



Monitoring Body Temperature and SpO2(oxygen level) Using IOT

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Abstract–The Internet of Things (IoT) gradually evolving as the subsequent phase of the evolution of the Internet, it becomes crucial to recognize the various potential domains for application of IoT, and the research challenges that are associated with these applications. From smart cities, to health care, smart agriculture, logistics and retail, to even smart living and smart environments IoT is expected to infiltrate into virtually all aspects of daily life. Even though the current IoT enabling technologies have greatly improved in the recent years, there are still numerous problems that require attention. Since the IoT concept ensues from heterogeneous technologies, many research challenges are bound to arise. The fact that IoT is so expansive and affects practically all areas of our lives, makes it a significant research topic for studies in various related fields such as information technology and computer science. Thus, IoT is paving the way for new dimensions of research to be carried out. This paper describes the design of the effective remote patient monitoring system which measures oxygen level and body temperature of a patient i.e. Monitoring Body Temperature and SpO2(oxygen level) Using IoT.

Keywords- Internet of Things, Healthcare, Sensors.

A. Introduction

Health is always a major concern in every growth the human race is advancing in terms of technology. Like recently corona virus attack that has devastated China's economy to some extent. It is an example how health care has become more important. In areas where the epidemic has spread, it is always a best idea to monitor these patients using remote health monitoring technology. So Internet of Things (IoT) based health monitoring system is the current solution for it. Remote Patient Care/Monitoring arrangement empowers routine clinical outpatient monitoring settings (e.g. at home), which increases access to human services offices at bring down expenses [4]. The original purpose of this project is the design and implementation of a smart patient health tracking system that uses Sensors to track patient health and uses internet to inform doctors and their loved ones in case of any issues.

Remote Patient Monitoring saves time of both patient and doctor, thus increasing efficiency and reliability of health services. Oxygen level and body temperature are the main signs that are routinely measured by physicians after the arrival of a patient. For a human adult of age 18 or older have a normal oxygen level is 95 and above then functioning of heart can be said to functional. If the oxygen level is lower than the normal heart rate, it is an indication of a condition known as bradycardia. Like Oxygen level, normal body temperature also vary and vary from person to person and changes throughout the day. The body temperature is lowest in the early

morning and highest in the early evening. The normal range for body temperature is 97 to 100 degrees Fahrenheit or 36.1 to 37.8 degrees Celsius. Temperature can be measured by using different types of sensors. The sensor displays the data in the LCD as well as sends it to the receiving end for displaying at the remote place [5]. This paper describes the design of an effective remote patient monitoring system which measures oxygen level and body temperature of a patient and sends the data to a remote end where the data will be displayed and physician or doctor will be able to examine him/her. This device will be much needed during emergency period in pandemic like SARS or for saving time of both patients and doctors.

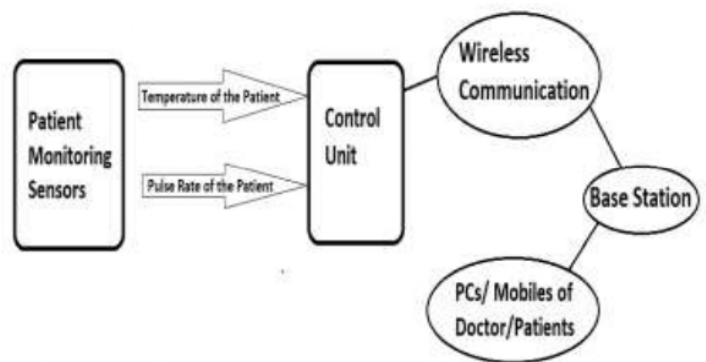


Fig. 1: Proposed System

B. Proposed Work

The core objective of this project is the design and implementation of a smart patient health tracking system. Fig.1 shows the overview of the proposed system. The sensors are embedded on the system to sense the temperature and heartbeat of the patient when the patient came in the range of system. Temperature can be measured by using different types of sensors like thermocouples, thermistors, resistance temperature detectors (RTD), and integrated circuit (IC) sensors. The SpO2(oxygen level) and heartbeats can be measured by using the SpO2(oxygen level) and heartbeat measuring sensors. These sensors are connected to a control unit i.e. IoT Module, which calculates the values of all the required sensors. These calculated values are then transmitted through a IoT cloud to the base station. From the base station the values are then accessed by the doctor at any other location [4]. Thus, based on the temperature and oxygen level and heart beat values the



doctor can decide the state of the patient and appropriate measures can be taken.

C. Advantages

- Reporting and Monitoring: - Through connected devices, it becomes easy for doctors and physicians to monitor patients' health. Also, real-time monitoring can save lives in a medical emergency like diabetic attacks, heart failure, asthma attacks, etc. By means of a smart medical device connected to the smartphone app, collecting medical and other required health data will not be challenging. IoT devices collect and transfer health data like blood pressure, oxygen, and blood sugar levels, weight, and ECGs. Prevention: - Smart sensors analyse health conditions, lifestyle choices and the environment and recommend preventative measures that will reduce the incidence of diseases and acute states. Alerts and Tracking: - In life-threatening situations, there is need to be alert in time. To combat such situations, medical IoT devices and applications can collect important data and transfer it to doctors and health personnel for real-time tracking. Also, these mobile applications and IoT devices can also send notifications regarding a patient's critical conditions irrespective of place, time. Medical data accessibility: - Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications. Improved treatment management and healthcare management: - IoT devices help track the administration of drugs and the response to the treatment and reduce medical error. Using IoT devices, healthcare authorities can get valuable information about equipment and staff effectiveness and use it to suggest innovations.

D. Challenges

- Data security and privacy: - The data stored inside IoT empowered gadgets are inclined to data-theft and it makes the information increasingly susceptible to cybercriminals that can hack into the framework to compromise individual wellbeing data. Integration: multiple devices and protocols: - The integration of different sorts of gadgets causes a block in the usage of IoT in the social insurance part. The purpose of this obstruction is that gadget makers haven't arrived at an agreement with respect to correspondence conventions and benchmarks. This outcome in a situation where each producer makes its own different environment of IoT gadgets that don't work with the gadgets and utilization of contending makers.

- Data overload and accuracy: - Due to the non-consistency of information and correspondence conventions, it is hard to aggregate information for essential bits of knowledge and investigation. IoT gathers information in mass and for appropriate information investigation, the information should be isolated in pieces without over-burdening with exact exactness for better outcomes. Over-loading of information may influence the dynamic procedure in the friendliness division in the more drawn out run.

E. Future Scope

- Independent Health Monitoring: - In medical emergencies, people of any age require immediate help from any source of help. The need for monitoring and sending the alert to the concerned person along with the doctor, IoT home health monitoring devices are increasing levels of independent health monitoring. Peace of Mind: - A patient at home with no one to look at becomes a risky affair. The situation becomes worst when a patient is suffering from dementia. Thankfully, the situation was a tension earlier that has been eliminated with the presence of IoT home health monitoring. The addition of wearable technology into it makes it even more stronger. These wearable devices detect the patient's condition along with sending information to the caretaker too. The information can either be given through text or email while alerting the doctors too. Healing at Home: - A few years back, monitoring patients was limited to the care of family or home nurses in case the patient is healing at home. On the other hand, if a patient decides to be in the hospital then regular monitoring is an obvious task. But with the passage of time and the introduction of IoT health monitoring tools, the choice of healing at home becomes easy. Integration of real-time monitoring and other definite modules, patients do not necessarily require to be under the hospital roof. The technology thus holds a strengthening future providing independent and mobile health monitoring while reducing the stress to visit doctors and health personnel. Medicines on Right Time: - How many times did you forget to take medicines on time? If your answer is many times, you are somehow like me! This issue has been cut by an IoT monitoring device that keeps track of a patient's prescribed medicine routine.

F. Conclusion

The main concern of IoT in healthcare industry is to guarantee more beneficial patients, engaged medicinal services suppliers, and cost-putting something aside for both. With the best services, you can assemble a savvy IoT sensor arrange. There are sure essentials to cost-effectiveness, which can be applied in IoT application advancement for social insurance too, for example, decreased overspending, the very much characterized job of sensors and its capacities, and send and get information when



vital. For doing this, you have to make a viable IoT application improvement methodology and application engineering in a joint effort with your innovation accomplice.

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