other systems. Unfortunately, with the lack of wideradoption of adequate interoperability, data from differentIoT devices may remain locked in each individual system andlose its potential value to the rest of a patient’s careteam.     3.

NEED OF FULL HEALTH RECORD OFPATIENT –  IoT data alone may not be meaningful if it is not withinthe context of a full health record. Many service providers support thecollection of meaningful patient data between every visit, but thisdata is only valuable within the context of a full patient chartand timeline. There are still many cases where the data collectedfrom wearables and other medical devices stays lockedin the IoT vendor repository or apps. For a doctor, thatdata may not be useful until patient’s full record is visible.    4.

DATA SECURITY –   Datasecurity causes concern in the implementation of IoT in healthcare. From the time that the data is collected at the device level to the point thatit is transmitted over to its final destination. But with thelack of common security standards andpractices, many health IoTprofessionals have concern about the risks associated with IoTdevice. FUTURE OF HEALTHCARE IoT: There are countlessapplications for the IoT in healthcare, but the technology isstill evolving .

One of the challenges of healthcare IoT is how tomanage all of the data it collects, the future of IoT willdepend on the ability of healthcare organization to turn thatdata into the meaningful insights.