



# Benefits and Issues of Health Monitoring System Based on the IoT

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**Abstract:** A world wherever everything is online and act to alternative things and folks to boost peoples lives likself driving drones and sensors for observation your health is conjointly referred to as the web of things (IoT). IoT devices are very useful in Hospitals. In most of the time using the IoT for Healthcare we replace part of the visit to the physician with an online consultation moreover some medical test can be performed remotely either, right at the patients home. In this paper author focus on Review of issue and benefits of HMS (Human Monitoring System) based on IoT smart devices can track health conditions IoT applications for health care can send a emergency signal if the patient has an asthma attack, heart failure or another medical issue.

**Keywords:** IoT, Sensor, folks, Human Monitoring System, driving drones.

## I. INTRODUCTION

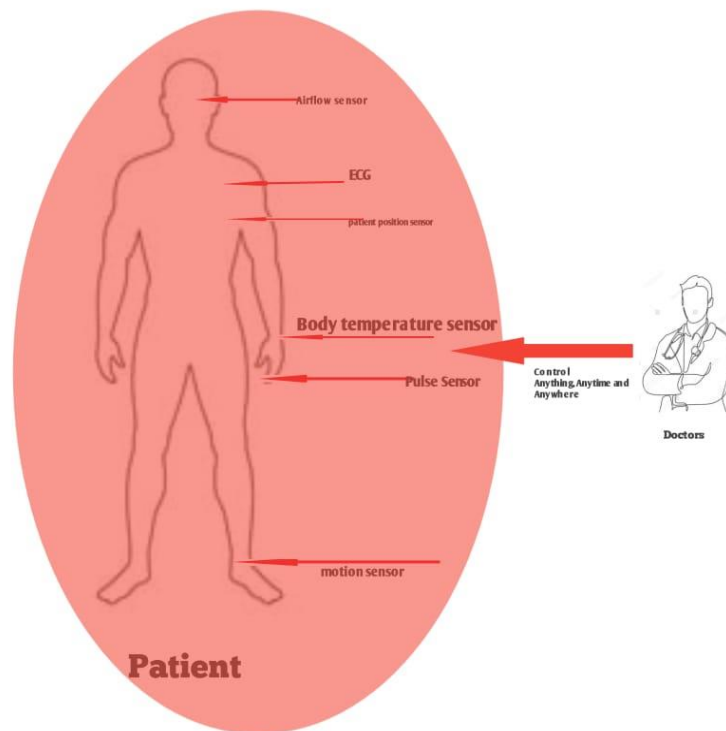
At present Internet has become a part of our daily life. Internet connected devices are becoming more available, it will be harder to imagine that the internet we use today to reach people, find information and assist us in our daily live with innovative services will not be extended toward creating value out of such increased availability of connected objects[1][2].

Internet of Things(IoT) is such when the internet and networks are mashed up. According to infra structure, IoT is the combination of embedded electronics, sensors, software and connectivity and sometimes it is called internet of everything.Heterogeneity of interconnected objects are responsible for exchanging data those are interconnected between pcs, human to human, human to things, things to things[17].

The data will be accessed exploitation the power given from the magnitude of web from anyplace, any time. therefore health information will be remotely accessed with the assistance of IoT. during this sense we've developed a model for aggregation health information from patients as human to things and also the health units accessed the information to supervise the patient's state any time remotely.

virtually individuals of all ages square measure exploitation mobile devices like sensible phones and tablets for exploitation numerous applications owing to being advanced mobile technologies. As health is one in all the most important problems within the sensible world therefore remote observation in everything is turning into standard. convenience of web it's currently turning into easier to use mobile technologies for medical applications.

A user can simply connect a health monitor via a mobile device to develop his or her own personal health[3]. There is currently strong need of advance in the field of health information[4].



**Fig: Human Monitoring System based on IoT Devices**

## II. SYSTEM EXPLANATION

Basically a hospital management consists of some teams of specialists like doctors, nurses, higher authorities etc. In a busy day the total units have to be compelled to be terribly careful concerning the health condition concerning their patients. However it's abundant robust to take the acceptable action once the patient are several in number. And additionally the value for the medical purpose is high for the large machines like cardiogram machine. Every machine will measure every kind of knowledge solely. It takes additionally Brobdingnagian area. The management units store the health knowledge in written. But they can simply use cloud for unlimited storage with low cost. They'll talk to specialist anytime from anyplace they want. Hospital management can't offer patient's health information to their guardians uncomparable. They supply solely visiting hours to the guardians. Victimisation this technique they'll easily monitor additional patients and provides correct treatments to the patients. The guardians may get the health data instantly.

### A. Phidgets Interface kit

Phidgets Interface kit receives analog input which can measure the continuous quantities like as temperature, humidity, position, pressure, etc. This kit allows extensive variety of sensors which can be connected directly with this kit using cable included with the sensor[16].

- 1) Accelerometer: The Phidget Accelerometer is a accelerometer that measures 3 gravitational(29.4m/s<sup>2</sup>) change per axis having three axis(x,y,z). This sensor can measures both dynamic acceleration named vibration and static acceleration named gravity or tilt[16]
- 2) Touch Sensor: A binary result such as Touch Detected or No Touch Detected is the output of the Phidgets touch sensor. Touch is detected when patient is regularly using the sensors or patient is in touch of sensors[16].
- 3) Light Sensor: Precision light sensor measures human perceptible light level in lux; its measurement range is from 1 lux to 1000 lux of the living environment of the patient. Firing activities are measured by this sensor[16].



- 4) Humidity and Temperature Sensor: Humidity sensor measures relative humidity from 10% to 95% with a typical error of 2%RH at 55% RH on the contrary temperature sensor measures ambient temperature in the range of -30oC to +80oC with a typical error of 0.75oC in the 0oC to 80oC range. The temperature sensor component is rated at -40oC to +100oC[16].

### B. E-Health Sensor Shield kit

The e-Health Sensor Shield approves Arduino and Raspberry Pi users for causation of biometric and medical applications which is used for measuring health condition through using different sensors. All this information can be used to monitor in real time the condition of a patient or to get sensorial data in order to be subsequently analyzed for medical diagnosis. All this biometric information which is gathered by this kit; can be sent through wireless using any of the 6 connectivity options available Wi-Fi, 3G, GPRS, Bluetooth, 802.15.4 and Zigbee[6] depending on the application. This E- Health Sensor Shield kit also ables to make interface with Arduino and RasperBerry board for making communication with personal computer[6].

1.E-Health ECG Sensor: The electrocardiogram is such a diagnostic tool that regularly measures the electrical and muscular functions of the heart. Normally an ECG machine uses 12 electrodes, but this sensor only 3 electrodes for generating patients ECG signal because, this 3 electrode create a triangle around the heart and can receive the information form heart position V1 to V5[6]. Besides this ECG sensor is self-configurable. A user can measure a patients ECG data at any interval he likes. But minimum data interval is one micro- second when this sensor is programmed to make interface with Arduino UNO. But, as comparing with normal sinus rhythm rate[18].

2) E-Health Body Temperature Sensor: Body temperature sensor measures the temperature level of a patient. When a person get sick his body temperature do not remain constant as natural. The reason is that various diseases are accompanied by when characteristic changes in body temperature. Similarly, body temperature allows to monitor of the motion of certain diseases, and a physician can easily evaluate the efficiency of a treatment[6].

C. Arduino UNO: Arduino UNO is a microcontroller which is based on ATmega328. To support as a microcontroller it contains everything it needed. Such that it has 6 analog inputs, 14 digital input/output pins, a 16 MHz ceramic resonator, single USB connection, a power jack and a reset button. Simply the microcontroller can be connected to a computer with a USB cable or an AC-to-DC adapter or battery to get started[15].

### III. ISSUES/ CHALLENGES AND BENEFITS

- The five main benefits of IoT in patient health monitoring system:

#### 1. Health Monitoring:

Smart devices will track health conditions. IoT applications for aid will send and emergency signal if the patient has a respiratory disease, failure, or another medical issue.

For example, Apple has integrated AN IoT technology in aid to Fall Detection System in Apple Watch. It detects if the user falls And shows an alert. The person has to faucet 'I'm OK' for one minute. In another case, Apple Watch calls emergency services. They conjointly send a message to emergency contacts.

#### 2. Better Patient expertise:

IoT in hospitals improves the tending system, offers patients an easier thanks to get involved with doctors. It results in up patient expertise and gaining client loyalty. Thus, the ton in tending trade helped the U.S. (Mt. Sinai Medical Center) cut back the waiting time for five hundredth of their emergency patients victimisation AutoBed computer code.

The hospital has around 100 beds, however admits a minimum of 1000 of patients. the first task of AutoBed is matching obtainable beds with new patients. This way, IoT devices in tending assist the hospital within the economical accomplishment of the set goals.

#### 3. Drug Management:

One of the Internet of Things health care edges is best drug management. IoT technology permits dominant the number of taken drugs. Doctors will monitor the dose and track effectiveness of treatment.



Also, the Internet of Things permits causing reminders to patients once they should to take their medication. In some cases, it's doable to inform the friend once the patient hasn't taken drugs on time.

#### 4. Healthcare Automation:

IoT devices will facilitate automatize body, manual, and routine tasks. Internet of Things medical applications will analyze a major quantity of data and make totally different metrics to visualize any changes within the patients' health conditions. Automatic processes of collection knowledge will scale back the amount of errors in creating designation

#### 5. Preventive healthcare:

A lot of individuals die from chronic diseases like heart condition, diabetes, and more. victimisation the analytic capabilities of ton, it's potential to supply patients with a lot of customized sorts of treatment and care.

Smart, Connected or wearable ton devices for health care will monitor condition of older or patients with chronic diseases. Having all that information, doctors are going to be able to provides a higher treatment and see the primary symptoms of the sickness. We've looked solely through the foremost common advantages of the web of Things technology. consistent with them, the role of ton in health care is to boost patients' well-being through trendy technologies likewise as boost physicians' work the IoT-equipped medical devices.

- Some issue or challenges of IoT in Health Monitoring System:

#### 1.Data security: -

The main downside of IoT for attention is poor security. information privacy is critical for the medical trade since case history is counselling. Malefactors could try and get access to the company's package and expose sensitive information. However, the good medical package development seller will effectively shield your future IoT-equipped app from any harmful actions of the third parties. To avoid such problems, it's a necessity to specialise in information security after you create use of heap in attention. Certainly, such a necessity can cause extra prices.

There also are such papers as GDPR and CCPA that shield personal data of patients on heap connected attention applications.

#### 2. Integration of Protocols:

IOMT connects loads of various IoT health devices. to form a versatile scheme, attention needs exploitation the practicality of the many devices with varied protocols. However, there's no single answer concerning communication protocols and standards. As a result, the combination of IoT within the attention trade is kind of slow and restricted.

Creating medical software system, you must make certain that your app is HIPAA and HITECH compliant. These protocols contain loads of rules and rules connected to process patients' personal data, and so as to facilitate such a compliance, you'll be able to apply to at least one of the attention IoT corporations having the in- depth experience in such Associate in Nursing integration and serving to you with success touch upon the aforesaid issue.

#### 3. Data overload:

An IoT care device collects and processes many more of data. As a result, doctors will face information overload and accuracy problems. the big quantity of data on the internet of Things caring applications will result in difficulties in decision-making throughout treatment.

## IV. CONCLUSION

With the development of technology it may be expected that the provision of internet is everyplace. The goal of this system is to mechanically gather information from patients and store the gathered information into cloud for permanent use that may help health professionals to remotely health observance. The hospital management may be ready to monitor additional patients at a time.

The system will facilitate guardians of the patients to know the health data. this technique is additionally transportable. So it may be expect that it'll facilitate the health units and guardian of the patients permanently caring and minimizing risk taking required immediate action. In future new health sensors may be additional and analysing the data to produce a satisfactory result supported the measured data to produce live opinion regarding patients state. There may be a telephony or SMS service may be enclosed to tell guardians and health units regarding patient's essential condition. This technique is very useful in day by day.



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