

Smart Health Care System Using IoT

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Abstract— Diagnosis, and checking of well being is an essential assignment in social insurance industry. Because of time requirement, individuals are not going by doctor's facilities, which may and potentially prompt a great deal of medical problems in a single moment of time. Prevalently a large portion of the social insurance frameworks have been produced to anticipate and analyze the wellbeing of the patients by which individuals who are occupied in their timetable can likewise screen their wellbeing at customary interims. Numerous investigations demonstrate that early expectation is the most ideal approach to cure wellbeing in light of the fact that early determination will assist and caution the patients to know the wellbeing status. Medicinal services being a worldwide issue all the more especially India being a most populated country where greater part of which live in towns denied of social insurance offices on ongoing premise deals consistently and routinely. With the expanding utilization of innovation, there is a pressing need such a savvy wellbeing checking framework that can discuss between organize gadgets and application which will help the patients and specialists to screen, track and record the patient's delicate information containing restorative data. This paper delineates illuminating medical problems utilizing the most recent innovation, Internet of Things (IoT). It shows the structural audit of keen social insurance framework utilizing Internet of Things(IoT) which is meant to give a Better HealthCare to everybody. Utilizing this framework design, patient's body parameters can be estimated continuously. Sensors gather patients body parameters and exchanges that information to Microcontroller ATMELEL 89s52 which additionally exchange that information to the MySQL database server. This MySQL database server deals with the information and gives availability. The patient can see this information with the assistance of Android App. Which one can introduce in Smartphone, or Tablet. In the event that information is unusual then patient gets notification likewise guardians will get crisis message. With the assistance of various basic leadership calculations choices can be made effortlessly and quick and as indicated by it individuals can approach the database. The patient can check their restorative record Hence, the framework gives a Better HealthCare to everybody and blunder free and smooth correspondence to patients.

Key words—*Internet of Things (IoT); ambient intelligence; monitoring; innovations; leveraged.*

I INTRODUCTION (HEADING 1)

Now a days, the internet has become a vital part of our daily life. It has changed how people live, work, play and learn. Internet serves for numerous ideas such as education, finance, industries, entertainment, social networking, shopping, e-commerce etc. The next innovative mega trend of Internet is Internet of Things (IoT). The IoT connects smart objects to the Internet. It can facilitate an exchange of data and bring users processed data in a more reliable and secured way. The Internet of Things (IoT) is one of the most vital and transformative technologies ever invented. The Internet of Things (IoT) is a megatrend in next-generation technologies that can culminate the complete business gamut and can be thought of as the interconnection of uniquely identifiable smart devices within today's internet infrastructure with extended benefits. These benefits basically include the advanced concatenation of the devices, systems, and services that go beyond machine-to-machine (M2M) scenarios. Therefore, initiating automation is feasible in nearly every domain. The Internet of Things (IoT) is changing much about the world we live in, the way how we drive, how we do purchases and even in healthcare solutions. Medical care and healthcare represent one of the most attractive application areas of the IoT. The Internet of Things (IoT) has the potential to give rise to many medical applications such as remote health monitoring, fitness programs, incurable diseases, and elderly care. Thus, various medical devices, sensors, diagnostic and imaging devices can be viewed as smart devices or smart objects constituting an interior component of the IoT. IoT-based healthcare services are foreseen to minimize costs, increase and provide a better quality of life, and enrich the users experience. In order to continuously make our health care services robust immense and secure, the IoT relies on several enabling technologies. Congregating real-time data from different sources, in this case, an unlimited number of patients for a considerable period of time has become very simple and fast using the potential of IoT. The potential of IoT for health and medical services are tackled by smart sensors which accurately measures, monitors and analyze a variety of health status designators. These include basic crucial health signs such as pulse rate and blood pressure. With the help of IoT's potential, doctors are now able to collect real-time raw data from numerous patients for a continual period of time through smart devices connected to an interconnected network, which ensure them not only with trustable and reliable results but also time-saving which will be of maximum benefits. Internet of Things (IoT) is going to revolutionize healthcare by significantly lowering costs and improving quality.

II RELATED WORK

Deepika Agrawal et al. [1] proposed an IoT-based healthcare monitoring system that collects all the medically relevant data of patients, including patients heart rate, blood pressure and ECG and sends alerts to the patient's doctor regarding patients full medical information, providing a fast and reliable health care service.

Sapna Tyagi et al. [2] defined the role of IoT in healthcare deliverance and its technological aspects that make it a reality and examine the opportunities. This system build's a network among all entities (doctors, patients, Labs, Pharmacists, Nurses) participating in healthcare that not only limits to the entities under one umbrella but also covers nationwide entities. Tried to implement the concepts of IoT where these entities would be directly communicating to the cloud.

Alexandru Archip et al. [3] defined the steps taken to design and build a low-cost monitoring system prototype. The system focuses on remote patient monitoring in hospital wards, following an ICU discharge. The system offers mobile support in order to facilitate faster and better medical in emergency cases and has been developed using low-power dedicated sensor arrays for EKG, SpO₂, temperature and movement.

S. Sivagami et al. [4] defined a proposal for smart hospital system (SHS), which relies on different, yet complimentary, technologies, specifically RFID, WSN and smart device such as mobile, inter-operating with one and all through a Constrained Application Protocol (CoAP)/IPv6 over low-power wireless personal area network (6LoWPAN)/representational state transfer (REST) network infrastructure. In this proposed system, the sensors are built to get the environmental conditions of the hospital for which hospital staff would be responsible and RFID is used for this monitoring. For the patient, a nurse would be responsible for tracking/monitoring the patient health condition (temperature and heart rate), based on which graphical chart is generated which is shared with the doctor.

Nitha K. P. et al. [5] reviewed the concept, applications and various existing technologies in healthcare. The system uses all the potentialities of Internet of Things (IoT) by enabling connection with smart devices to provide them the best health care and also enumerated the key difference between and brief clarification of the scope of IoT in personalized health care, that ranges from wrist-worn devices to health care systems.

Alex Page et al. [6] proposed that network sensor either worn on the body or embedded in a living environment that can help in providing rich information captured on a continual basis which is aggregated and effective minded about the patients physical and mental health. They have proposed a system where the data acquisition is performed multiple wearable sensors that measures physiological biomarkers such as ECG, skin temperature, respiratory rate, EMG muscle activity and posture. A ZigBee or Bluetooth is used to transfer sensor data to the concentrator. Often a storage/processing device in a locus of a mobile client referred to as a cloudlet, is used to augment its storage/processing capability whenever the local mobile resources do not fulfill the applications requirements. The cloudlet can be a local processing unit (such as a desktop computer) which is directly accessible by the concentrator through WiFi network. Also addressed about the cloud-based medical data storage and the upfront challenges. Analytics that use the sensor data along with e-Health records are becoming prevalent can help with diagnoses and prognosis for a number of health conditions and diseases and additionally, the visualization is a key requirement for any such system. This treasure trove of data, when analyzed and presented to physicians in easy-to-assimilate the visualization that have the potential for drastically improving healthcare and reducing costs. Also highlighted several challenges in sensing, analytics, and the visualization that need to be addressed before systems can be designed for seamless integration into clinical practice.

S. M. Riazul Islam et al. [7] proposed an intelligent collaborative security model to reduce security risk; discussed how different innovate technologies such as big data, ambient intelligence, and wearables are leveraged in a healthcare context; addressed various IoT and eHealth and regulations around the world. Furtherly, analyzed the distinct IoT security and privacy features, as well as including security requirements, threat models, and attack taxonomies from health care perspectives and defined the advances in IoT-based health care technologies.

Danilo De Donno et al. [8] proposed A novel, IoT-aware, sharp-witted architecture for automatic monitoring and tracking of patients, personnel and biomedical devices within the hospitals and nursing organizations. Staying true to the IoT vision, they proposed a Smart-Health-System (SHS) which relied on different, yet complementary, technologies, specifically RFID, WSN, and smart mobile technologies.

Cecilia Occhiuzzi et al. [9] proposed An Ambient Intelligence platform, denoted as NIGHTCare for remote monitoring and control of overnight living environment which is entirely based on RFID passive technology which is bale to recognize nocturnal behaviors and activities, generates an alarm to the operators, families, or towards first-aid remote centers in case of anomalous or pathological events and support diagnostics. The NIGHTCare platform deploys miniaturized wearable tags (WT) properly integrated in the clothes, conventional ambient tags (AT) disseminated in the environment, a long-range UHF RFID reader, a web-based graphical processor with warning modules and a physical layer software engine for real-time processing. By processing the electromagnetic signals which are arising from the interaction between the subject and surrounding environment,

system detects and reports the presence or the absence of the user in the bed, his/her jerky movements and the motion patterns, accidental falls, prolonged absence from the bed and prolonged periods of inactivity such as fainting, unconsciousness or even death.

Mohamed Adel Serhani et al. [10] proposed a frame work to collect patients data in real time, in order to perform appropriate nonintrusive monitoring and propose medical and/or lifestyle engagements, whenever needed. The framework completely relies on service-oriented architecture (SOA) and the cloud which allows seamless integration of mobile technologies and services to smoothly collect the vital data for the patients wearable biosensor devices. The data are stored in the cloud which and made available that can be accessed by the physicians and/or by any other authorized entity. various sensors and transmits the processed data to the remote monitoring station.

III PROPOSED WORK

The proposed framework means to cover a conclusion to - end savvy, proficient and inventive wellbeing application that can be developed with two useful building squares. Be that as it may, the principle capacity of the building piece is to accumulate every single tangible datum that are identified with the checking of the patients, though the second square capacity is to store, process and present the came about data on the server where the specialists can get to wellbeing reports following the instance of the observed patients..

As shown in Figure 1, which illustrate the overall model, the system consists of a robust health monitoring system that is intelligent enough to monitor the patient health automatically using IoT. This would help the doctors to monitor patient's report from anywhere and at anytime

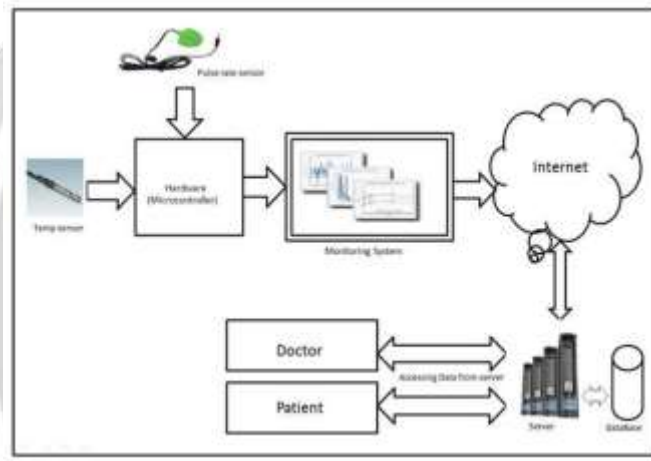


Figure 1: Proposed Block Diagram of IoT based Smart HealthCare System

The framework utilizes keen sensors that produce crude information data gathered from every sensor and send it to an information server where the information can be additionally broke down and changed over into a chart examination and factually kept up at the server which can be utilized by the therapeutic specialists.

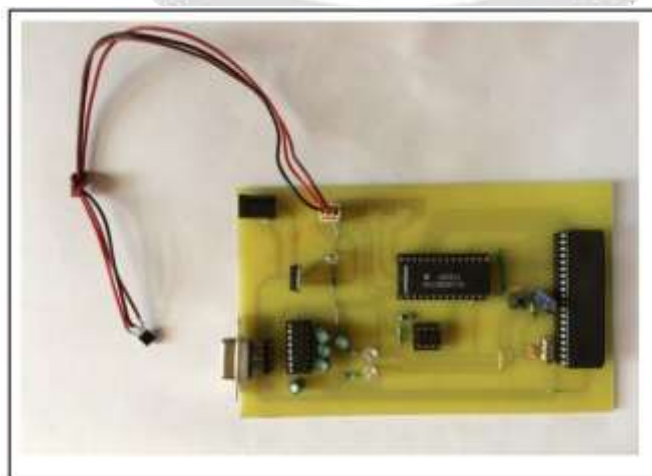


Figure 2: Experimental Circuit Setup

As depicted in Figure 2, and said above the proposed system is an integrated system and combines an excellent means of diagnosis by the fusion of hardware and software. The components related to hardware include Microcontroller

- ATMEL 89s52.
- Temperature sensor.
- Pulse rate sensor.
- RS-232.
- Analog-to-digital converter.

The equipment is appropriately supplemented with a correct mix of programming to shape a profoundly advancing framework in the field of wellbeing. Microcontroller ATMEL 89s52 is the 40 - stick DIP which is the mind of the model which administers every one of the capacities. It gathers the info information from the sensor, for example, temperature sensor, a heartbeat rate sensor and so forth and sends the information that is distinguished by the sensors while associated with the patients and this information is sent to the simple to-computerized converter which changes over the simple information into advanced information. This information is then transferred to the web server. The transferred information can be seen by specialists and also patients through a page and android application. The site page and android application are furnished with extra highlights, for example,

- Booking doctors appointment according to area and specialization.
- Emergency push button.
- Medical alert.
- Patient's feedback.
- Single and Family registration.
- Access health data from anywhere.

Let's doctor provide patient referral to other doctor.

The voltage regulator IC 7805 is the integrated circuit. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC 7805 maintains the output voltage at a constant value. It provides +5V regulated power supply.

The software and hardware mutually interact with each other to form a complete health diagnostic system. The patient and doctor are provided convenience to access and mutually benefit each other. At the time of extremity situation alert message is sent to the doctor. Hence quick provisional medication can be easily done. This system is much cost effective with low power consumption capability, easy setup, high performance and time to time response.

IV EXPERIMENTAL RESULTS

The proposed keen wellbeing checking framework is being sent and tried over a patient whose individual points of interest are gone into the online interface. The patient is associated with the savvy wellbeing observing framework which comprises of a heart rate sensor, circulatory strain and a temperature sensor. The live diagram of the patients heart rate, p ulse and a temperature is being checked on a Wamp based database server. The IOT gadget utilized here is Microcontroller ATMEL 89s52 and sensors. The framework design of the proposed demonstrate is clarified by the given figures which incorporate a server associated Microcontroller ATMEL 89s52 that transfers the information got by the sensors onto the database and factual charts are being plotted for encourage investigation and records.

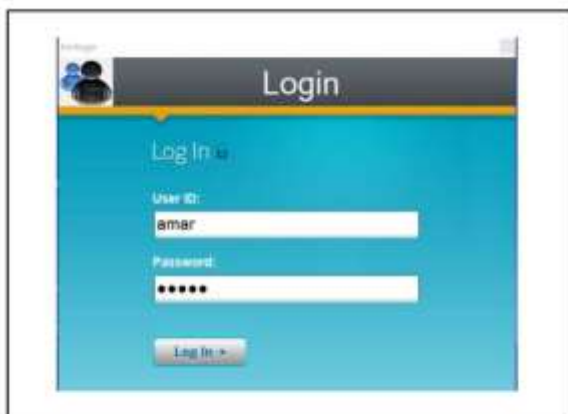


Figure 3: Administrator Login

In the login page, the user can get login into his own page either as a doctor or as a patient according to the credentials given



Figure4:HomePage

The home page of the web portal consists of various tabs such as login, registrations, view patient details etc.



Figure 5: Patient Registration

The admin page allows the patient to enter the personal Details such as name address age ,sex, blood group that are essential for for treating various diseases.these would help in better understanding of the patient and can be treated

In the ADD tab, the patient blood pressure, heart rate and temperature sensors are added into the database server with the unique user ID so as to maintain the records for further purpose.

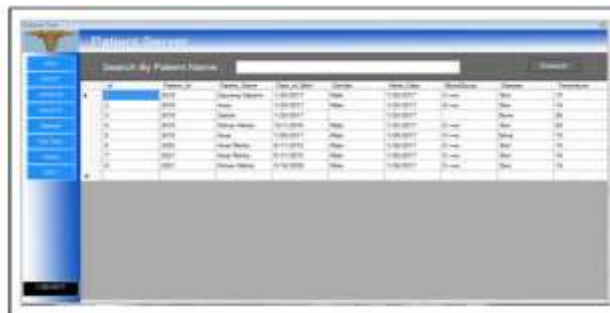


Figure 6: Uploaded Data

The data from the various sensors are uploaded in the database server which is been further used to analyse the health reports and to plot a graph.



Figure 7: Database Servers

V.CONCLUSION

The internet has immensely changed the way we live, intercommunicating between people at a virtual level in several contexts spanning from professional life to social relationships. The IoT has the potentiality to add a new dimension to this process by establishing communication among smart objects, leading to the vision of anytime, anywhere, any media, anything communication. Ingenious use of IoT technology in healthcare not only bring benefits to doctors and managers to access wide ranges of data sources but also challenges in accessing heterogeneous IoT data, especially in a mobile environment of real-time IoT application systems. Considering the population status and the majority of the people live in villages which are remote places and with the growing technology and more importantly healthcare being the predominant issue of the nation this smart healthcare system using IoT technology plays an important monitoring tool at levels in the larger interest of the global as a whole. The health monitoring system is beneficial to the patients as well as to the society where the implementation of such systems will save hospital bill, waiting time, and also reduce the long queues in the hospitals. This paper tries to emphasize on a healthcare system which is enabled with IoT technology that not only realizes the illustration and traceability of healthcare actors but guarantee the improved health care services. The key motive behind the proposed system is to provide better and efficient health services to the patients by implementing networked information so that experts and doctors can make use this data and could provide fast and efficient solution. Thus, this technology provides solutions to healthcare issues and connects the patients across the country and also doctors to monitor, track and record patients vital data and medical information on real time basis so that timely and effective solutions to the patients on regular basis.

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