

IoT POWERED INTEGRATED SMART HOMES WITH PATIENT MONITORING AND ELDERLY HEALTH CARE

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Abstract - Today's growing population in developing countries like India compels researchers to develop novel methods for tracking ongoing health tests. For doctor visits, it has become required to frequently travel to hospitals, which is now a time-consuming and expensive process. To solve this problem, a method was proposed that would use an IoT device to transmit data about the patient's temperature and heart rate to a web server. Using the Internet of Things, the doctor can keep an eye on the patient's condition on his smart phone. The doctor can also store the patient's medical history on a web server and access it from any location at any time.

The proposed system's plan to send email and SMS alerts when any of the health parameters exceeds the threshold value is another advantageous feature. The notification system will keep the relevant authority informed of the circumstance. The Blynk application is implemented in this system to monitoring the patient regularly.

Key Words: IoT, Health parameters, Threshold value, Smart phone, Blynk app.

1.INTRODUCTION

Medical electronics sensors, or E-sensors, are a vital part of healthcare facilities today. One of the significant developments in the scientific sector is the monitoring of patient electronics-health (E-health). Here, the patient's body temperature, pulse, and heart rate are each monitored using a sensor that measures temperature and heartbeat. As a result, just as a thermometer is used at home to check body temperature before a doctor's appointment, This proposed model (devices) can be used to check the patient's health status at home as first aid information to the concerned patient. Otherwise, visiting doctors or diagnostic centres is now very expensive from a financial perspective.

To minimize this situation, this system describes the design of an Arduino microcontroller based advanced/high performance integrated health portable monitoring system. Like one parameter say Heart rate of the patient is measured by placing the index finger on IRD (Infra-Red Device) sensor and the pulse rate is then

measured. The Heart Rate, and the Body Temperature information is then sent to the web server through IoT.

2. METHODOLOGY

Home automation/ Smart home entails delivering customers smart lighting game plans, improved essentiality conservation, and perfect use of imperativeness while dependably bringing control of operating the home electrical equipment to the tip of the finger. In addition to referring to fundamental lighting procedures, the idea also has something to do with creating a unified home security system and having universal control over home security. The Internet of Things based Home Automation system provides plans to control every home equipment via web protocols or cloud-based processing. In comparison to wired frameworks, the IoT-based home automation structure gives a tremendous level of flexibility. It comes with various interesting features like ease of usage, effortlessness of-foundation, minimal use of diverse wires or free electrical affiliations, straightforward accuse acknowledgment and actuating, or with basic flexibility.

2.1 SYSTEM IMPLEMENTATION

Proposed system

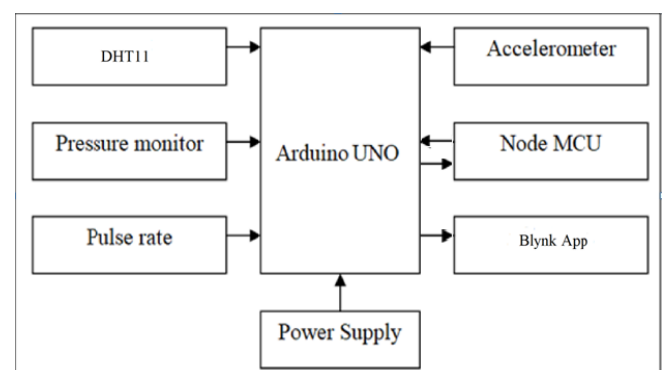


Fig.1. Block Diagram of the Proposed System

Working Function of the Proposed System

One of the IoT applications for tracking patient health is patient monitoring. By enabling real-time health monitoring, the internet of things increases the efficiency of medical equipment. Using the Internet of Things, the doctor may keep an eye on the patient's condition on his smartphone. The doctor can also store the patient's medical history on a web server and retrieve it from any location at any time. Temperature, blood pressure, sugar levels, and other data are collected using these smart devices in order to assess the patient's health. The difficult task in the IoT is communicating the acquired data to the doctor, making precise decisions based on the data collected, and informing the patient. This system suggests the patient with medical care and next step to be followed in case of critical situation.

The suggested system offers a novel method for PHMS implementation: an Internet of Things (IoT)-based Patient Health Monitoring System using Arduino. The Arduino ATMEGA 328P microcontroller processes the DHT 11 sensor, Pressure sensor, Pulse rate sensor and accelerometer generated data. The ESP8266 (Node MCU) offers the best ability to integrate Wi-Fi functionality into other systems.

A System On Chip (SoC) with integrated TCP/IP is the Node MCU board. Node MCU can act as a server, client, or both in a network. Node MCU operates as a host in server mode and makes requests to the server in client mode. Additionally, Node MCU features input/output pins that may be linked to sensors or actuators, allowing the server to receive data from the sensors and use it to activate the actuator. It provides a full and independent Wi-Fi networking solution and may be utilized to host the program or offload Wi-Fi networking duties to another application processor. The patient is also informed by the PHMS of any potential precautions that should be taken. PHP and My SQL Server and Blynk application are used in the system's software side.

Blynk Application

Blynk is an Internet-of-Things platform for iOS or Android smart phones that allows users to remotely operate devices like Arduino, Raspberry Pi, and Node MCU. Using this application, you can compile and provide the right address on the various widgets to construct a graphical interface or human machine interface (HMI). For use with the Internet of Things, Blynk was created. It can store data, visualize it, display sensor data, remotely operate hardware, and perform many other fascinating things.

The platform consists of three main parts:

Blynk App: It allows you to create amazing interfaces for your projects using various widgets which are provided.

Blynk Server: It is responsible for all the communications between the smartphone and hardware.

Blynk Libraries: It enables communication, for all the popular hardware platforms, with the server and process all the incoming and outgoing commands.

The process that occurs when someone presses the Button in the Blynk application is that the data will move to Blynk Cloud.

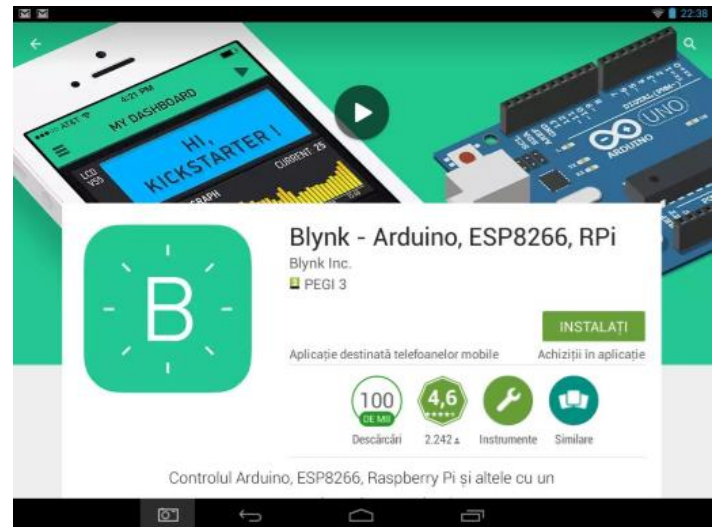


Fig.2. Blynk Application

3. CONCLUSIONS

Home automation / Smart encompasses the utilization of at least one PC to control fundamental home capacities, even remotely. An automated home is called a smart home. Home automation can incorporate the booking and programmed operations of water sprinkling, warming and cooling, window covers, security frameworks, lighting, and nourishment arrangement machines.

This system work analyzed Microcontroller based health monitoring system using IoT. Any abnormalities in the health conditions can be known directly and are informed to the particular person through via internet. The proposed system is simple, power efficient and easy to understand. It acts as a connection between patient and doctor. The hardware for the project is implemented and the output results are verified successfully.

The system's current iteration provides two parameters—heartbeat and temperature—on the internet. However, there is still potential for development. It is also possible to assess a few other factors, such as blood pressure, glucose levels, BMI (body mass index), waist circumference, etc. The patient's full health status will then be documented and easily accessible online. so that it will be much simpler for the doctor to periodically check on the health of their patients and give them health-related advice.

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