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IOT Based Patient HealthMonitoring

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ABSTRACT: Healthcare is given the extreme importance now a- days. In this aspect, an IoT based health monitoring system is the best solution. Internet of Things (IoT) is the new revolution of internet which is the growing research area especially in the health care. With the increase in use of wearable sensors and the smart phones, these remote health care monitoring has evolved in such a pace. IoT monitoring of health helps to get a proper diagnosis of the state of health, even if the doctor is at far distance. In this paper, a portable physiological checking framework is displayed, which can constantly screen the patient'sheartbeat, temperature and other basicparameters of the room. We proposed a nonstop checking and control instrument to screen the patient condition and store the patient information's in cloud utilizing Wi-Fi Module. A remote health monitoring system using IoT is proposed where the authorized personal can accessthese data stored using any IoT platform and based on these values received and can diagnoses from a distance.

KEYWORDS: Healthcare Monitoring, IOT Devices, Wearable Gadgets, Sensors, Data, HealthInformation.

I. INTRODUCTION

The healthcare industry is changing rapidly, with the advent of new technologies and innovations being introduced. In the past decade, the industry has seen a rapid increase in the utilization of wearable gadgets forpatients, to monitor their health and provide better care. The use of these gadgets has revolutionized the healthcare industry, enabling healthcare professionals sprovide better care.

Wearable gadgets have the potential to revolutionize the healthcare industry by providing better care forpatients and making healthcare more efficient. By providing real-time data, healthcare professionals canquickly identify medical problems and provide better treatment for patients. The use of wearable gadgets canalso reduce the cost of healthcare, as it eliminates the need for frequent doctor visits. The use of these gadgets can also enable healthcare professionals to provide preventive care to patients, as they can detect health problems before they become serious.

Remote Patient Monitoring arrangement empowers observation of patients outside of customary clinical settingwhich expands access to human services offices at bring down expenses. The objective of this project isthe design a smart patient health tracking system that uses sensors to track patient health and uses internet to inform about their health. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing
procedure.

II. RELATED WORKS

IoT is fast becoming popular in the healthcare sector, amongst others, with the ability to cost-effectively and efficiently gather critical data for processing though establishing innovative cyberphysical systems. In healthcare, this technology – together with machine learning and computational intelligence techniques – provides for medical service innovation and theintroduction of paradigm shifting medical frameworks.

In fact, there is growing research and development in this area towards harnessing the aforementioned technologies to collate and fuse data from different streams to provide remote diagnosis, patient supervision and assistive treatment etc. [2, 3]. Thereare some recent works in the areas of application related to the proposed system. An example of this is presented in [1], which proposes an advanced IoT based system that combines remote health monitoring, home automation and security. The system monitors the heart rate, blood pressure, respiration rate, body temperature, body

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movement.

Similarly, IoT-based systems which utilize mobile and wearable technologies are proposed in [4] and [10] for collection and interoperation of data. The data are collected primarily through wearables, but could also include other sensor data, to provide healthcarepractitioners with physiological and environmental information of the person - in their natural living environment. In fact, the system proposed in [10] is based on wireless sensor networks, and is specifically intended for supervision and monitoring of pregnant women. It functions primarily on wearables or wireless body sensor networks for relaying information to the medical staff.

Most of the proposed and implemented systems are a bit costly compared to our social and economical context. In some cases, a wearable device has been able to transmit location information alone. Whereas other systems used infrared signals or tracked the log of the doors of the house to provide location specifically. Use of sensors was finalized according to the requirements of the system.

III. PROPOSED SYSTEM

The healthcare industry is at an exciting crossroads with the emergence of new technologies. Wearable gadgets for patients have become increasingly popular in recent years, offering an unprecedented level of convenience and accuracy in the delivery of healthcareservices.

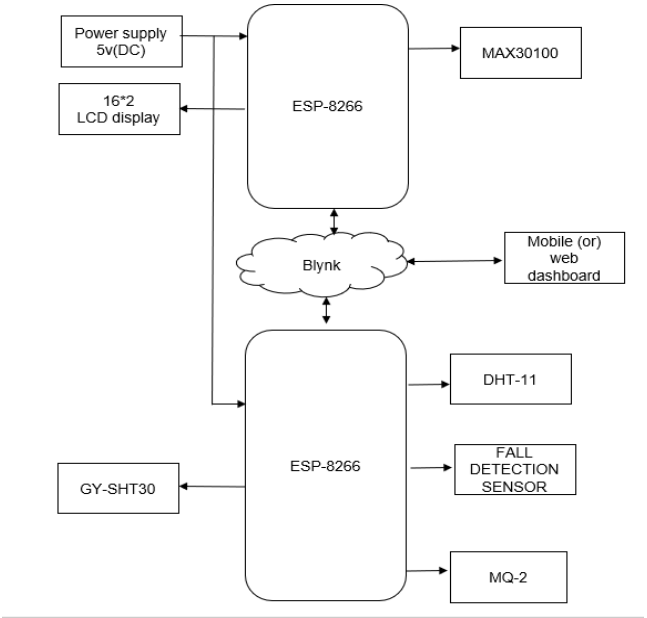

Fig 1 Block Diagram of the Proposed System

HEART BEAT AND PULSE OXIMETOR SENSOR

The MAX30100 is an integrated pulse oximetry and heartrate monitor sensor. Heartbeat sensor is utilized togauge the computerized yield of a heart beat for every moment. It comprises of two LEDs discharges red light and other one radiates IR light where as to quantify thebeat rate and IR light is required as the heart contract and afterward unwinds and the assurance of heartbeat rate by expanding or diminishing of oxygenated blood. SPO2 sensors are peripheral capillary oxygensaturation sensor which measures the level of oxygen saturation of the patient blood. This sensor has an infrared light source and photo detectors to transmit light

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Fig 2 Heart Beat and Pulse Oximeter Sensor

TEMPERATOR SENSOR

GY-SHT30-D Digital Temperature and Humidity Sensor. GY-SHT30-D module for the digital measurement of temperature and relative humidity thatequips the known sensor SHT30. It also offers new features, such as improved signal processing and two distinct user-selectable I2C address. Each SHT3x is individually calibrated and the calibration coefficients are programmed into an OTP memory on the chip. The compact size and low power consumption make SHT30 the ultimate choice for even the most demanding.

Fig 3 Temperature Sensor

DHT-11

The DHT11 is a commonly used Temperature and humidity sensor that comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data.It measure the surrounding temperature and humidity of the patient.

Fig 4 Temperature and Humidity Sensor

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FALL DETECTION SENSOR

Fall alert devices contain a sensor called a triaxial accelerometer, which measures speed, distance, and direction.The accelerometer is programmed to look forthe pattern of movement consistent in most falls: rapid downward acceleration followed by no movement.

CO SENSOR

The MQ2 gas sensor operates on 5V DC andconsumes approximately 800mW. It can detect LPG, Smoke, Alcohol, Propane, Hydrogen, Met hane and Carbon Monoxide concentrations ranging from 200 to 10000 ppm.consumption with a combination of several proprietarytechnologies. The power-saving architecture features three modes of operation: active mode, sleep mode anddeep sleep mode. This allows battery-powered designs to run longer.

Fig 6 ESP-8266

BLYNK APP

Blynk responsible for all the communications between the smartphone and hardware. You can use the Blynk Cloud or run your private Blynk server locally. It'sopen-source, could easily handle thousands of devices.

IV. RESULTS AND DISCUSSION

This section explicates the experimental outcomes of the developed system which collects data from sensors.

Fig 5 CO Sensor

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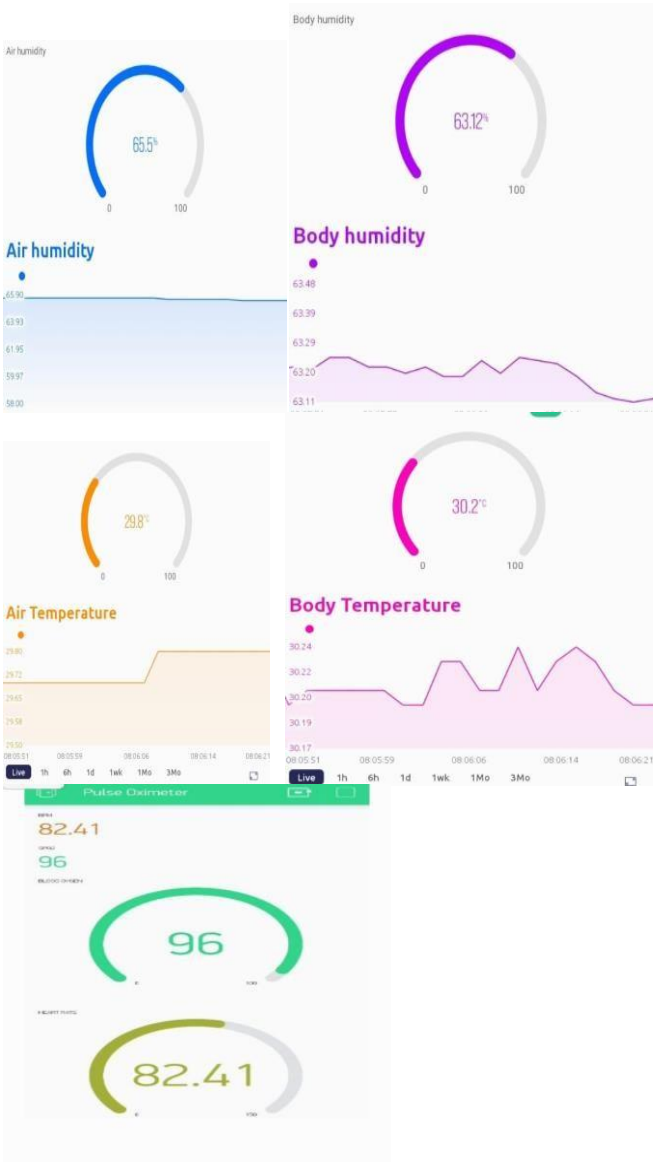

ESP-8266

Engineered for mobile devices, wearable electronicsand IoT applications, ESP8266EX achieves low power
The preliminary testing of both the wearable device and the room node – with the sub-nodes – was conducted using the microcontrollers' serial monitors, to ensure correct retrieval of all sensor data in real- time. Thereafter, the incoming data fields on the Blynk platform were tested to ensure that the measured sensor data were correctly transmitted to cloudplatform in real-time

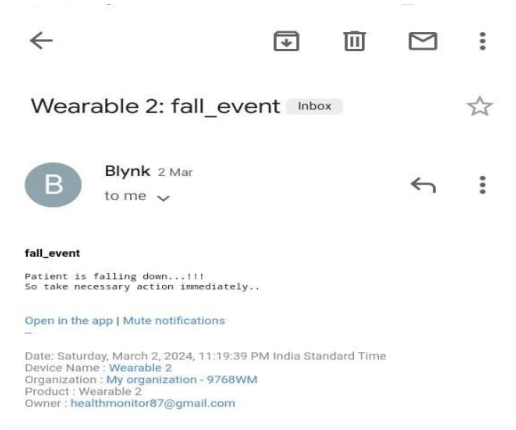

Fig 8 Experimental test results for system alert notifications sent via Email

V. CONCLUSION

This system introduces an IoT based health care monitoring system for patients. The proposed methodology work analyzes the variable health parameters values which are taken from sensors. Several precautions have been taken to ensure appropriate therapy, including regular monitoring of pulse rate, SpO2 level, and temperature. This system gives better and effective healthcare services topatients and the information is collected through internet and communication devices in turn connected to cloud services..By using this method where the doctor can check his patient anywhere, anytime. Emergency alert message will be to predefined email id,if once the obtained current value is exceed or deceed the threshold value. This system is helpful for patients who need healthcare services at 24/7.

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