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Applied Science and Engineering Technology

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FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

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IOT based Blood Booking for Hospitals and Remote Elderly Monitoring System

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Abstract: Advances in information and communication technologies have led to the emergence of Internet of Things. 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.

The body sensor network (BSN) technology is one of the core technologies of IoT developments in healthcare system, where a patient can be monitored using a collection of tiny-powered and lightweight wireless sensor nodes. However, the development of this new technology in healthcare applications without considering security makes patient privacy vulnerable. In this paper, at first, we highlight the problems associated with shortage of beds in Govt.

Hospitals and blood booking and management of the same. Subsequently, we propose an IOT based concept to pre-book the bed for patient prior to reach the hospital via Ambulance and order the blood with a single click using web App which can efficiently accomplish those requirements.

Keywords: Raspberry pi; Internet of Things; IR Sensor; Motion detector sensor; Relay;

I. INTRODUCTION

The last few decades have witnessed a steady increase in life expectancy in many parts of the world leading to a sharp rise in the number of elderly people. A recent report from United Nations predicted that there will be 2 billion (22% of the world population) older people by 2050.

In addition, research indicates that about 89% of the aged people are likely to live independently. However, medical research surveys found that about 80% of the aged people older than 65 suffers from at least one chronic disease causing many aged people to have difficulty in taking care of themselves. Accordingly, providing a decent quality of life for aged people has become a serious social challenge at that moment.

The rapid proliferation of information and communication technologies is enabling innovative healthcare solutions and tools that show promise in addressing the aforesaid challenges. Now, Internet of Things (IoT) has become one of the most powerful communication paradigms of the 21th century. In the IoT environment, all objects in our daily life become part of the internet due to their communication and computing capabilities (including micro controllers, transceivers for digital communication). IoT extends the concept of the Internet and makes it more pervasive. IoT allows seamless interactions among different types of devices such as medical sensor, monitoring cameras, home appliances so on. Because of that reason IoT has become more productive in several areas such as healthcare system. In healthcare system, IoT involves many kinds of cheap sensors (wearable, implanted, and environment) that enable aged people to enjoy modern medical healthcare services any where, any time. Besides, it also greatly improves aged peoples quality of life. The body sensor network (BSN) technology is one of the most imperative technologies used in IoT-based modern healthcare system. It is basically a collection of low-power and lightweight wireless sensor nodes that are used to monitor the human body functions and surrounding environment. In case the patient fell down then The Motion detection sensor will sense the information and intimates the status to Ambulance with GPS location of patient. The Ambulance driver using his App reach the patient using the maps. Before the driver takes the patient to any hospital checks for the availability of beds or wards using the smart web App. If there is availability then he can book the bed instantly and can reach the destination easily. If not he can take the patient to another hospital. After reaching the hospital if patient needs blood immediately the using web app one can book the blood easily.

II. LITERATURE SURVEY

During a literature survey we collect some of information about the blood bank management system located in city and rural area, some of the country maintain a online blood bank system like in Srilanka, this project have combination of three sub modules which is blood module, patient module, donor module. As a result, needy people end up going through a lot of pain. India has many blood banks, all-functioning in a decentralized fashion. In the current system, individual hospitals have

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue V, May 2019- Available at www.ijraset.com

their own blood banks and there is no interaction between blood banks. Donors cannot access blood from blood banks other than the bank where they have donated blood. In present system, all the blood banks are attached to hospitals database and there is no stand-alone blood bank. This monitoring is useful for elderly or chronically ill patients who would like to avoid a long hospital stay. Wireless sensors are used to collect and transmit signals of interest and a processor is programmed to receive and automatically analyze the sensor signals.

III. METHODOLOGY

Basically project consists of three important parts in it. The first one is a Hardware part where raspberry Pi is interfaced with motion detection sensor to identify person is fine or fainted and fell down. The IR sensors to monitor the Patient beds weather they are filled or empty. The Alarm is to notify the surrounding people regarding the status. IOT modem is to link Raspberry Pi with Server. The second part of the project is the server with data base to store the data and to link Hardware with Web App. The third part of the project is web app provided for Ambulance driver or common people so as to pre book the patient bed and blood if its needed before reaching any hospital.
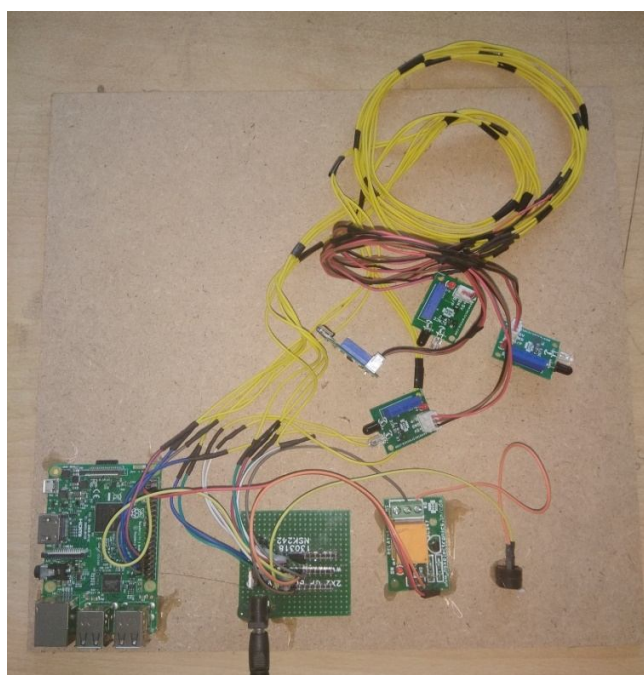

Figure 1: Hardware Components

A. Raspberry PI

Raspberry pi is a card –sized ARM powered linux computer development board. there square measure in total of five forms of numerous board with totally different specification, for the planned meteorology system Raspberry pi to model is employed because the main development board which is shown in Figure 2.

The raspberry pi consists of four USB ports and one 10/100 Base T Ethernet Socket. Forty pins GPIO Header are present in the raspberry pi board which is used for connecting to analog to digital converter chip (MCP3008)to which the sensors are connected. A 5V micro USB power port is present to which the power supply is given for the device. A HDMI port is present through which interfacing of the monitor and the raspberry pi can be done and the USB ports for the keyboard and mouse interfacing. At the bottom a Micro SD Card Slot is provided where the Micro SD Card is too inserted with the raspbian Jessie botting software which based on linux platform. The GPIO pins have different uses individually such as power supply, ground, clock, UAR.

B. IR Sensor

IR Sensor module has great adaptive capability of the ambient light, having a pair of infrared transmitter and the receiver tube, the infrared emitting tube to emit a certain frequency, encounters an obstacle detection direction (reflecting surface), infrared reflected back to the receiver tube receiving, after a comparator circuit processing, the green LED lights up, while the signal output will output digital signal (a low-level signal), through the potentiometer knob to adjust the detection distance, the effective distance range 2 ~ 10cm working voltage of 3.3V-5V. The detection range of the sensor can be adjusted by the potentiometer, with little interference, easy to assemble, easy to use features, can be widely used robot obstacle avoidance, obstacle avoidance car assembly line count and black-and-white line tracking and many other occasions.
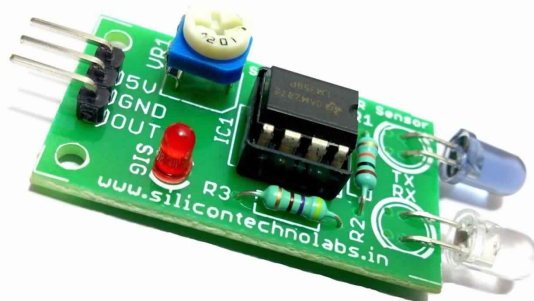
C. PIR Sensor

PIR sensor detects a human being moving around within approximately 10m from the sensor. This is an average value, as the actual detection range is between 5m and 12m.PIR are fundamentally made of a pyro electric sensor, which can detect levels of infrared radiation. For numerous essential projects or items that need to discover when an individual has left or entered the area. PIR sensors are incredible, they are flat control and minimal effort, have a wide lens range, and are simple to interface with.

Most PIR sensors have a 3-pin connection at the side or bottom. One pin will be ground, another will be signal and the last pin will be power. Power is usually up to 5V. Sometimes bigger modules don't have direct output and instead just operate a relay which case there is ground, power and the two switch associations. Interfacing PIR with microcontroller is very easy and simple. The PIR acts as a digital output so all you need to do is listening for the pin to flip high or low. The motion can be detected by checking for a high signal on a single I/O pin. Once the sensor warms up the output will remain low until there is motion, at which time the output will swing high for a couple of seconds, then return low. If motion continues the output will cycle in this manner until the sensors line of sight of still again. The PIR sensor needs a warm-up time with a specific end goal to capacity fittingly. This is because of the settling time included in studying nature's domain. This could be anyplace from 10-60 seconds.

D. Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.
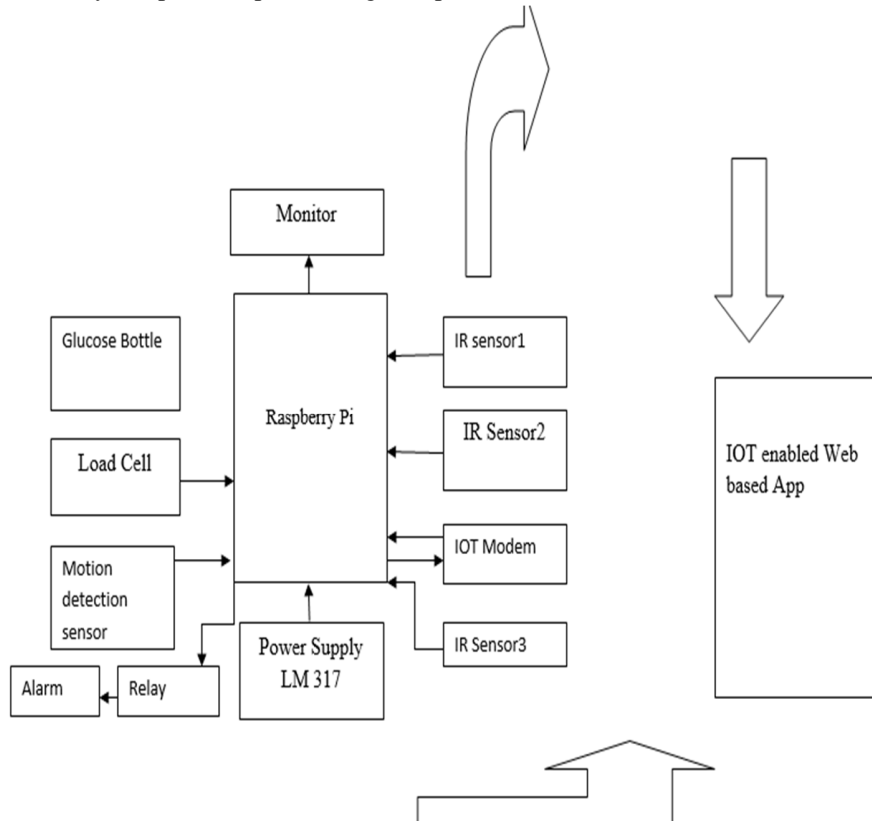
Figure: IOT based Elderly monitoring system

The design of our system as shown in Figure 2 In case the patient fell down then The Motion detection sensor will sense the information and intimates the status to Ambulance with GPS location of patient. The Ambulance driver using his App reach the patient using the maps. Before the driver takes the patient to any hospital checks for the availability of beds or wards using the smart web App. If there is availability then he can book the bed instantly and can reach the destination easily. If not he can take the patient to another hospital. After reaching the hospital if patient needs blood immediately the using web app one can book the blood easily. Using load cell glucose level of glucose bottles can be easily measured and if the level goes low the alarm will turn on giving and indication to replace the glucose bottle injected to patient so as to avoid reverse flow of blood.

IV. RESULT

V. CONCLUSION

The Elderly monitoring system provides when those elders are no longer able to live independently. Families figure out numerous different strategies for handling eldercare needs. As part of the process of finding eldercare solutions, they must consider many different factors, including finding ways to assess elders' needs, locating care resources that can address these needs, and managing financial and legal considerations associated with transitioning elders into care arrangements. After locating appropriate care, they must help support their elders and themselves through the stressful process of transitioning into care.

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