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Patient Care Monitoring and Mobile Notification Using Health Care IoT

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***Abstract*—** The Internet of Medical Things (IoMT) is the collection of medical devices and applications that connect to healthcare IT systems through online computer networks. Medical devices equipped with Wi-Fi allow the machine to machine communication that is the basis of IoMT. IoMT devices link to cloud platforms such as Amazon Web Services, on which captured data can be stored and analyzed. IoMT is also known as healthcare IoT. The proposed idea is based on the advancement of new advanced technology and Internet of Things which act as an airing device for patient care identification and patient care monitoring. It allows doctors to attend manifold of patients in rural areas without regular concentrating on a single patient. It also includes mobile notifications to doctors if the patient condition is critical. The (IoMT) is an incorporation of medical devices and applications that can connect to healthcare ideas using networking technologies. It connects patients to their doctors and allows transfer of medical data over a secure network, which in turn reduces unnecessary hospital visits and reduces the burden on healthcare ideas largely. In this paper an IoT idea will be developed to monitor the patient with this chronic disorder using cloud data logging. The developed idea can also be used to monitor various other parameters of patients such as Respiration, Body temperature, Pressure and the same can be logged every 20 seconds on cloud services. The doctors can monitor the patient's data using his mobile phone by logging into the cloud service and take necessary actions according to the parameters measured.

Keywords*—IOMT, MALAISE DETECTION, DENGUE*

I. INTRODUCTION

The proposed idea is based on the advancement of new advanced technology and Internet of Things which act as a airing device for malaise identification. It allows doctors to attend manifold of patients in rural areas without regular concentrating on a single patient. Internet of Medical Things (IoMT) [3] is an incorporation of medical devices and applications that can connect to healthcare ideas using networking technologies. It connects patients to their doctors and allows transfer of medical data over a secure network, which in turn reduces unnecessary hospital visits and reduces the burden on healthcare ideas largely. In this paper an IoT (Internet of Things) [1] idea will develop to detect early Dengue symptoms and to monitor the patient with this chronic disorder using cloud data logging. The Dengue identification is achieved by RBC count measure by passing infra-red rays in the finger of human body. The developed idea can also be used to monitor various other parameters of patients such as Respiration, Body temperature, Pressure and the same can be logged every 20 seconds on cloud services. The doctors can monitor the patient's data using his mobile phone by logging into the cloud service and take necessary actions according to the parameters measured. When the patient's immunity level goes below a critical level, it is informed to the doctor through mobile notification.

II. METHODOLOGY

An Internet of medical things can be built to collect patient's medical data parameters and is used to upload the same to the Think speak cloud services. A simple practical solution to this problem can be made by using Raspberry pi, a single board computer powered by ARM cortex. The Raspberry pi 3 is used for our malaise detection and data logging implementation by developing algorithms using Python programming language. The algorithm focuses on collecting the data from the sensor arrangement, perform calculations to measure the immunity and to the feed the data to the online cloud services over the internet throug Wi-Fi. The proposed ideas include various components and are listed in the following sections.

ARM processor

ARM processor is a small sized single board computer weighs only 50g [2]. It operating voltage of Raspberry pi model B is around 5V, 700mA and cost effective than an actual computer. The ARM process single board

computer is available in various models like A, B and a more advanced version B+. with high operating frequency (700MHz) Many Operating systems like Raspbian, Pidora, and Raspbmc can be installed using a SD card. Different peripherals like mouse, keyboard, and Wi-Fi adapter can be connected using its four USB2.0 ports to make it a full size computer. Also the board consists of an Ethernet port to connect to network, GPIO pins to interface and control switches, sensors, LEDs and other devices. All kinds of monitors like paper ORs, LCD screens, TVs can be connected using HDMI port. Some additional features include the audio jack and the camera connector to interface camera. These numerous features enable the users to use Raspberry pi in wide range of applications.

FLOWCHART FOR PROPOSED IDEA

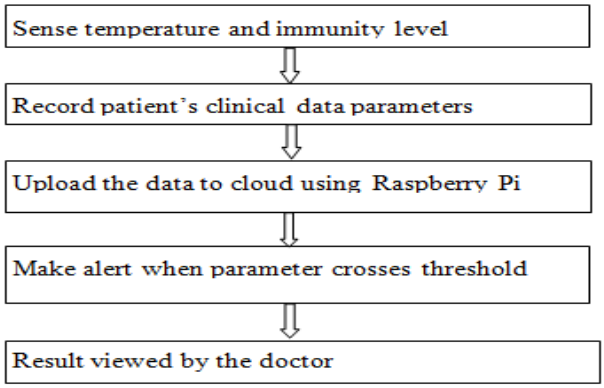

Fig. 1: Flow Chart of Proposed Arm Based Smart Wheel Chain

BLOCK DIAGRAM

The block diagram of the proposed idea is shown in the Figure 2. The main component in the system is ARM powered Rasberry pi board. Different sensors like heat sensor, Respiration sensor,

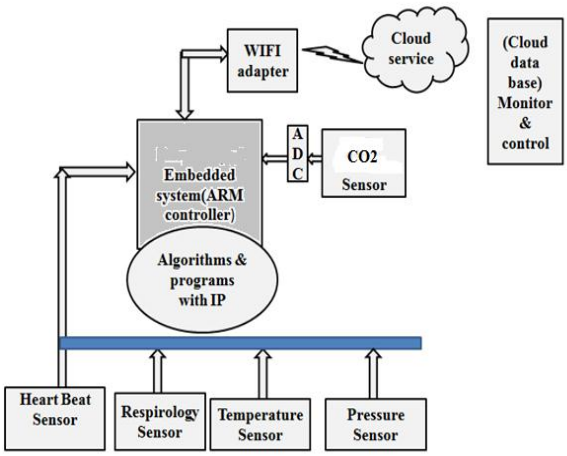

Fig. 2: Block Diagram of the Proposed Idea.

Temperature sensor and heart beat sensors are connected to this ARM processor. The arm processor analysis these sensor data and send to the cloud services and as push notification over the internet.

Sensor Array

The Sensor arrangement consists of five sensors, which include a Heartbeat sensor, Respirology sensor, temperature sensor, pressure sensor and most importantly Pulse Oximeter sensor. The temperature sensor may be a digital sensor (DHT11) or analog sensor (LM35). The pulse Oximeter sensor provides the analog info of oxygen level in the blood, which is used to regulate the RBC count and protection of the patient. A hardware ADC or python configured software ADC is used to interface the pulse Oximeter sensor to the Raspberry pi pinouts. The malaise is identified from the protection intentions and is dejected to the doctor. The other parameters of the patient are constantly monitored and logged to the Think Speak cloud.

III. CONCLUSION AND RESULTS

The proposed idea developed will be able to detect early fever indications and to monitor the patient care by using cloud services such as Think speak data logging. It can be also used to allow the doctors to attend manifold of patients without continuous focusing on a single patient.

The patient's data and parameters will be logged into Think Speak every 20 seconds and doctors can enter into their channel to view the measured parameters. The data's can also be exported into excel sheet for future analysis and record. When a patient parameter goes beyond critical point the doctors will get push notifications into their mobile phones through internet. The results of various parameters on Think speak and mobile notifications are shown in figure below.

ADVANTAGE

1. Pre-screening which avoids severe attack on the patient.
2. It will be used in creating awareness among rural areas.
3. Flexible communication between doctors and patients irrespective of distance

APPLICATION

1. Used in pre identification of deadly malaises.
2. Implementation of pressure and respiration rate detection also useful in regular health check-up even at far distance.

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