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INTRAVENOUS FLUID LEVEL INDICATOR WITH MOVABLE SENSOR UNIT

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Abstract – *The great demand of today world is to get everything within a very short time. This current task's primary goal is to calm human exertion via consequently controlling the trickling arrangement of the patient and keep them awared in a clinic. A critical situation occurs as the air enters into the saline bottle which leads to loss of large amount of blood .This undertaking comprises of a RF transmitter and beneficiary which is fundamentally utilized for the remote correspondence reason. In this an alarm message will be sent to the worry attendant station when the trickle framework arrives at a specific level by utilizing GSM module. The microcontroller is utilized to forms the data for every one of the directions given to every part. An IR sensor is utilized to recognize the sudden change in the level of glucose. When level of glucose reaches the point it provides an LCD display and also displays the patient's room number to the nursing station. If nurses are not present in their respective stations the glucose may reach the critical point and buzzer is set to alert the nurse or the attender. The nurse and attender of the patient is kept awarded about the level of the glucose.*

Key Words*: *IoT, Health Monitoring, IR Sensor, LCD.

1. INTRODUCTION

Saline, one of the most popular intravenous therapy plays a major role in the management of patients who are critically ill. Surveillance of saline bottle level is very important because when the bottle is emptied and the needle is not removed from the vein then the blood flows outward into the bottle. In hospitals, the nurses or caretakers are responsible for monitoring the saline bottle level. Mostly, due to negligence and any unusual condition, the exact timing of removing the needle from the patient's vein is ignored which causes a serious casualty and may lead to death as well. To prevent the accident due to the ignorance of caretakers and to provide alertness for nurse, the proposed is cost-effective smart saline level monitoring device which includes IR sensor and LCD display. The system is built by using IR sensor and microcontroller. IR sensor can be used to measure the weight of the drip or to detect the motion of flow of drip.IR sensor will be placed at drip stand which is movable and can be fixed at any point at which level nurse is needed. When the glucose level reaches the point at which sensor is fixed automatically buzzer/alarm will be turned ON at patient room for the alertness of patient as well as the attender/nurse. At receiver side LCD display is used to display the reached value as well as indicate the room number where the drip bottle has to be replaced which can alert the nurse station. This system keeps nurse/attender aware of reach of low level of drip bottle.

2. EXISTING SYSTEM

The existing framework consists of voltage controller which is interfaced with microcontroller which is used to supply a consistent voltage of 5volts. The transmitter part comprises of a load cell. Load cell is a transducer that is used to create an electrical signal whose magnitude is proportional to the force being measured. Load cell which here is used to measure the weight of the glucose bottle .The weight of the glucose bottle is not measured accurately.

3. PROPOSED SYSTEM

In this model we interface a voltage controller to the microcontroller which is utilized to supply a consistent voltage of 5volts.The transmitter part comprise of an IR sensor. Infra Red sensor can gauge the warmth of an item just as distinguishes the movement. It radiates so as to detect a few parts of the environment. LEDs are associated for the level sign of the liquid levels. A RF module is utilized both at the transmitter and the recipient side. RF module is a little electronic gadget used to transmit as well as get radio flag between two gadgets. This remote correspondence can be cultivated through Radio Frequency (RF) correspondence. IR sensor will be placed at the trip stand which is movable and can be fixed at any point. The sensor can be fixed at any point at which level nurse is needed. When the glucose level reaches the point at which sensor is fixed automatically alarm/buzzer will be turned ON. LED indicator will indicate the nurse station by glowing the LED. As the glucose level reaches the fixed point automatically message will be sent through the GSM module and will be displayed at LCD display. The concerned nurse can change the trips bottle.

3.1 Block Diagram

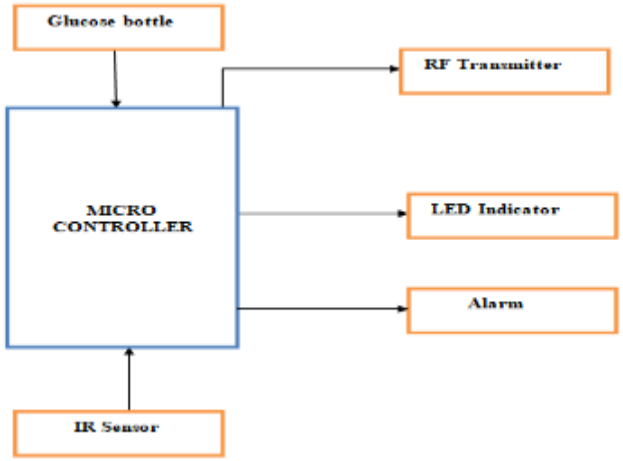

Fig- 1: RF Transmitter side Block Diagram

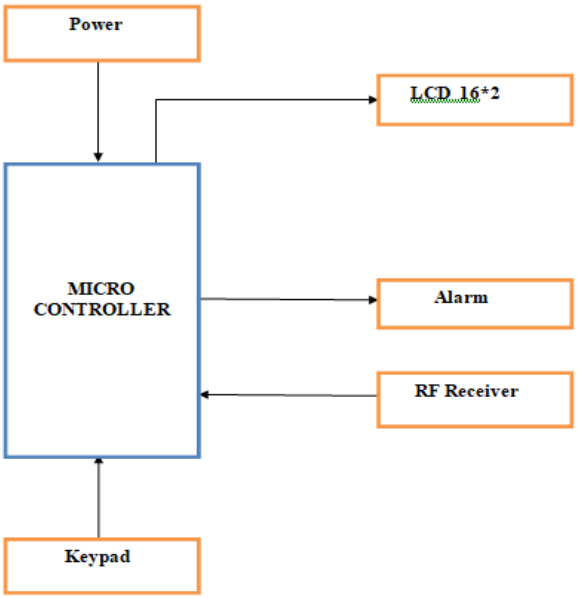

Fig- 2: RF Receiver side Block Diagram

4 HARDWARE DESCRIPTIONS

4.1 Arduino UNO

The Arduino Uno is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino.cc. The board is outfitted with sets of computerized and simple information/yield (I/O) sticks that might be interfaced to different development sheets (shields) and different circuits.

Fig .4.1 Arduino UNO

The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) by means of a sort B USB link. Essentially associate it to a PC with a USB link or power it with an AC-to-DC connector or battery.

4.2 Specification

Microcontroller	ATmega328
OperatingVoltage	5V
Input Voltage (recommended)	7-12V
InputVoltage(limits)	6-20V
DC Current perI/OPin	40mA
DC Current for3.3VPin	50mA
FlashMemory usedby	32 KB of which 0.5 KB
SRAM	2KB
EEPROM	1KB
ClockSpeed	16

4.3 PIC (16F877A):

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques

4.4 Architecture Of Pic [16F877A]:

Fig 4.2 PIC16F877A

4.5 LCD Display

A Liquid Crystal Display (usually contracted LCD) is a slender, level showcase gadget made up of any number of shading or monochrome pixels exhibited before a light source or reflector. It is frequently used in battery-controlled electronic gadgets since it utilizes extremely modest quantities of electric power.

Fig 4.3 LCD Display

4.6 Transformer

The potential transformer will step down the power supply voltage (0-230V) to (0-15V and 0-9V) a level. If the secondary has less turns in the coil then the primary, the secondary coil's voltage will decrease and the current or AMPS will increase or decreased depend upon the wire gauge. This is called a STEP-DOWN transformer. Then the secondary of the potential transformer will be connected to the rectifier. The Internet of Things is changing how organizations and shoppers approach their days around the globe. We anticipate that there will be in excess of 55 billion IoT gadgets by 2025, up from around 11 billion out of 2018. Among that our device prototype focus on the healthcare. Health care system is an integral part of every society. Automating these services helps in reducing the burden on human beings and yields more accurate results. The transparency of the system helps people to rely on it. That is when there is a spike in the heart rate, the raspberry pi immediately alerts the user. The objective of developing such a system is to reduce health care costs and also provide a faster way to detect a problem. We have used Raspberry pi in particular because of its multi-tasking capability and its low power consumption. This system can be easily installed in hospitals, houses and can serve as a large database to collect data. The results can be integrated with the mobile by developing an application so that it can be easily accessed at all times and at all locations.

4.7 IR sensor

An IR sensor can quantify the warmth of an item just as recognizes the motion. These kinds of sensors estimates just infrared radiation, as opposed to transmitting it that is called as a detached IR sensor. Generally in the infrared range, every one of the items emanate some type of warm radiations. These sorts of radiations are imperceptible to our eyes, that can be recognized by an infrared sensor. The producer is basically an IR LED (Light Emitting Diode) and the identifier is just an IR photodiode which is touchy to IR light of a similar wavelength as that discharged by the IR LED. At the point when IR light falls on the photodiode, The protections and these yield voltages, change with respect to the size of the IR light got.

Fig 4.4 IR SENSOR

5. Result

Transmitter side

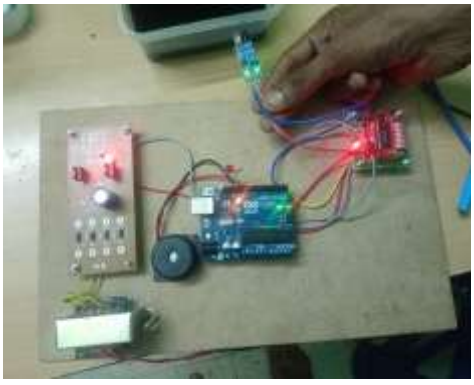

Fig 5.1 Transmitter Side prototype

At transmitter side, IR sensor is used for predicting the level of liquid inside the drip bottle. As IR sensor is fixed at certain point, the level of the liquid when reaches its point automatically buzzer/alarm wil turn ON. LED starts glowing at patients room.

Receiver Side

Fig 5.2 Receiver Side prototype

At receiver side, LCD is used to display the reached value as well as to indicate the room number where the drip bottle has to be replaced which can alert the nurse station. Alarm can also be used at nurse station for common alertness of nurse or attender.

5.1 Simulation

Transmitter Side

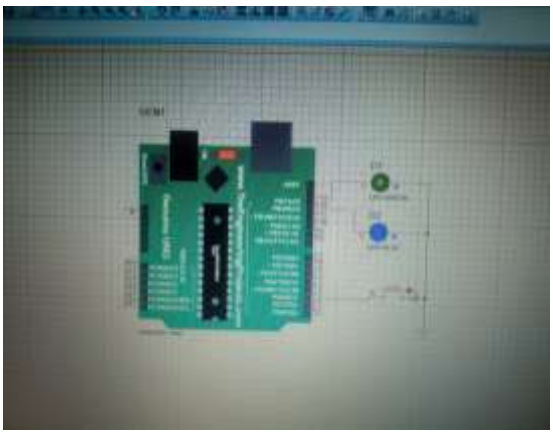

Fig 5.2 Transmitter Side Simulation output

Receiver Side

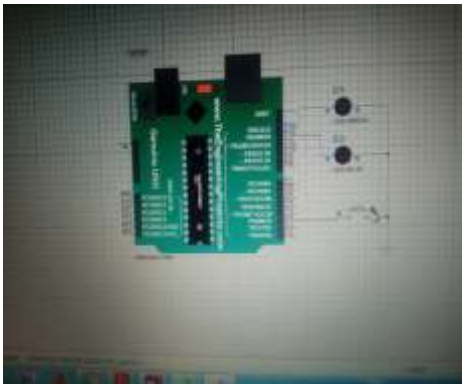

Fig 5.3 Receiver Side simulation output

6. CONCLUSION

The proposed system enables legitimate checking of the liquid to even without any specialist or attendant in this manner guaranteeing total wellbeing of the patients' wellbeing. By sending glucose bois used to control and screen the level or sum of glucose fluid present in the outing bottles in medical clinics. When this glucose level marker appears the individuals dealing with the patients and their in-charged medical caretakers need not stress over the time that will take for the glucose jug to be discharged. They can do the works anything they desire and along these lines the messages showing the present estimation of the glucose container is sent to the attendant station. Attender/medical caretaker can go at the opportune time and supplant the glucose bottle when that gets vacant. The RF module is utilized for the correspondence between the transmitter and the recipient over radio recurrence.

7. FUTURE WORK

A wireless healthcare monitoring system by means of using mobile devices and sensors can be implemented in a global network with the help of Arduino and Raspberry Pi. The devices and IoT gathers and share information with each other, making it possible to collect, analyse and monitor data more accurately. Thus IoT can be used for monitoring the patient and providing services in a timely manner. The proposed system can be enhanced and extended by using other invasive as well as non-invasive sensors for picking up essential medical potentials of a patient. This can be further analysed, stored and transferred on a global platform. Mega Arduino can also be used that is capable of interfacing many sensors at the same time. This will help showing results parallel so that ease of connection and time saving can be facilitated.

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