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REVIEW ARTICLE

PATIENT MONITORING SYSTEM USING RASPBERRY PI-A REVIEW.

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Abstract

There are several cases where the patients in ICU could not be frequently and properly monitored. Also real time parameter values are not efficiently measured in clinic as well as in hospitals. Sometimes it becomes difficult for hospitals to frequently check patient's conditions may be it because of the inadequate time to spend for each patient. Also continuous monitoring of an ICU patient is not possible. To deal with these types of situations, our system is beneficial. Our system is designed to be used in hospitals for measuring and monitoring various parameters like temperature, pulse rate, blood pressure. The results can be recorded using Raspberry Pi displayed. Also the results can be sent to server using GSM module. Doctors can login to a website and view those results. A live video will be streamed and, the doctors and relatives can monitor the patient from any distance.

And also the parameters of the patient can be compared with threshold values and if there is any variations immediate messages could be sent to doctors and relatives. Advantage of this system is that it provides current video and status of the patient at any time.

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Introduction:-

Health is one of the global challenges for humanity. In the last decade the healthcare has drawn considerable amount of attention. The prime goal was to develop a reliable patient monitoring system so that healthcare professionals can monitor the patients, who are either hospitalized or executing their normal daily life activities. Recently, the patient monitoring system is one of the major advancements because of its improved technology.

Currently, there is a need for more modernized approach. In the traditional approach the healthcare professionals play a very major role. They need to visit the patient ward for necessary diagnosis and advising. There are two basic problems associated with this approach. First, the healthcare professionals must be present on site of the patient all the time and next is that the patient remains admitted in a hospital, bedside biomedical instruments, for a period of time.

In order to solve these two problems, patients are given knowledge and information about disease diagnosis and prevention. Secondly, a reliable and readily available patient monitoring system is used For improving the above

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conditions; we can make use of technologies in a smarter way. In recent years, health care sensors along with raspberry pi play a vital role. Wearable sensors are in contact with the human body and measure his or her physiological parameters. We can buy variety of sensors in the market today such as ECG sensors, temperature sensors, pulse monitors, humidity sensors etc. The cost of the sensors varies according to their size, flexibility and accuracy. The Raspberry Pi which is a cheap, flexible, fully customizable and programmable small computer board brings the advantages of a PC to the domain of sensor network.

In our system we are measuring patient parameters (temperature, heart rate, pulse, etc) using different available sensors. These sensors collect data i.e. biometric information which is then given to raspberry pi and then to server. Biometric information gathered is wirelessly sent using different options available such as Wi-Fi, 3G, GSM, Bluetooth, 802.15.4 and ZigBee depending on the application. The data stored in a database and can be displayed in a website that can be accessed only by authorized personnel. The doctors, RMOs, patient or his family members can be given authorization.

Literature Survey:-

In [1], raspberry pi system is designed to continuously monitor Electrocardiogram [ECG] and other vital parameters. This data is stored in a database and can be displayed in a website which can be accessed only by authorized personnel. Data is updated using MySQL db and alert is given to doctor by GSM module and Raspberry pi.

[2] is usually used to monitor patients who are discharged to wards. This system has been developed using low-power dedicated sensor arrays for EKG, SpO₂, temperature and movement. The sensor interfaces is a central control unit which exposes a Restful based Web interface that ensures a platform agnostic behavior and provides a flexible mechanism to integrate new components.

[3] describes a low cost monitoring system based on raspberry pi and also include motion detection algorithm written in python. The algorithm for motion detection is implemented on raspberry pi, which enables live streaming camera along with motion detection. The live video can be viewed by any web browser.

[4] which is based on Wireless sensor based mesh network which is an integration of Wireless Sensor Network(WSN) and Wireless Mesh Network(WMN) technologies. The patients temperature, heart beat and is monitored automatically using bio-medical I kit. A LCD is provided with the kit that is used to notify the nurse about the health status of the patient. The information is then sent to a mesh node through Zigbee technology. From the mesh node, a SMS is sent to doctors through GSM connection, if emergency situation is met.

[5] intend to improve the quality of life of people with visual impairment and also with obesity problems, by creating a low-cost health care self-monitoring system using a network of sensors which transmits the biomedical information's played by voice to the patients and help them to move and to know the exact location of obstacles, using a sound signal received in headphones or speakers.

[6] reports on the remote monitoring of the daily routine behavior of elderly patients in their domestic houses. Several sensors were installed, including infrared sensors to detect human movements and magnetic switches to detect the opening and closing of doors, watt meters embedded in wall sockets to detect the use of household appliances, a flame detector to detect the use of a cooking stove and carbon monoxide, sensor to detect the presence of subjects in the room by monitoring the carbon dioxide expired. An industrial networking system was introduced into each house to combine those sensors. The sensor outputs were recorded on a PC.

In [7], a wireless system for remotely monitoring the patient's oxygen saturation (%SPO₂), sphygmo (Pulse) and plethysmogram levels are explained. Pulse oximeter is used to measure data continuously and transferred to a central monitoring station through a wireless sensor network which is used for storage and display. MicaZ wireless motes were programmed with nesC and a graphical user interface was used to capture and display incoming measurements for all patients being monitored.

In [8] a low cost, secure portable system with wireless transmission is presented to monitor vital parameters such as heart rate, O₂ level etc. Transmitted data is archived and visualized both on a mobile phone and on a central server.

The [9] proposes an integrated system (hardware and software) for real-time, wireless, remote acquisition of cardiac and other physiologic information from HF patients while in their home environment. Transducers for measurement of ECG, heart rate variability (HRV), acoustical data are embedded in the patient clothing for unobtrusive monitoring for early, sensitive detection of changes in physiological status.

[10] presents the development of an experimental test-bed for the real world Habitat Monitoring System. Our system consists of stationary sensor nodes which are integrated with Wi-Fi network in order to acquire the remote physical environmental data. It also has integrated the temperature, humidity and light sensors in this Habitat Monitoring System for investigating the performance of HMS test-bed.

In [11], a wireless network is created for remotely monitoring patient's health parameters like Temperature, ECG, Heartbeat, Coma recovery and saline level indication. All these parameters are continuously measured with the help of appropriate efficient low cost modules, which are designed for each parameter. The measured data from the patients are transferred to a central monitoring station via a Zig-bee. PC acts as a central monitoring station which runs Lab View for monitoring parameters.

[12] allows the use of wireless inertial sensors to improve user's comfort during sleep. The system is intended for monitoring the periodic leg movements (PLM) and user's activity during sleep. It distributed sleep monitoring system which combines wireless inertial sensors SP-10C by Sensoplex controlled by a custom smart phone application as an extension of the polysomnographic (PSG) monitor SOMNOscreen plus from Somnomedicsis.

[13] is a paper on detecting the presence or absence of the patient in the room. In order to stop the collection of redundant data concerning about the patient's vital status, an RFID localization and monitoring system – PaLMS which is able to uniquely and unambiguously identify the patient and perceive its presence in room was developed, making the process of data collection and alert event.

Proposed system:-

Patient Monitoring System using Raspberry Pi is an Internet of Things (IOT) project. This project is used to monitor patients in an ICU in a hospital, with the help of live video streaming and gives information about the parameters of health of the patient .And also helps the doctors and relatives to monitor the patients live conditions. Continuous information of the patients in ICU could be analyzed using our system. Live streaming of the video could be done with the help of Raspberry pi .Our system is designed to be used in ICUs for measuring and monitoring various parameters of patient like temperature, blood pressure and heart beat. And also the parameters of the patient can be compared with threshold values and if there is any variations immediate messages could be sent to doctors and relatives. Advantage of this system is that it provides current video and status of the patient at any time. In our project we use wearable sensors to measure temperature, pulse, diastolic and systolic pressure. These parameters are measured to know whether the patient is in safe state or not. And a video of the patient in the ICU will also be displayed in the web page designed. And the patient will be well monitored. Doctors and relatives can monitor them from faraway places. If any of the values crosses the limit, an alert will be sent. This live streaming will be done with the help of Raspberry Pi. Database is also created to store the values of parameter periodically. Features of the system are, Relatives could monitor the patient with live video streaming, The doctor can view the condition of the patient and do the treatment accordingly, The attention towards the patient is much more than before with this system, Doctors and relatives can login into the website using username and password which enhance the security of the system and Database will be updated periodically.

Conclusion:-

This project proposes a method for monitoring the present condition of the patient in an ICU. Our project helps the patient to be monitored well in the hospital, for that live video streaming is being done. And also parameters are displayed in the webpage. Database will give us the periodic values of the parameters like temperature, pulse, blood pressure .If there is any abnormalities an alert will also being send.

References:-

1. M.Surya Deekshith Gupta, Vamsikrishna Patchava, Virginia Menezes," Healthcare based on IoT using Raspberry Pi", ©2015 IEEE
2. Alexandru Archip, Nicolae Botezatu, Elena S, erban, Paul-Corneliu Herghelegiu and Andrei Zala," An IoT Based System for Remote Patient Monitoring", ©2016 IEEE
3. Huu-Quoc Nguyen, Ton Thi Kim Loan, Bui Dinh Mao and Eui-Nam Huh," Low Cost Real-Time System Monitoring Using Raspberry Pi", ©2015 IEEE
4. B. Vijayalakshmi, C. Ram kumar," Patient monitoring system using wireless sensor based mesh network", IEEE-20150
5. Oana GEMAN1, Iuliana CHIUCHISAN," A Health Care Self-Monitoring System for Patients with Visual Impairment using a Network of Sensors", ©2015 IEEE
6. Mitsushiro Ogawa, Ryoji Suzuki, Sakuko Otake, Takeshi Izutsu, Tsutomu Iwaya, Tatsuo Togawa," Long term remote behavioral monitoring of elderly by using sensors installed in ordinary houses", 02002 IEEE.
7. Radosveta Sokullu, Mustafa Alper Akkaú," Wireless Patient Monitoring System", © 2010 IEEE
8. Mona Kamel, Sahar Fawzy, Ahmed El-Bialy, Ahmed El-Bialy,"Secure remote patient monitoring system", ©2011 IEEE.
9. G. G. Mendoza, B. Q. Tran,"In-home wireless monitoring of physiological data for heart failure patients", © 2002 IEEE
10. Avinash More, Sharad Wagh, Kedar Joshi, "A Test-bed for Habitat Monitoring System Using Wi-Fi in Wireless Sensor Networks", ©2015 IEEE.
11. Gunalan .M.C1, Sathesh.A2 PG Scholar1," Implementation of Wireless Patient Body Monitoring System using RTOS", 2014 ISSN 2091-2730 .
12. Priyanka Madhushri, Beena Ahmed, Thomas Penzel, Emil Jovanov," Periodic Leg Movement (PLM) Monitoring using a Distributed Body Sensor Network ", ©2015 IEEE.
13. Fernando Marins1, Rui Rodrigues1, Filipe Portela2, Manuel Santos3, Ant´onio Abelha3, Jos´e Machado3," Extending a Patient Monitoring System with Identification and Localisation", ©2013 IEEE.