DEVELOPMENT OF SMART HEALTH CARE MONITORING SYSTEM USING IOT

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ABSTRACT

In the current situation we encounter various problems in health sector which may be solved with the various ideas. the prevailing patient monitoring system, even in multispecialty hospitals are following traditional methods of maintaining records of patients within the style of hardcopies i.e., files, documents, reports etc., which has lot of disadvantages and also this is often not eco-friendly. within the hospitals they also do various scanning, blood tests, X-rays, temprature then on. But they supply data of those within the kind of hardcopies. What if the case, where they might upload data to a particular patients account, such the doctor can easily checkout that data and effectively provide medications to the patient Currently available vital sign, temprature, oxygen saturation monitor watches for fitness observations. because the health is that the main point of concern, past and present record is far needed to diagnose correctly for present health condition. the patient cannot describe the matter well to the doctor, those records will do the work that point. during this research work attempts are made for implementation of patient monitoring system which consists of sensors connected to the microcontroller, it's intended to amass vitals from patient body. The accumulated data is synced to the cloud account of a specific patient. The uploaded data is used for generating reports in daily/weekly basis in order that the report is extremely helpful for the doctor to diagnose fairly and quickly.

*Keywords***:** *IOT, Vitals, Medications, Fitness, Microcontroller*

1. INTRODUCTION

The Information and communication technology (ICT) within the sector of the healthcare and advancement of mobile computing, networking topologies has been the helpful in improvement of mobile health monitoring (MHM) [1]. Present the health care systems with the employment of cloud support and internet services, helps in improvement of the agricultural health care services [2]. The vitals acquired from the patients are transferred via internet connection then the physician within the opposite side gets the data and analyse by himself then the provides suggestions from far distance itself. But the knowledge is also processed well therefore the clear picture about the patient is obtained. The Essential data and data helps in improvement of quality of health care services. Internet of Things is the emerging concept where various IoT devices communicates, and are interconnected facilitating various advantages in forming a cloud computing devices [9]. the shape temperature are often accumulated precisely using analog sensor. And temperature is additionally an honest vital to be measured [3]. vital sign is one in every of the powerful tool to know about the status of an individual's health and it isn't only beneficial for maintaining fitness but also considerable in spotting potential health issues [4]. Example for proposed method is taking the ECG database from MIT Data base and compresses the multichannel ECG data and thus the result use for the analysis or comparison [13]. In the today's world population is rapidly increasing and also the priority towards the health of these is additionally increasing the simultaneously [5]. So, there is a desire for well-equipped health care centres which should be maintained and developed. To support health care centres, to possess an organized system which might allow proper maintenance of records of patient's vitals: pulse, temperature and even oxygen level, etc. acquired by the sensors throughout his/her hospitalized period, and generating the reports, has narrated during this research work. Electronic Vital acquisition system is connected to cloud through IOT devices the patient will have a completely unique account which could be accessed by him through login into the online site, which is created for this project. the current paper focus on specializing during a generalized system within the country, which should be accessible to each and every person. for example, if someone having some health issues involves hospital (using this system) if he gets his vitals checked, then it'll be uploaded to his account with the current time and date. thereupon data he will get treatment from Doctor. Even the suggestions got from doctor are visiting be uploaded to same account with time and date attached. the foremost advantage is storage of all the information of patient vitals in single unique account held by patient, the patient might not want to carry all the past/previous records which he/she got from different hospitals etc. This generalized the system will help the doctor to diagnose efficiently with less confusions like present health care system do. This Work focused on giving solution to this patient monitoring system which creates ambiguity to both patients and Doctors i.e., maintaining all records (present/past) related to a patient since his birth till his death are visiting be available at one wed site which helps plenty. When a replacement baby is born then an account is made in hospital itself, the vitals of that baby are uploaded to the net site and condition of baby like every disease, biopsy report etc. Then succeeding checkup report is also uploaded. If within the case of change of doctor needed, then this old reports in his

account are very useful to new doctor to diagnose well with good knowledge of history of patient, whereas the present system is lagging by this feature and matter of report is to be carried and some of reports could even be missing, patients most often fail to properly describe his problem.

2.   OBJECTIVES

1.   Internet of Things (IoT) is the emerging technology, which contains huge amount of smart object and smart devices connected to the internet for communicating with each other.

2.   In this project to analyze and compute the patient health we are using node MCU, which is the heart of this project.

3.   These smart devices are used to collect temperature, oxygen level, heartbeat information etc., which are used to evaluate the health condition of the patient.

4.   Developing wed application and hosting it into cloud.

5.   The final results are displayed on the website.

6.   These data results can be stored in data base centre location at any time.

3.   PROPOSED METHODOLOGY WITH BLOCK DIAGRAMS

Electronic Vital acquisition system is connected to the cloud through IOT devices the patient will have a novel account,which can be accessed by him through login into the web site which is formed for this project. the present paper specialize in that specialize in a generalized system within the country, which should be accessible to every and each person. for instance, if an individual having some health issues involves hospital using this method, if he gets his vitals checked, then it'll be uploaded to his account with the present time and date. thereupon data he will get treatment from Doctor. Even suggestions got from doctor are going to be uploaded to same account with time and date attached. the most advantage is storage of all the information of patient vitals in single unique account held by patient, the patient may not want to hold all the past or previous records which he/she got from different hospitals or diagnostics centers etc. This generalized the system will help the doctor to diagnose efficiently with less confusions like present health care system do. This Work focused on the giving solution to present patient monitoring system which creates ambiguity to both patients and Doctors i.e., maintaining all records present/past associated with a patient since his birth till his death are available at one website which helps lots. When a brand new baby is born then an account may be created in hospital itself, the vitals of that baby are going to be uploaded to the web site and condition of baby like all disease, biopsy report etc. Then succeeding checkup report will be uploaded. If within the case of change of doctor needed, then this old reports in his account are very useful to new doctor to diagnose well with good knowledge of history of patient, whereas present system is lagging by this feature and text of report is to be carried and a few of reports could also be missing, patients most frequently fail to properly describe his problem..
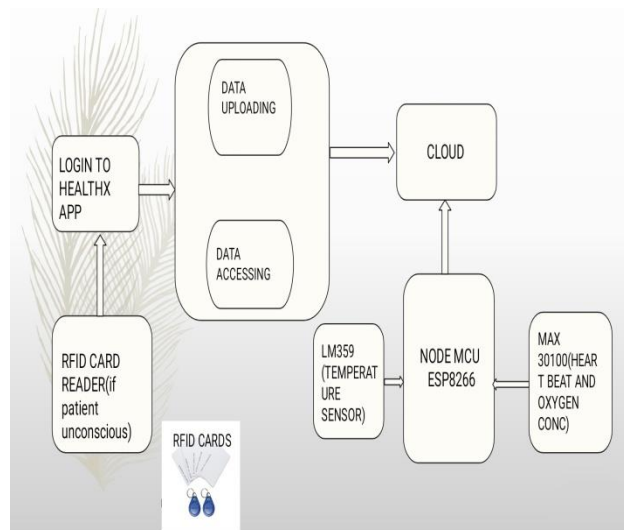
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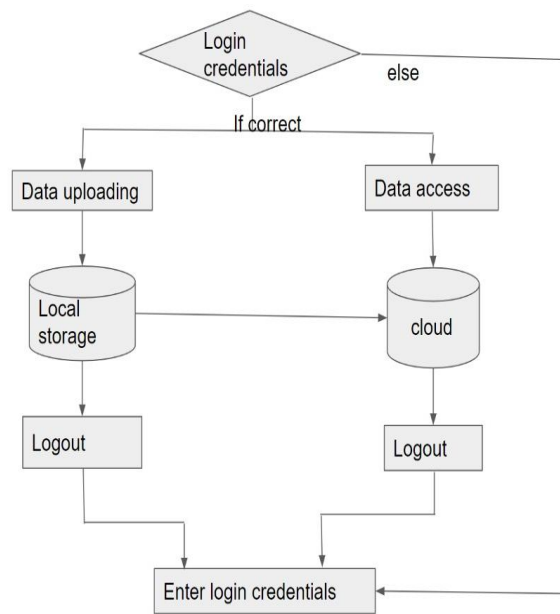
4. TOOLS THAT ARE GOING TO BE USED FOR THE PROJECT

Hardware Requirements:

Node MCU: it is An open-source firmware and development kit that helps you to the prototype your IOT product within a few Lua script lines[10]. and the sensors can also be effectively interfaced to this development board. The author has implemented the heart rate monitor prototype using NODEMCU which was motive to us to use its module for this proposed patient monitoring system [11]. It consists of the 10 GPIO, every GPIO can be PWM, I2C, 1-wire.

Max 30100: Author has assessed that Max 30100 it is an optical reflective type sensor which can be used to the acquire Heart beat rate and Oxygen level [12]. The MAX30100 operates from 1.8V and 3.3V power supplies and I2C compatible sensor module.

LM35 temperature sensor: LM35 is an 3-pin (Vcc, gnd,data)analog temperature sensor ,which can be used to the measure human body temperature, Ensured Accuracy at 25°C known from the datasheet a unique account in website particularly designed for this purpose [8].

5. SOFTWARE REQUIREMENTS

Bitvise SSH: Bitvise SSH Client is employed to initiate connections to SSH servers. it's usually used interactively, so it'll only run when a user runs it, but it may be launched unattended to run scripted commands or file transfers, or to take care of an SSH connection for port forwarding[6].

Amazon Web Services (AWS): we using AWS account because the cloud. Amazon web service is an internet platform that gives scalable and cost-effective cloud computing solutions. AWS could be a broadly adopted cloud platform that provides several on-demand operations like compute power, database storage, content delivery, etc., to assist corporates scale and grow[7].

Arduino IDE: The open-source Arduino IDE Software makes it easy to put in writing code and upload it to the board.

6. RESULTS

Patient will be monitored through the sensored device and the variations in the health conditions is alerted to the consult doctors with the patients previous health conditions, and the necessary treatment will be taken as soon as possible.

7. ADVANTAGES

1. Helps patients improve self management and care plan adherence.

2. Reduces patient's expenses and improves work productivity

3. Optimizes clinical staff efficiency and combats clinical staff shortages

4. Prevents the spread of infectious diseases and Hospital-Acquired Infections

5. IoT healthcare devices, wearable technology and data access allow physicians to monitor patients with greater precision and provide better-informed treatment.

6. IoT security systems increase safety for patients, physicians and staff.

7. IoT reduces costly visits to doctors and hospital admissions and makes testing more affordable.

8. IoT devices help track the administration of drugs and the response to the treatment and reduce medical errors.

8. APPLICATIONS

In the healthcare IT market, the remote patient monitoring devices had greatly decrease the burden of patients and the delivered high quality of care with lower risk. The most widespread and promising Application of Patient Health Monitoring System.

1. Maintain Diabetes

2. Reduce Risk of Heart Attack

3. Continuous monitoring: It can be used in hospitals on operated patients for monitoring their vital parameters

9. CONCLUSION

The system shows the excellent sensitivity towards measurement of the oxygen saturation level and pulse rate of the patient, while conducting experiment with healthy person it gives accuracy up to 95%. It has been cross verified using the pulse oximeter available in the market. The health care monitor blood oxygen saturation and pulse rate during the course of operation and in unconscious condition. This system can also be used to access the above said data for the doctor even when he is not in hospital and medicate the patient, furthermore the documents can be digitalized and accessed at any point of time. The proposed framework allows a person to digitally store all the documents/records regarding to health since the birth till death, for that options available in the website. The current application visualizes the real time data from the cloud. The application can include a model that can be trained on the go using the data from the cloud to predict the vitals of a patient for a future date. This helps the person identify any spikes in the vitals and accordingly precautionary measures can be taken. The advantage of future improvements in the field of IOT devices and advancement of medical equipment's can be integrated to this system to make the system general that can be used by any person. The location information of a user can be obtained by integrating global positioning system to this patient monitoring, which also helps in safety monitor for dementia patients. Till now we developed hardware and software use RFID card to login intoweb application and host into cloud. The aim in future development is to develop a mobile application, which will be helpful for the user to get the history records or reports easily from this application itself. This system can also use to access the above said data for the doctor even when he is not in hospital and medicate the patient, furthermore the documents can be digitalized and access at any point of time.

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