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TELE HEALTH MONITORING SYSTEM IN RURAL COMMUNITY USING INTERNET OF MEDICAL THINGS

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Abstract:

Telemedicine is an innovative system of improving healthcare delivery from long distance using the telecommunication and modern information technologies. This system creates communication among patients & healthcare professionals maintaining convenience & commitment. It keeps confidential and safely transferred from one place to another. In the rural areas of our country, patients went to the public health centers (PHC) for their treatment. PHCs in India are allotted with hardly one doctor. It is difficult at a single doctor's end to provide treatment to huge number of patients approaching a single doctor. Therefore, it is proposed to develop an automated T-Health monitoring system. It should monitor and measure different physiological parameters of the body like Heart Beat, Temperature, Blood Pressure using Arduino. IoT devices is proposed to collect the required parameters and evaluate the data obtained from the IoT devices are to send to the cloud database in PHC.

Keywords: PHC, Mysignal, Cloud, WIFI

1. Introduction

Telemedicine is an upcoming field in health science emerging out of the powerful combination of Information and Communication Technologies (ICT) with Medical Science having huge potential in addressing the difficulties of social insurance conveyance to provincial and remote territories other than a few different applications in instruction, preparing and administration in wellbeing part. Tele-Health is reclassifying the way medicinal services and therapeutic training is conveyed. In numerous provincial groups or remote places or post-catastrophe circumstances, a reliable human service is inaccessible. Telemedicine can be connected in such places or circumstances to give crisis social insurance. Patients can get clinical social insurance from their home without difficult go to the healing center. Present day advancements web coordinated effort has empowered simple data sharing and discourse about basic restorative cases among social insurance experts from numerous areas. Telemedicine has encouraged patient observing through PC or tablet or telephone innovation that has lessened outpatient visits. Presently specialists can check remedy or direct medication oversight. Besides, the home-bound patients can look for restorative help without moving to facility through emergency vehicle. This framework likewise encourages wellbeing instruction, as the essential level medicinal services experts can watch the working methodology of social insurance specialists in their particular fields and the specialists can administer crafted by the amateur. Telemedicine wipes out the likelihood of transmitting irresistible sicknesses amongst patients and social insurance experts. In India, 68% of the populace still lives in the country ranges. Rustic social insurance framework is tormented with a few issues like serious deficiency of medicinal services experts, absence of vital therapeutic supplies and additionally non-restorative foundation, for example, power, clean water, absence of arranging and funds. Around 60-80% of the doctor positions in different fortes are empty in the country social insurance administrations. The rustic/urban social insurance difference is reflected in the medicinal services results as IMR in urban populace is 27 while in provincial populace it is 44. Correspondingly, add up to richness rate (TFR) is 1.8 in the urban populace while in country populace

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it is 2.6. There are no direct answers for India's heath mind problem; be that as it may, utilization of India's advances in the field of data and correspondences innovation (ICT) industry in social insurance conveyance is an imaginative plan to handle human services divergence. The broad utilization of ICT in medication has opened new skylines to enhance medicinal services in India. The Internet of things is progressively permitting coordinating gadgets equipped for associating with the Internet and giving data on the condition of soundness of patients and giving data continuously to specialists who help. A Web based Information framework for Management of Primary medicinal services. A large portion of the Patients are checking through specialists or Nurse. "Web of Things (IOT) is the system of physical items or "things" installed with electronic gadgets, programming innovations, sensors, and system availability, which encourages these paper to gather and trade information for benefiting different administrations [16]." It is an idea showing an associated set of anything, anybody, at whatever time, wherever, any administration and any system association. Specialists can frequently analyze or recommend without seeing the patient. The patient needs to physically show up before the close-by wellbeing focus, where the attendants or health laborers will analyze at first level, take note of the manifestations and advises the abnormal state authority specialists about the case. In the wake of looking at the reports, the expert specialist proposes the treatment through wellbeing laborer which diminishes costs and makes fulfillment by virtual correspondence of patients and specialists to examine solution changes and test comes about through an online framework. Enormous Data Healthcare is the drive to profit by developing patient and wellbeing framework information accessibility to produce social insurance advancement. By making brilliant utilization of the regularly expanding measure of information accessible, we find new bits of knowledge by reevaluating the information or consolidating it with other data. In medicinal services this implies not simply mining understanding records, therapeutic pictures, demonstrative reports and so forth., for bits of knowledge, conclusions and choice help gadget, yet in addition persistent investigation of the information streams delivered for and by each patient in a doctor's facility, at home and even while moving by means of cell phones. Indeed, even today the dominant part of social insurance examination is performed by doing month to month information revives in social databases that create pre-handled reports. A reasonable hole is regularly missing lab test is frequently 45 days old, as the information stream move from grouped information fields to continuous fields from value-based frameworks and gushing information from scientific displaying gadgets. This old model of examination will come up short. Investigation should be done on that spot minute not in the pre-prepared frame. Information invigorates should be done progressively not once in a month.

2. Related Works

There are previous works that have been done in this area to detect signs of patients thus preventing complications. [1] Minoi (2014) presented how the remote blood pressure health monitoring system will read, store and send data over wireless network to a remote server and also view the data on a regular basis by Medical doctors remotely from the website. [2] JGómez (2016) concluded that a remote health monitoring system is able to improve rural community's health care and wellness using wireless technology. Murthy had given survey of Mobile based Health Care systems in different countries and also potential solution for enabling Mobile Web technologies for rural areas. [14] Boyi Xu (2014) discussed about how IoT-based system is used to collect, integrate, and interoperate IoT data flexibly in order to provide support to emergency medical services and also shows the resource-based IoT data accessing method is effective in a distributed heterogeneous data environment for

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supporting data accessing timely and ubiquitously in a cloud and mobile computing platform . [13] Hassanalieragh (2015) gave an idea of data acquisition, data transmission, cloud processing and visualization using machine learning approaches in remote health care systems. [7] Kumar (2014) addressed the critical computing and analytical ability of Big Data in processing huge volumes of medical data in real time situations to turn the dream of Healthy India into reality and reforms in the health care sector and boosts the innovations in the big data analytics to improve the rural health care system.

3. PROPOSED SYSTEM

The patient health monitoring is one of the major concerns in the health care industry. The telemedicine is one which would be Interesting to everyone because of its amazing factors. Multiple jobs can be done by a single health application with user's intervention. The system has been designed to take several inputs to measure physiological parameters of human such as temperature, heart rate and detection of any fall The project is divided into two parts. First the hardware design and Second the software design. The project activity must be done step by step. It begins with searching and collecting information from scientific perspective. The review is about mechanical structure design and electronic circuit design also software programming implementation. The project was begun by finding the concept and idea related to this title. The information transmitting and viewing will act according to the module programmed using the software. It should implement all the required behaviour like sensing. Research is done on the mechanical and the electronic designs are built. The software design mainly comprises of the code/program of the application of the system. By using the wifi module ,data will be uploaded into the Thing speak server.



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3.1.1 Working

A sensor in this health monitoring system will collect information about the patient's health condition.Real-time monitoring is successfully done with IoT and saves lives from different problems like temperature, pulse, blood pressure,etc. Smart medical devices are connected via a smartphone to transfer the required health data to the physician smoothly.Smart devices which is used to allow patients to track their treatment process and communicate with the doctors in PHC and in-turn PHC doctors to their Specialist. Real-time staff location data to manage workforce efficiently. The T-Health system we deployed to the community allows the measurements to be automatically transmitted via wireless 3G network or WIFI to the PHC whereby medical doctors can view the data on a regular basis remotely from a website through the T-Health application. When the heart beat goes less than the 60 bpm then the microcontroller sends a signal to the GSM module and the GSM module will send the message to the hospital and doctors mobile along with the patient condition (heart beat, temperature) and GPS location(google maps link) and also displayed on the LCD display. When the heart beat goes greater than the 80 bpm then the microcontroller sends a signal to the GSM module and the GSM module and the GSM module will send the message to the hospital and doctors mobile along with the patient condition (heart beat goes greater than the 80 bpm then the microcontroller sends a signal to the GSM module and the GSM module and the GSM module will send the message to the hospital and doctors mobile along with the patient condition (heart beat goes greater than the 80 bpm then the microcontroller sends a signal to the GSM module and the GSM module will send the message to the hospital and doctors mobile along with the patient condition (heart beat, temperature) and GPS location (google maps link) and also displayed on the LCD display.



Figure 1:- Data Flow of the Proposed Method



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4. Results and Discussion

The IOT based on tele health monitoring system is designed and implemented with the help of Arduino IDE, GPS, GSM, Atmega328p, temperature sensor and Heartbeat sensor.



Fig .4.1 : Heartbeat happen shown on the LCD display

The above figure represents the heartbeat of the patient Whenever patient BPM is less than the 60 bpm then it is critical position and when BPM is greater than 100 bpm the it shows high position. when the BPM isbetween 60 bpm and 100 bpm then it is Normal position. Where it shows the output values of the sensors calculated and displayed in an LCD display, so that these values are visible even to the patient.

The body temperature sensor pulse rate sensor room temperature and may not be true values are calibrated using the microcontroller. The bellow figures represents the text SMS sent to the doctors mobile and along with patient health condition, temperature and location. Go to the link to track location of the patient. It redirect to the google maps.



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Fig. 4.2: SMS send to the mobile with patient condition and location

5. Conclusion

In this paper, we have presented and proved the prototype for an automatic system that guarantees a constant monitoring of various health parameters and prediction of any kind of disease or disorder that prevents the patient from the pain of paying frequent visits to the hospitals.

The proposed system can be set-up in the hospitals and massive amount of data can be obtained and stored in the online database. Even the results can be made to be accessed from mobile through an application.

The system can be further improved further by adding artificial intelligence system components to facilitate the doctors and the patients. The data, consisting medical history of many patients parameters and corresponding results, can be explored using data mining, in search of consistent patterns and systematic relationships in the disease. For instance, if a patients health parameters are changing in the same pattern as those of a previous patient in the database, the consequences can also be estimated. If the similar patterns are found repeatedly, it would be easier for the doctors and medical researchers to find a remedy for the problem.

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