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A Survey on Patient's Health Monitoring System in Real Time Using Raspberry Pi

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ABSTRACT:Proposed implementation entitled "Patient's Health Monitoring System in Real Time Using Raspberry Pi" is the work helpful to village side patients and remote monitoring of patient can be in emergency situation for the patient's health conditions using health parameter measuring sensors for various health parameters is a major improvement in the medical era. The sensors used in proposed work gets thebiomedical signals of patient body, helps to monitor the patient's condition in real time and camera can helps doctors for seeing patient in real time. In this concept, the monitoring of the patient is done by the doctor without actually visiting to the patient. Here, we are using electronic sensors for the body parameters measurement like temperature, pulse rate and seeing of patient using camera. These sensed signals are transmitted to the Raspberry pi to update the data continuously via ADC which will convert these analog signals into digital signals. Through radio media, these processed data is sent through wireless at receiver for seeing by doctors monitoringscreen (Laptop or PC with internet connection). So, the doctor can monitor patient condition and interact with the patient's health parameter so that doctor can suggest prescriptions for in the emergency situation just by sitting in his chamber.

KEYWORDS: Raspberry pi, Temperaturesensor, pulse rate sensor, camera, monitor, Wi-Fi connection

I.INTRODUCTION

Proposed system introduces measurement of patient's health parameters usingelectronicsensors. If we connect an electronic sensorto patient'sbody which will sense health parameter that is temperature, pulse rate and observing to patient using camera and sends it to the doctor to remote location.Earlier the health care system was working on analog input system and output taken from the signal is displayed on CRO or any computer screen. That output data maybe in analog form or in digital form. For this type of input and output data's the converter like ADC and DAC are required which is itself in raspberry pi. Also systems were relied on wired network. This network is formed with the help of RS232 and RS485 or USB. After that the communication is done through the protocol like TCP/IP. These protocols were developed further like I2C bus protocol. To monitor the patient there is a computer system required in earlier health care system but according to latest technology of Raspberry pi which itself is a mini computer which overcomes this problem. One Raspberry can manipulate the multiple patients reading and those are allowed to pass on the other uses sharing the same area network. Providing healthcare services is very important for people specially who have chronic diseases. System can be usefulthose people need continuous healthcare which cannot be provided outside hospitals.

Reasons for the proposed system:

- Making healthcare more accessible for people who do not have access to healthcare providers in their communities;
- Making healthcare easier for people who do not have access to public transportation in order to go to hospitals; Increasing bed capacity in hospitals, especially during public events where a large number of people are meeting in one place
- Giving medical staff more times to be attentive to patients who need more care;
- Preventing delays in the arrival of patients medical information to the healthcare providers, particularly in accident and emergency situations; and

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- Reducing manual data entry for patient's data which prevents real-time monitoring and restricts medical staff to monitor their patients efficiently.

II.LITERATURE REVIEW

I have gone through the various research work of health monitoring system, theyhave used Zigbeetechnology, web services and various technologies. For the proposed system keywords are :pulse rate sensing unit, temperature sensing unit,blood pressure measurement unit and adaptivepart which I am going to use is camera for monitoring the patients in real timeand also health parameters which doesn't have electronic sensor can get through camera by measurement using traditional equipment and observation of it through camera streaming scene using raspberry pi module.

"Implementation of health-care monitoring system using raspberrypi", by AbhilashaIngole, ShrikantAmbatkar, SandeepKakde, presented at the IEEE ICCSP 2015 conference in 2015.In this paper basicparameters like body temperature & heart beat is monitored and is transferredon webpage to make it locally visible for users. The system is design to read thebody temperature and heartbeat of patient at run time. The system mainly focused on collecting the physical parameter and then that information is madeavailable for multiple users. The results or the collected information is sent tomultiple users who share same area network. Once the user operates his systemhe will receive the information which is updated automatically since, the program is a user interface. As the collected data is made available for user, one canrefer that data to determine the health condition of patients. Since the systemis automatically updated after particular time span the data is refreshed andif any abnormality arises that may be detected using the alarm [1].To realizedistributed body temperature monitoring system is designed using temperaturesensor DS18B20.Body temperature data is collected with the help of DS18B20temperature sensor and a 4.7k resistor When the heart beat detector is workingat that time the LED ashes in unison with each. Heart beat and shows the statusof device. It works on the principle of light modulation by blood flow throughfinger at each pulse. This digital output is connected to Raspberry Pi by using 5Vto 3.3V level converter/shifter to measure the Beats per Minute (BPM) rate. The7detected values should be available for every doctor who is appointed for thatpatient, for this the detected values should be made local by uploading them onparticular webpage. This webpage is refreshed in every second who shows detected values at runtime. It will contain the basic information of the patient andthe determined values of body temperature and pulse rate (which are refreshedat every second).

"Raspberry Pi Based Patient Monitoring System uses WirelessSensor Nodes", byMendrelaBiswas, presented at International Research Journal of Engineering and Technology (IRJET) in April-2016.In this project, the monitoring of the patient is done by the doctor continuously without actually visiting the patient. Here, we are using various sensors tosense the physiological parameters like temperature, blood pressure, ECG andthe level of saline. These sensed signals are transmitted to the Raspberry pi toupdate the data continuously via ADC which will convert these analog signalsinto digital signals. Through RF transmitter, the data is sent wirelessly to themonitor screen of the doctor. So, the doctor can visualize the patient's data justby sitting in his cabin. When a critical condition occurs, the visual indicationswill be sent onto the screen [4].

"Patient Parameter Monitoring System using Raspberry Pi", byNavdeti , presented atInternational Journal Of Engineering And Computer Science in March-2016.This system is designed to be used in hospitals for measuring and monitoring various parameters like temperature,ECG, heartbeat etc. The results can be recorded using Raspberry Pi displayed on a LCDdisplay. Also the results can be sent to server using GSM module. Doctors canlogin to a website and view those results. In our system we are measuring patient's parameters (ECG, temperature, heart rate, pulse, etc) different availablesensors. This sensor collected data i.e. biometric information is given to raspberry pi and then it is transferred to server. Biometric information gathered canbe wirelessly sent using different options available such as Wi-Fi, 3G, GSM,Bluetooth, 802.15.4 and ZigBee depending on the application. The data storedin a database and can be displayed in a website that can be accessed only byauthorized personnel. The doctors, RMOs, patient or his family members can begiven authorization. The system even facilitates the doctor to view the patient'sprevious history from the data in memory.

"Web Based Remote Patient Monitoring System with IntegratedGSM", by Nikita Patni, presented at International Journal of Advanced Research in Electronics and Communication Engineering inApril-2015.In this paper created portable embedded system based on ARMprocessor that facilitates RPM using wired, wireless communication and cellular8technology. This system implemented ZigBee interface for wireless communication and GSM for mobile based remote monitoring along with wired web interface. It is observed that, wired interface provides reliability in

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communicationwhile wireless interface gives exibility in patient movement whereas cellularinterface provides solution for emergency situations.

"Wireless Biomedical Parameter Monitoring System" by HarshavardhanB.Patil, presented at International Journal of Engineering Research andApplications in April-2015.In this review paper , wireless biomedical parameter monitoring system using ZigBee.The system can be used to monitorphysiological parameters, such as Blood pressure (Systolic and Diastolic), Pulserate, Temperature of a human subject. Using several sensors to measure differentvital signs, the person is wirelessly monitored within his own home. Impact sensorhas been used to detect falls. The device detects if person is medically distressedand sends an alarm to a receiver unit that is connected to a computer. Thissetsan alarm allowing help to be provided to the user. The device is battery powered for used outdoors. The wireless biomedical parameter monitoring systemsbased on wireless sensors and communication module. There are some existing system as only to measure only one or two biomedical parameter at a time, inthis system more than two parameters can measure this system incorporatesdifferent sensors with interfacing of microcontroller and making communicationthrough ZigBee module with two different section named, transmitter and receiver section. So proposed system is more superior to existing system.

Wireless-Patient-Monitoring-System-Using-Point-To-Multi-Point-Zigbee Technology"by AungSoePhyo, ZawMyoTunand, HlaMyoTun , presented at International Journal Of Scientific & TechnologyResearchin June-2015.This application of Zigbee based network consists oftwo transmitter sections and a receiver section. Each transmitter section consistsof heartbeat sensor, body temperature sensor, microcontroller, Zigbee and LCDmodule. In the proposed system the patients' health is continuously monitoredand the acquired data is analyzed at a personal computer using Graphical UserInterface(GUI).If a particular patients health parameter is higher or lower thethreshold values, an alarm system is used to alert the doctor. The aim of this system is to know the condition of patient's health by the doctor immediately and toreduce the load of the staff taking care of the patient in the hospitals. In this paper, wireless point to multipoint system is used between doctor and patient. Thispaper describes the wireless sensor network based on ZigBeetechnology. It ismainly used for collecting and transferring the various monitoring informationabout the patients in hospitals. Wireless sensor networks application for physiological signals communication transmission has many technologies. Such as theInfrared, Bluetooth and ZigBee, etc. Because the angle limit problem of the infrared transmission, and the infrared have not be used for Physiological signaltransmission. Although Bluetooth is better than ZigBee for transmission rate,but ZigBee has lower power consumption. Hence, ZigBee is generally used for 24hours monitor of communication transmission systems. Compared to Bluetooth,ZigBee provides higher network exibility and a larger number of nodes, and abetter transmission range with low power consumption. Large number of nodesenables the expansion of such systems. Recently, ZigBee based wireless networkswere tested in various applications.

By the reference with all of the research papers which I have mention above, Iwant to implement, the system which will overcome the drawbacks and also theproposed system is applicable in real time interaction between patient side anddoctor side using raspberry pi,communication medium,also a camera unit whichis new idea beyond existing system. The already mentioned systems done withhealth monitoring system using raspberry pi,zigbee, GSM etc.The referenced system doesn't have real time interaction between patient and doctor but proposedsystem will overcome this drawback. The proposed system will most useful forthe village side patient, who didn't get on time treatment with proper prescription, no doubt village side doctors also knows prescription but still they refer thepatient to specializeddoctor. At this time system will be very useful.

The proposed system involves various health parameters such as pulse rate,temperature, heart beat and innovative part over referenced systems which iscamera unit which will monitor to the patient and also blood pressure measuredusing Sphygmomanometer.

III.PROPOSED SYSTEM

The system will overcomethe some drawbacks and also theproposed system is applicable in real time interaction between patient side anddoctor side using raspberry pi, through communication medium (internet) and also involves a camera unit whichis new idea beyond existing system. The already mentioned systems done withhealth monitoring system using raspberry pi,zigbee, GSM etc. The referenced system doesn't have real time interaction between patient and doctor but proposedsystem will overcome this drawback. The proposed system will most useful forthe village side patient, who didn't get on time treatment with proper prescription, no doubt village side doctors also knows prescription but still they refer thepatient to specialized doctor. At the time system will be helpful.

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The proposed system involves various health parameters such as pulse rate,temperature and innovative part over referenced systems which are camera unit which will can captures live streaming to the patient and also blood pressure measuredusing Sphygmomanometer.

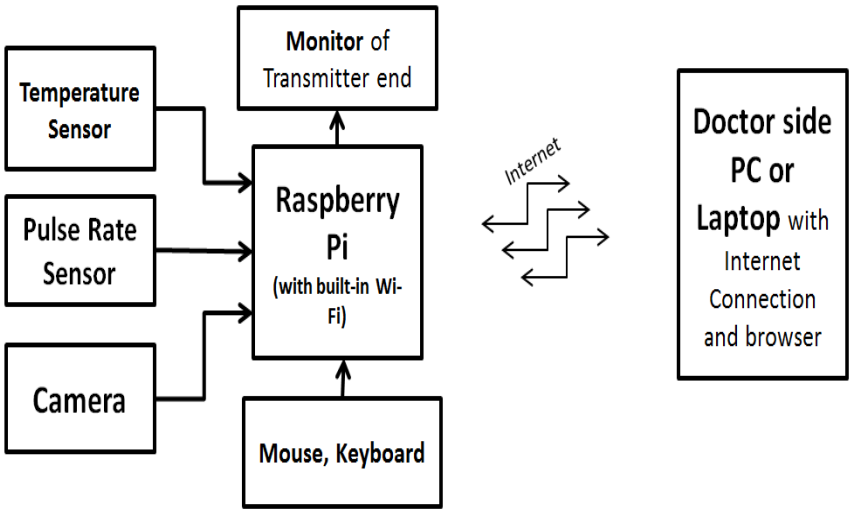

Fig.1 Block Diagram of proposed system

VI.CONCLUSION

From the review I conclude that proposed system provides accurate and fast user authentication. Using Raspberry pi board system features various features as well as advantages of fast processing applicable at high end era too.Raspberry pi transmitsensed data to doctor through internet network this can be of great use in the field of medicine and helps the Doctor to keep a keen eye on the patients' health. Internet medium has its own significance from which I have chosen Raspberry pi for accessing proposed system from remote place.

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