Design & Development of Health-Care Patient Monitoring System using Cloud Computing Environment

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ABSTRACT

This paper focuses on Design & Development of Health-care Patient Monitoring System using cloud Computing. In traditional method of patient monitoring the patients physiological information is on paper recorded by the nurses. As these nurses work on shift basis the latest details of the patient may not be completely explained from outgoing to incoming nurse. Many times the diagnosis is made based on manually recorded physiological information and the prescription was noted without concern with tolerant current medical records. With such conventional method diagnoses as well as the recommendation are noted against the law, which does not permit to do experts to have an easy entry to tolerant record. With such scenario it is bit difficult to diagnose the patient correctly for the proper treatment. This leads to the expansion of store and ahead at least under ICU environment. With such system the patient's normal functioning in the form of space-time records of biological event are seize, stored for as long as to the experts for unplugged.

To facilitate population living in rural as well as interior part of the country with portable battery operated Telemetric unit. To provide flexibility to such patients to have distant medical checkups as well as continuous patient monitoring. shows methodology and basic idea about how the sensors, actuators connected to processor which able to process the signal in proper graphical physiological parameters of patients displayed on monitor by Java Programming technique later its connected to wireless sensor network then sent to web server to the experts present on another side. During this COVID-19 pandemic situation, biomedical health-care Monitoring System is very helpful for those patients where vehicles, transportation and continuous monitoring is necessary

Keyword : - *Internet of Things (IoT) 1 , HMIS (Hospital management integrates service)2 Cloud Computing 3*

1. Introduction

Internet of Things (IoT) connects a system of interrelated, .anyone, anything, any service, and any network. IoT is used to globalize the patient data. IoT is useful in many applications such as health care, water level indicator, security, HMIS (Hospital management integrates service) etc. Monitoring of biological parameters such as body temperature and ECG/heart rate are acquired using low power sensors etc. These signals are properly processed by an ultra-low power processor before the transmission to node unit. [12]

In IoT based patient monitoring system, the essential framework of tolerant fitness ware sent to cloud computing technology using network connectivity.

Applications related to Health- care, utilizing vital body sensors that help to generate a bulk of data which are needed to be stored for processing in upcoming years. Cloud computing technology combines with the (IoT) Internet of Things concept and helps for maintaining and processing of vital data on-line instead off line .Software related low power design approach with a case study of low power/energy i.e. power critical, biomedical application low power telemedicine system is then analyzed. [2] IoT is used to Globalize the patient data. It is useful in many applications such as health care, water level indicator, security, HMIS (Hospital management integrates service) & Patient health-care framework (PHF) etc. [2]. The patient's physiological data is sent to faraway thus, an examiner/doctor can able to see these details from nevertheless of location. Doctors can take the reference of these studies, case study of the patient while advise the therapy, medicines to the tolerant. Patient's real time health status can be stored in the cloud. Our aim is to develop advanced Real time telemedicine system by using an ultra-low power processor and low power biomedical sensors. To Increase battery life using appropriate circuitry & proper coding technique. Validation of designed system for measurement of temperature, heart beats, blood pressure and ECG. [2].

To facilitate population living in rural as well as interior part of the country with portable battery operated Telemedicine unit. To provide flexibility to such patients to have distant medical checkups as well as continuous patient monitoring necessary in current pandemic situation COVID-19. The Patient health care information is sent to Internet location so that experts can able to see this contents from anywhere in the world, Patients real time health status can be saved in cloud Environment and easily Experts can take the prints or digital records in any memory devices available it also prevents data loss or corruption of data although in case of IOT ,cloud computing is more authentic with very few chances of data loss .Proposed expert system shows methodology and basic idea about how the sensors, actuators connected to processor which able to process the signal in proper graphical physiological parameters of patients displayed on monitor by Java Programming technique later its connected to wireless sensor network then sent to web server to the experts present on another side.

In review paper[1] deliver the idea about wellness system which consists of a temperature sensor, pulse rate and ECG sensor, MSP432, Power supply, IoT module (node MCU) and the receiving section i.e. mobile or laptop.


Figure 1.1: Traditional patient monitoring

In traditional patient monitoring system all hospital staff members collect the data by traditional method like record the temperature of patient, heart beat,routine check up by pen board method which is attached with respective patient bed

With static mode. Although nurses would also look into that data if shift wise nurses like morning,afternoon,evening data is recorded same time if communication is not done between previous nurses present on current duty then due to lack of upgradation of data is not done then expert ,doctors not given updated record of patients so this method is not reliable where multiple patients are there and lack of doctors .

So new research has to be taken for future advancement in hospital management .

2. System Block Diagram
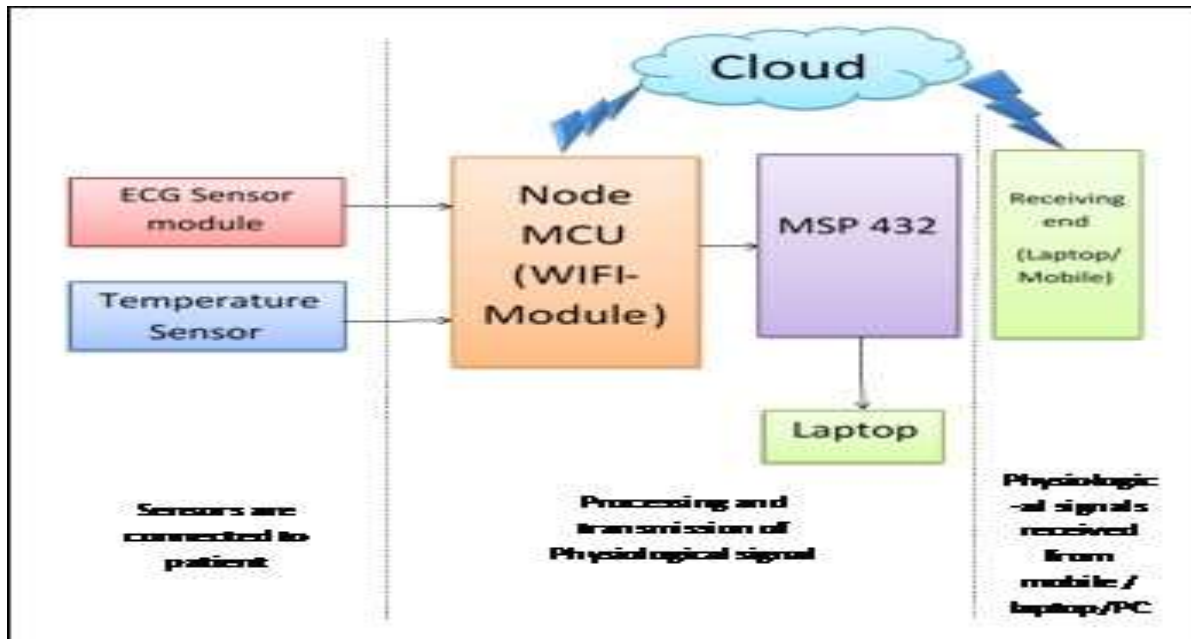
During my research work my observation found, health care system is implemented to monitor basic physiological parameters of the patient using Internet of things (IoT) and to improve the system performance with respect to power consumption, speed, and cost of the system. The block diagram consists of ECG sensor module, temperature sensor, MSP432 micro controller and Wi-Fi module at the transmitting end and Laptop/PC/Mobile at the receiving/examiner end.[13] Above setup is considered for later implementation.

"The one wire digital thermometer DS18B20 takes body temperature directly in the digital form so is fed directly to the processor unit." and "The AD8232 is an integrated ECG signal conditioning unit with 3-leads arrangements and is used to acquire an ECG/Heart rate.". The small voltage ECG signals in analog form are converted into digital form with the help of an inbuilt ADC "The converted digital ECG signal is fed to MSP432 MCU.".MSP432 after due processing the temperature and ECG/heart rate signals puts them on to the UART pin for their transmission to the Node MCU. [13]

These signals are then transmitted to the cloud where they are stored as data base of the patient. "The receiver (doctor/examiner) can access this data from the cloud by using Wi- Fi, Internet etc."There are the different ranges of body temperature which varies according to their ages are given in table I Standard body temperature ranges of patient

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Normal Body Temperature	
Age in Years	**Temp. in ^{0}C**
0 – 2	34.4 – 38.1
3 - 10	36.1 – 37.8
11 - 65	35.9 – 37.6
>65	35.8 – 37.5

TABLE1.2 – STANDARD BODY TEMPERATURE RANGES OF PATIENT

Above table shows the experimental results of the patients body Temperature from various common age groups

then it is recorded and compared with the doctors reference values and send along with few more parameters like ECG Sensor modules and results is combined and ready to send on cloud of doctors/ Experts database for further analysis and future treatments. The digital sensor for body temperature measurement provides compatible function For increasing temperature and better combination for IOT and cloud system.

3. Logic Flow Diagram for software support System.[16]
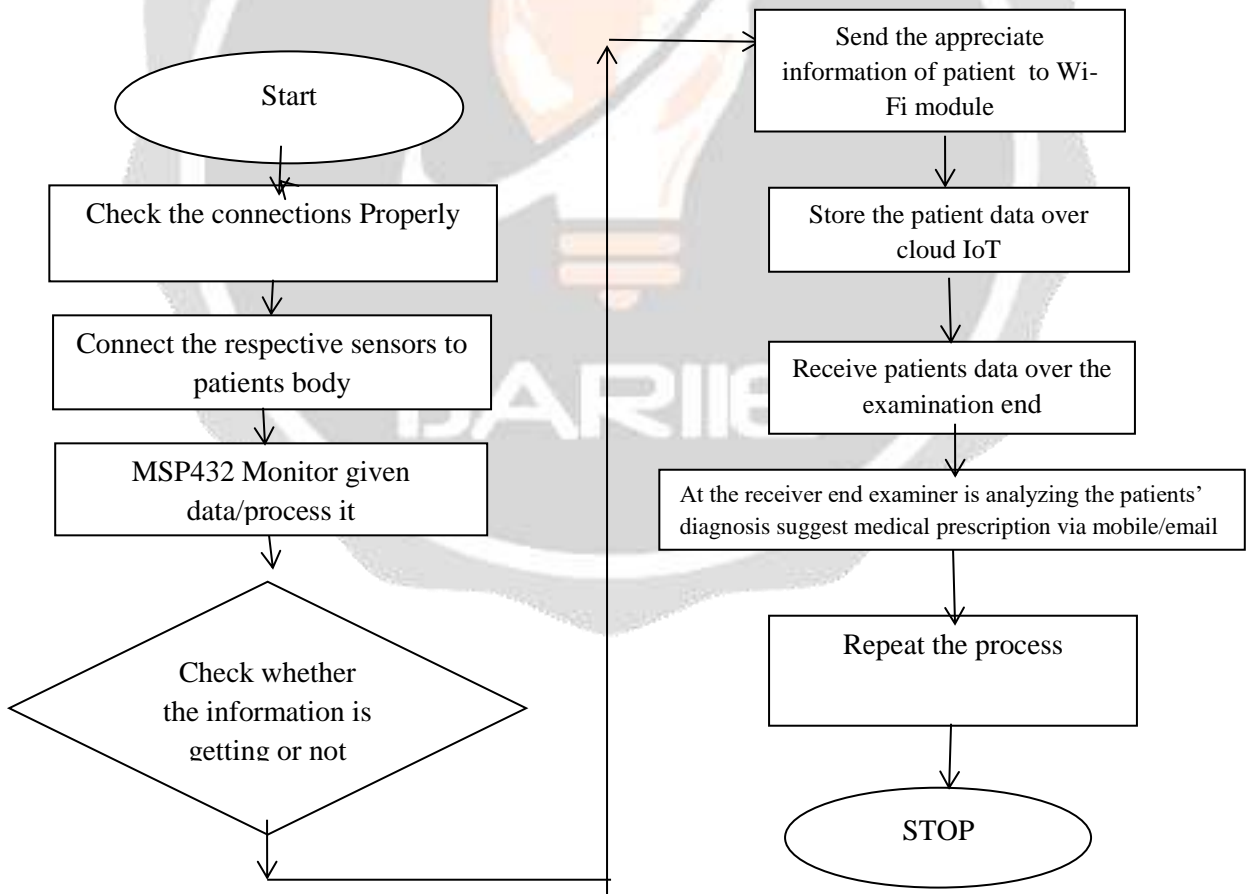
4. IoT with cloud server

Nowadays recent advances in IoT and cloud computing, wireless sensors networks it is very easy to monitor changes in physical parameters & diagnosis the patient remotely without visiting the patient many times, IoT- based health-care systems found new ways of innovation. The cloud is the place where patient data is processed and stored wisely for next use.[14] Below figure shows [15]
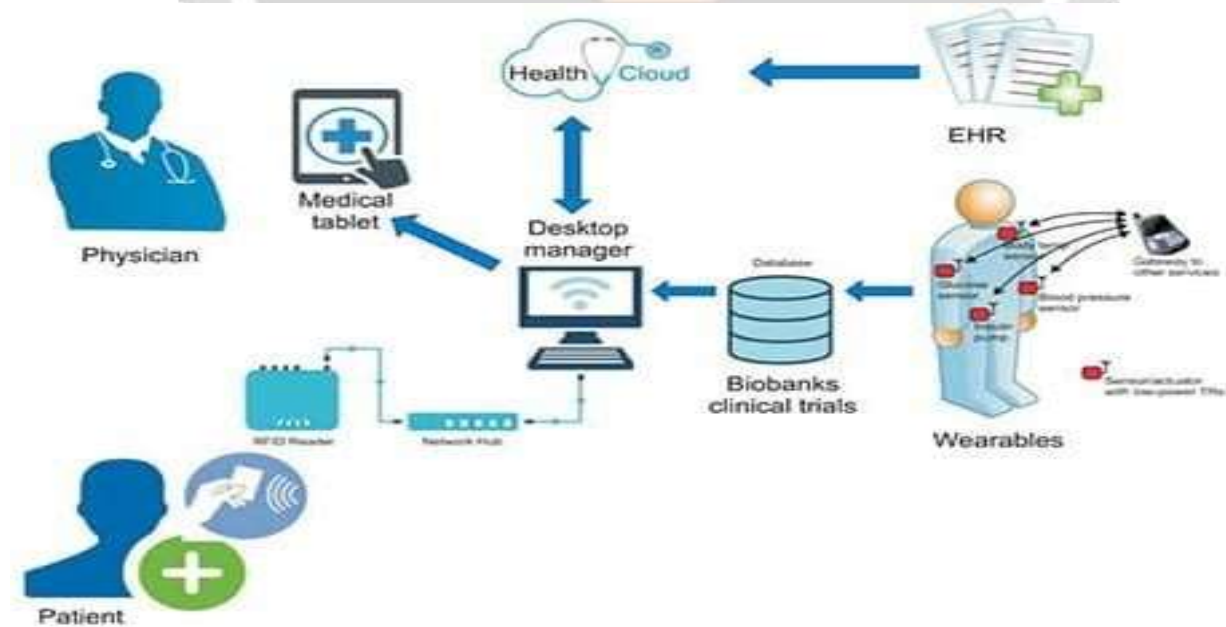

Figure-3

Figure-4

8. Conclusion

The components which are selected above used to achieve high speed signal processing System .the processor and sensor are low power consumption to avoid cloud server delay There is a possibility of data loss. But as the temperature sensor transmitted and received in digital values data loss situation is handled. There are many more signals can be used on same system and also possible to check more than one patient at remote location on
this system .HTML Java script programming language used to create database at the receiving End .
Processor analysis is carried out separately from which it is concluded that with sequential codes the current extracted is reduced to increase the battery life. Multiple patients will be examining by data based information saved in display monitor then store in cloud. IoT with cloud environment is optimize solution so cloud environment/computing with IoT both gives high performance In data management emphasize quality of each other. Java Script is programming languages which are used to create one data base and with the help of that data patient information can be sent
remotely using ideal combination of IoT and Cloud Environment. The components which are selected above used to achieve high speed signal processing System .the processor and sensor are low power consumption to avoid cloud server delay There is a possibility of data loss. But as the temperature sensor transmitted and received in digital values data loss situation is handled. There are many more signals can be used on same system and also possible to check more than one patient at remote location on this system .HTML Java script programming language used to create database at the receiving end In today's pandemic situation after post COVID recovery above stated research work is important, where beds, live essential services are not at all available when it is needed to
many tolerant in current situation such portable monitoring expert system is very useful.

Acknowledgment

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