

Smart Health Care System

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I. INTRODUCTION

Now a days Internet of Things is used for monitoring the patient efficiently in the ICU. In this paper we are proposing a smart IOT based ICU patient monitoring system. Basically we are using IOT and digital controller to create a smart patient monitoring system. With this we are using temperature, heart rates and blood pressure sensors to monitor the vital parameters of a patient. Diastolic pressure, systolic pressure and heart rate can be measured using the blood pressure sensor. If any of these parameter goes beyond a certain limit, an alarm buzzer is turned in to notify the concerned person.

Cloud Computing provides an alternative to the on premises data centre. With an on premises data centre, we have to manage everything, such as purchasing and installing hardware, virtualization, installing the operating system, and any other required applications, setting up the network, configuring the firewall, and setting up storage for data. After doing all the set-up, we become responsible for maintaining it through its entire life-cycle.

The objective of this paper is as follows

The main aim of Smart Patient's Health Care System is to give warning of early or dangerous deterioration.

II. METHODOLOGY OF PROJECT

Following are the steps:

Arduino is working as a main part of the system. It works or gives I/O instructions to respected hardware and software.

ECG stands for Electro Cardio-graphy. It counts the heart beats of patient.

EMG stands for Electro Myo-Graphy. It is used to count the muscle power of patient.

Cloud Computing with Google Fire-base provides tools to grow your app and business, for startups & global enterprises.

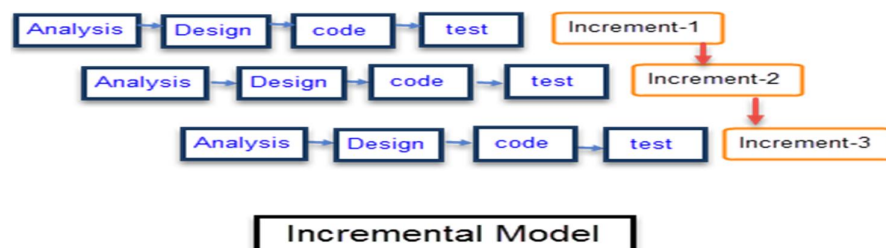


Fig 1. Incremental Model

III. IMPLEMENTATION

A. Software Implementation

1. Arduino with Embedded C: - The language used for Arduino is called processing., which is similar to the C language.
2. Cloud Computing with Google Fire-base: - Fire-base is used to create mo-bile and web applications.
3. Android Application with MIT Inventor 2.: -

MITApp Inventor is a web appli-cation inte-grated development envi-ronment originally provided by Google, and now maintained by the Massa-chusetts Institute of Technology. It allows new-comers to computer pro-gramming to create application software(apps) for two operating systems (OS): Android, and iOS, which, as of 8 July 2019, is in final beta testing. It is free and open-source software released under dual licensing: a Creative Commons Attribution Share Alike 3.0 Unported license, and an ApacheLicense2.0forthesourcecode

B. Hardware Implementation

1. Arduino + ESP 8266 (ESP32): -ESP32 is a series of low cost, low power system on a chip micro-controllers with inte-grated Wi-Fi and dual-mode Blue-tooth. Features of the ESP32 include the following.

Features:-

- Processors: operates at 160 or 240 MHz .It is a ULP co-processor.
 - Memory: 320KB RAM,448KiB ROM
 - Peripheral interfaces: 34*programmable GPIOs.
2. Power Supply:- It provides Supply to our system.
 3. ECG (Electro Cardiography) Sensor:- Heart diseases are increasing day by day which is a big problem and must be controlled to save human beings. We cannot take heart disease lightly. If we monitor the ECG signal at initial stage then this disease can be prevented. By analyzing or monitoring the ECG signal at the initial stage this disease can be prevented. So here in this paper we are presenting a system with AD 8232 ECG –Sensor.ECG gathers electrical signals from human heart. The electrical activity of heart can be charted as an ECG.(Electrocardiogram).By using ECG we can diagnose different heart diseases. Here in this paper we are interfacing AD8232 ECG sensor with Arduino and observing ECG signal on a serial plotter.
 4. EMG (Electro Myography) Sensor:- Electromyography sensors, also known as EMG sensors, measure small electro- myographic signals generated by your muscles as yo u move them. The muscle movement includes clenching your fist, lifting your arm, and even moving a finger. Since EMG sensors diagnose various degenerative nerve and muscle -related conditions, it is a valuable asset in the medical field.

Features:-

- Wearable Design
- Operates on 3.1V to 5.9V
- Raw EMG is expan-dable via shi-elds
- It has LED indicators
- Specially desi-gned for micro-controllers
- Adjus-table Gain

Electro pad:- Trans-cutaneous electrical nerve sti-mulation (TENS) is a method of pain relief involving the use of a mild ele-ctrical current. ATENS machine is a small, battery-operated device that has leads connected to sticky pads called ele-ctrodes. We can attach the pads directly to our skin.

Testing:-

Unit Testing

Basically used to check the small parts of function ,procedures or interfaces either they are working properly or not. So that we can use them for particular application.

Integration Testing

Here we are combining diff-erent units their inter-actions and then testing, the way sub-system suniteintoone common system, and code compli-ancewith therequire-ments.

ValidationTesting

This testing is done to check either tested and deve-loped soft-ware satis-fies the client/user needs. A crucial testing for all functionalities of an application is done here.

SystemTesting

Once our product is ready then it must pass through the system testing. This testing comes under the category of black box testing ,where knowledge of the code is not required and total testing is implemented by testing team.

Test Result

TABLE I: SAMPLE TEST RESULTS PATIENT'S DATA DISPLAYING ON MOBILE APP

Steps	Description	Expected Results	Actual Results	Status
1	Assembly of electronic equipments	Successfully Assembled	Successfully Assemble	PASS
2	Checking program compile or not	Compile successfully	Yes its compiled	PASS
3	Selection of port number and Buderate	Select the port number and Buderate	selected	PASS
4	Uploading the program in ESP32	Program Uploaded	Done Uploading	PASS
5	Connecting to internet	Successfully connected	connected	PASS
6	Read from Heart beat Sensor	Successfully read	Successfully read	PASS
7	Read from muscle sensor	Successfully read	Successfully read	PASS
8	Display the reading of Heart beat and muscle power on monitor	Successfully Displayed	Successfully Displayed	PASS
9	Uploading sensor value to cloud	Successfully uploading	Successfully uploading	PASS
10	Receiving sensor value on Android Application via cloud service	Successfully receiving	Successfully receiving	PASS
11	Showing graph on android application as per cloud service	Successfully showing	Its showing	PASS
12	Giving alert according to limits	Alert successful	Alert successful	PASS

IV. CONCLUSION

Here we are proposing a system which will be perfect and when the trans-fer of data is fast,fea-sible and importantly rel-iable. So, now onwards everybody will use this super technology.Smart Health Care system enables doctors to collectpatient data through different sensors from patients at location ABC and transfer this information to location XYZ. That data can be used by different clinicians to manage or give further prescription to their patients.

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