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Intelligent Patient Monitoring and Guidance System using IOT

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Abstract: ***The applications of Internet of Things are parking at smart way, automatic home control, smart city, smart environment, industrial places, agriculture fields and health monitoring process. One such application is in healthcare to monitor and care taken the patient health status Internet of Things makes medical equipment's more efficient by allowing real time monitoring of patient health. We have proposed a system which is very helpful in monitoring & updating the patient health status in a graph report format to the doctor via PC or Desktop. We also developed a WLAN Technology for the faster communication. Thus we have implemented a PULSE MONITORING for continuous pulse rate measurement for an Hours/Day is done by Blood pulse sensor. Likewise Body Temperature has been noted by using Temperature Sensor with help of ADC converter. A Raspberry PI module picks up the sensor data and sends it to the network through Wi-Fi and hence provides real time monitoring of the health care parameters for doctors. These data and record can be accessed anywhere and anytime by the doctor. The proposed design of the Project is to report a clear notification of patient database health status in graphical form to the doctor side.***

Keywords: Raspberry Pi board, Pulse sensor, Temperature sensor, ADC convertor, Internet of Things.

I. INTRODUCTION

Advances in information and communication technologies have led to the emergence of Internet of Things (IoT).In the modern health care environment, the usage of IoT technologies brings convenience of physicians and patients, since they are applied to various medical areas (such as real-time monitoring, management, and healthcare management).The IOT has become one of the important parts of our daily life. It has changed how people live, work, play and learn. Internet serves for many purpose educations, finance, Business, Industries, Entertainment, Social Networking, Shopping, E-Commerce etc. The next new mega trend of Internet is Internet of Things (IOT).

Visualizing a world where several objects can sense, communicate and share information over a Private Internet Protocol (IP) or Public Networks. The interconnected objects collect the data at regular intervals, analyses and used to initiate required action, providing an intelligent network for analyzing, planning and decision making..It is generally considered as connecting objects to the Internet and using that connection for control of those objects or remote monitoring. The IOT definition was referred only to part of IOT evolution considering the machine to machine market today. But actual definition of IOT is creating a brilliant, invisible network which can be sensed, controlled and programmed. The products developed based on IOT include Embedded technology which allows them to exchange Information, with each other or the Internet and it is assessed that about 8 to 50 billion devices will be connected by 2020.Since these devices come online, they provide better lifestyle, create safer and more engaged communities and revolutionized healthcare. The entire concept of IOT stands on sensors, gateway and wireless network which enable Users to communicate and access the Application/information thus IOT offer more prominent guarantee than in the field of health awareness. As a saying goes "Health is wealth" it is exceptionally crucial to make utilization of the innovation for better wellbeing. Consequently it is obliged to add to an IOT framework which gives secure health awareness checking. So outlining medicinal services framework where client information is received by the sensor and sent to the cloud through Wi-Fi and permitting just approved clients to get to the information.

II. LITERATURE SURVEY

Persistent aberration of heart rate may be an indication of serious health complication such as coronary Artery Diseases, Tachycrdia and Hpertension.Hence heart rate monitoring is extremely essential in order to keep track of one's heath. Unlike traditional method

like Electro-cardiogram which are complicated and non-portable, there is a need for a simple and affordable heart rate measuring device. This paper expounds the design and working of a device based on principle of Photoplethysmography.It is an economical user friendly and low power consuming device. The performance of the device was evaluated and its result were compared with the reports of conventional heart rate monitor, deviation was absorbed minimal.

In their project they monitor the heart beat rate of the user by pulse sensor and when the pulse rate reach above or below the given threshold value. Then Heart rate is displayed in the LCD it then proceeds to alert by an alarm and SMS sent to the mobile phone of the medical expert or health personnel, if and only if the threshold value of the heartbeat rate is maximally exceeded.

This system designed and developed a reliable, energy efficient for sending alert message to the concern person when person in coma. The system used smart sensors like flex sensor, MEMS. Body sensor and eye blink sensor. Whenever person moves any finger, any eye lid and tilt the body towards right or left side, the flex sensor, eye blink sensor and MEMS sensor detects the movement respectively, and alert to the concern person through GSM.It send message through the GSM modem to the concern person showing the status of the body. The system monitor physically 24*7 for getting the improvement of comatose patient for further treatment.

According to this project, we reviewed the current state and projected for integration of remote health monitoring technologies into the clinical practice of medicine. Wearable sensors, particularly those equipped with IoT intelligence, offer attractive options for enabling observation and recording of data in home and work environments, over much longer durations than are currently done at office and laboratory visits. This treasure trove of data, when analyzed and presented to physicians in easy-to-assimilate visualizations has the potential for radically improving healthcare and reducing costs. We highlighted several of the challenges in sensing, analytics, and visualization that need to be addressed before systems can be designed for seamless integration into clinical.

III. METHODOLOGY

The main purpose of this study is to remote the cardiac patients in getting latest healthcare services which might not be possible due to low doctor-to-patient ratio. Developed monitoring system is evaluated for the performance. It shows reliable and helpful at low cost of high speed for data security. In addition, the developed system is equipped to generate warning messages to the doctor and patient under critical circumstances. The block diagram of the proposed system is shown in fig 1 and the Developed prototype is shown in fig 2.

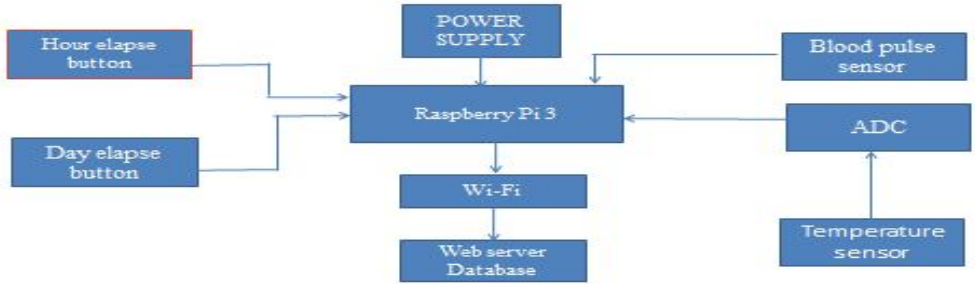

Fig 1: Block diagram of proposed system

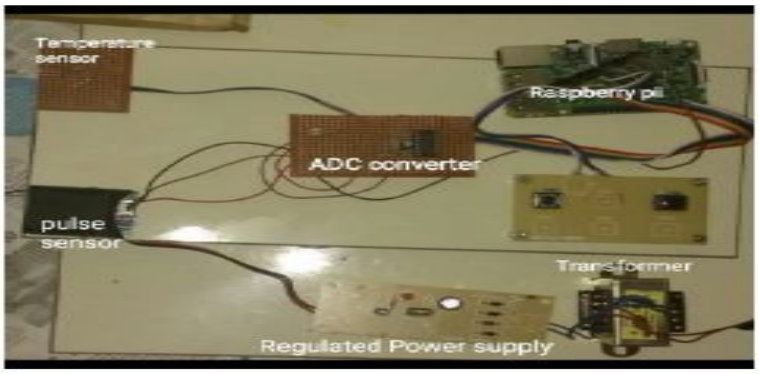

Fig 2: prototype setup

The thermistor is used to measure the temperature. Thermistor is also called as temperature sensitive resistor. In practice two type of thermistors are available such as positive temperature co-efficient and negative temperature co- efficient. Here we are using negative temperature co-efficient in which the resistance value is decreased when the temperature is increased.

Resistance value will be varied depend upon the Temperature level. Temperature varied means the resistance value also varied. If resistance value increased means output also increased. The resistance value and output is a directly proportional one. Then the final voltage is given to ADC for convert the analog signal to digital signal. Then the corresponding digital signal is taken to process in microcontroller. The ADC value will increase if the temperature increased. We can measure the temperature only with the help of any controller or processor. The pulse dosimeter used detect the pulse rate is based on the red and infrared light absorption characteristics of oxygenated and deoxygenated hemoglobin. Oxygenated hemoglobin absorbs more infrared light and allows more red lights to pass through.

Deoxygenated (or reduced) hemoglobin absorbs large number of red light and allows high number of infrared light to inside the medium. Pulse dosimeter uses a light emitter with red and infrared LEDs that shines through a reasonably translucent site with good blood flow. Now a days Infant sites are the foot or palm of the hand and the big toe or thumb. Opposite the emitter is a photo detector that receives the light that passes through the measuring site.

Raspberry pi is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you had expect a desktop computer to do, from browsing the internet and playing high-definition video, to make spreadsheets, word-processing and playing games. The Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras.

All Raspberry Pi include the same Video core IV Graphics Processing Unit (GPU), and either a single-core ARMv6-compatible CPU or a newer ARMv7-compatible quad-core one and 1GB of RAM, 512 MB or 256 MB. They have a Secure Digital (SDHC) slot or a MicroSDHC one for boot media and persistent storage. In 2014, the Raspberry Pi Foundation launched the Computer Module for use as a part of embedded systems for the same compute power as the original Pi.

In early February 2015, Raspberry Pi and Raspberry Pi 2 were released. That new computer board is initially available only in one configuration (model B) and has a quad-core ARM Cortex-A7 CPU and 1GB of RAM with remaining specifications being similar to those of the prior generation model B+. In November 2015, the Foundation launched the Raspberry Pi Zero, a smaller product priced at US$5. Raspberry Pi 3 was released on 29 February 2016.

IV. RESULTS AND DISCUSSIONS

The proposed system is connected with sensors to the Raspberry Pi board, adding Raspberry Pi MAC address and Programs to the website. After connecting internet to the Raspberry Pi, it act as a server. Then the server is automatically sends patient's health status to the website. Using this website link anybody can monitor patient's health status anywhere in the world. So it is very useful for patient's to give first aid at any time and to report a clear notification of patient database health status in graphical form to the doctor side which is shown below fig 1 & fig 2.

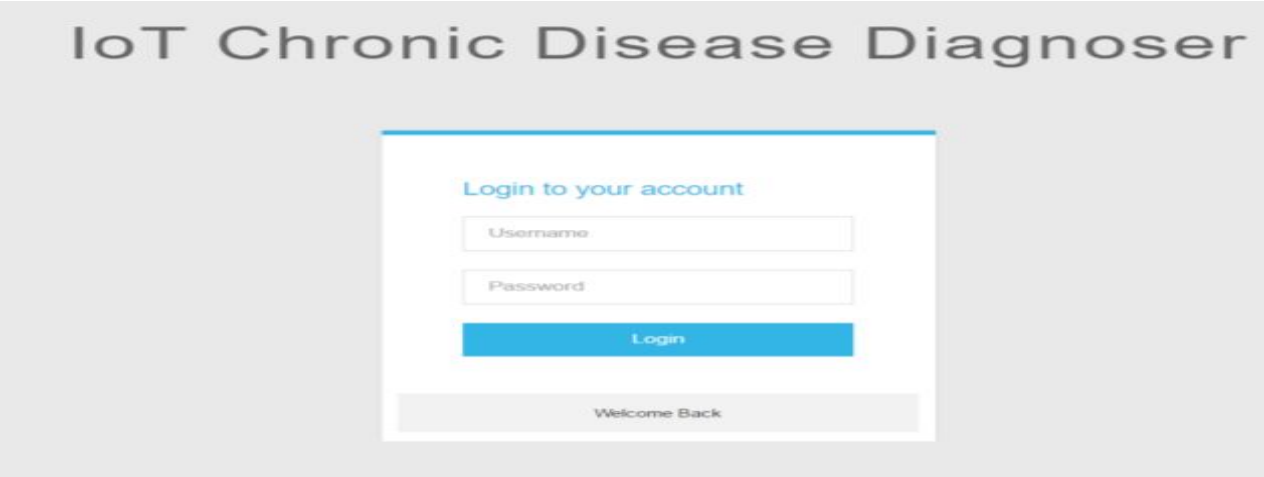

Figure 3 Login output

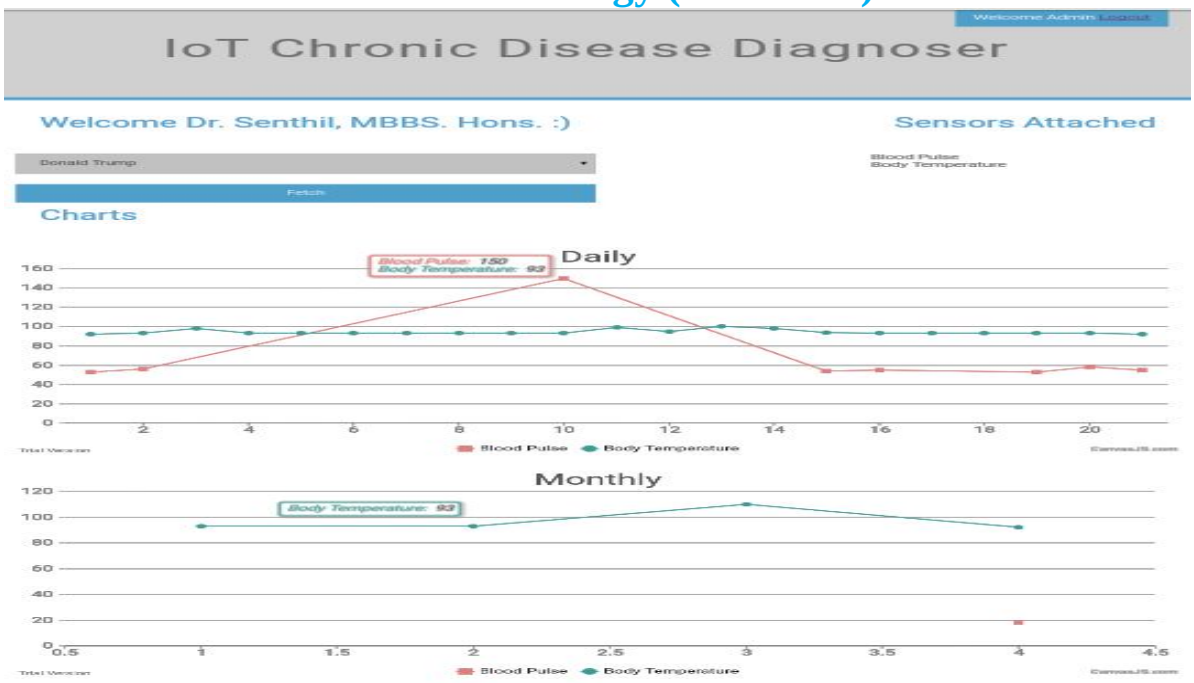

Figure 4 Output characteristics

V. CONCLUSION

In future, by sending an alert message to the blood bank in the emergency situation, the patient's life can be saved without delay. So it is very useful for patient's to give first aid at any time. Similarly other Device like ECG, EEG can be made connected to gather additional information about patient health status.

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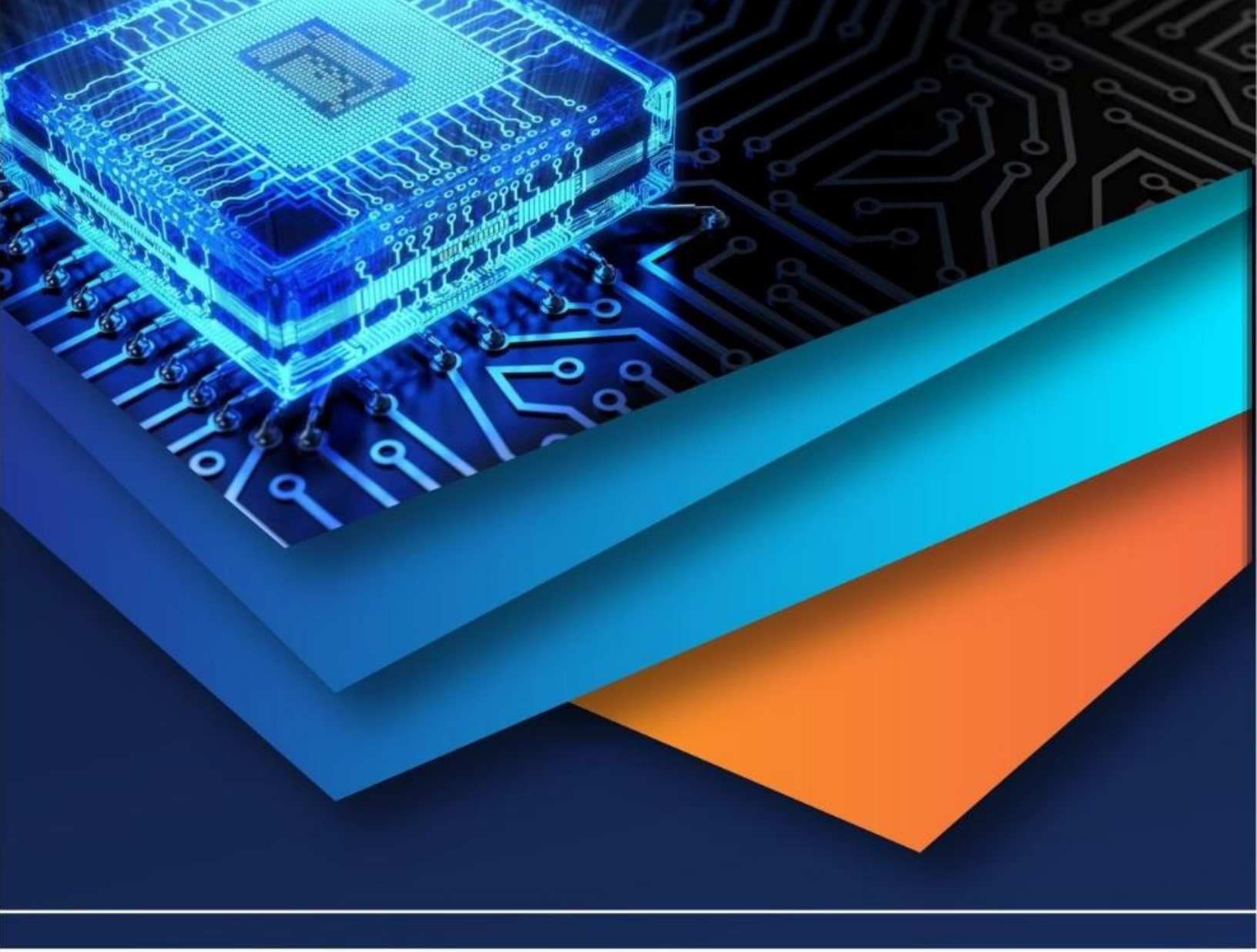

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