AUTOMATIC MONITORING AND REGULATING OF SALINE FLOW RATE USING IOT

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Abstract: Saline, also called as saline solution, is a mixture of sodium chloride in water and has a number of uses in medicine. Applied to the affected area it is used to clean wounds, help remove contact lens, and help with dry eyes. By injecting into vein it is used to treat dehydration such as from gastroenteritis and diabetic ketoacedosis. It is also used to dilute other medications to be given by injection. A drip is a short, small plastic tube that a doctor or nurse will put into your patient's vein, using a needle. They will leave a plastic tube in so that fluids and medicines go directly into your patient's blood. Normally at all hospital the saline level was monitored by the working staff and the nurses. Basically this particular procedure is delayed and obnoxious. This problem may happens due to the less number of working staff in the hospital and due to carelessness and laxity. When the saline bottle is empty back flow of blood takes place. The proposed system consists of Monitoring the quantity of the fluid at every interval and regulating the saline flow. When it crosses the critical level of the saline bottle the an indication system has been provided to the system and it will also send an alert message to the particular staff who is taking care of the patient.

Keywords: ESP8266 controller, servo motor, ultrasonic sensor, IOT, Buzzer.

I. INTRODUCTION

Automated system in the hospital has been improving in day to day life. This allow improving quality of hospital service, making work of medical and non-medical personnel more efficient, increase loyalty of medical personnel and patients. And, finally, solving the main tasks of the medicine informatization: improving the treatment quality and preserving and improving public health. Once the saline bottle has been fed to the patient, the concerned authority or the nurses should continuously want to monitor the patient. This may cause delayed and obnoxious.

If they forget to monitor the saline bottle, as soon as the saline bottle is empty reverse flow of the blood takes place, this may cause major problem to the patient. Hence to prevent this from the patient, we are proposed a system which will automatically monitor the saline flow and when it cross the critical level of the saline bottle automatically an alert message is sent to the patient's relative and the concerned authority or doctor. And the proposed system also regulate the saline flow. An IOT system has been introduced to communicate between android phone and the device.

This Proposed system has been implemented by using the components ESP8266 is a Wi-Fi microchip and microcontroller capability, ultrasonic sensor for monitoring the saline flow, Key pad matrix for giving the input data, LCD display 2x16 has been used for displaying the output, Buzzer has used for indication system, Android application has been developed in the smart phone was indication of alert message and giving the input data when the keypad has been failed to take the input.

Objective

- To overcome drawbacks in manually controlled saline system.
- Greater accuracy
- IOT – increase the control range between android mobile and device.
- Automatically stop the flow after emptying the saline bottle .
- Provide cost effective.
- This application in user friendly.

II. LITERATURE SURVEY

Existing system:

Different methods of saline control mechanism are used. The existing arrangement of saline flow controlling and monitoring is not more efficient and accuracy. Monitoring and regulating the saline was done with the help of flow sensor and servo motor. Flow sensor consists of two metal wires arranged in parallel very close to each other. It is an indirect method of measuring the quantity of fluid passing through the pipeline. Arrangement of flow sensor in the tube is complex.

Arduinomega2560 is used as a microcontroller for controlling the hardware and it doesn't contains on-chip Wi-Fi module An android app has been developed using Android Studio for pairing the smart phone with the developed system. The android mobile has been paired with the device with the help of Bluetooth module HC05. Which can only connect the device and the android mobile only at a particular distance of 30 to 40 feet only. The input flow rate are given by keypad or android based smart phone. LCD display is used for displaying the outputs.

Problem identified in existing paper are Less accuracy, Connecting the flow sensor are complex and chance of leakage of fluid, the Bluetooth module has been used to connect the android phone and the device. But it can only connected at a particular distance of 30-40 feet only. We cannot able to connect the android phone and the device when we cross the proposed range.

Proposed system:

The proposed system consists of automatic monitoring and regulating of saline flow using IOT. This system has been implemented by using the components ESP8266 is a Wi-Fi microchip and microcontroller capability, Servo Motor, Ultrasonic sensor, Keypad Matrix 4x4, LCD Display 2x16, Buzzer, Android phone, Power board, Arduino Pro Mini.

The proposed system consists of monitoring the saline level which was done with the help of ultrasonic sensor, the ultrasonic sensor consists of emitter and transmitter and it emits the ultrasonic waves and receives the reflected echo. It calculates the quantity of fluid remaining by subtracting the total quantity of the fluid and the quantity of fluid went. The regulation of the system has been done by servo motor. The servo motor has been used for the pressing mechanism of the saline fluid.

Keypad matrix 4x4 has been used to get the input saline rate, when the input saline rate has been set, the servo motor will rotate based upon the input given by the user. The output display of the system was done by LCD Display 2x16, it will display the quantity of fluid remaining in the saline bottle, and flow rate per second and time remaining to complete the saline bottle. Buzzer has connected for giving the alert sound to the nurses or doctor. Wi-Fi module used for connecting the android mobile and the device for sending the alert message when the saline bottle has been completed and also for giving the input flow rate at time of keypad matrix failed to take the input date. We are proposing a system which will automatically monitor the saline level with the help of ultrasonic sensor and regulate the flow rate with the help of servo motor and when it crosses the critical level an alert message is send to the faculty or concerned authority or nurses, and the output has been displayed in the LCD display 2x16.

III. COMPONENTS REQUIRED AND DESCRIPTION

This proposed system has been implemented by using the components,

- ✓ ESP86266
- ✓ Servo Motor
- ✓ Ultrasonic sensor
- ✓ Keypad Matrix 4x4
- ✓ LCD Display 2x16
- ✓ Buzzer
- ✓ Android phone
- ✓ Power board
- ✓ Arduino Pro Mini

➢ **ESP8266**

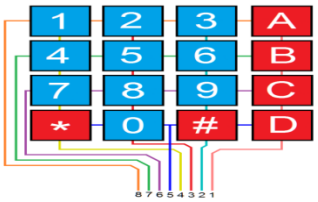
It consists of 32 I/O pins, and hardware based on the ESP-12 module. The device features 4MB of flash memory, 80MHz of system clock, around 50k of usable RAM and an on chip Wifi Transceiver. Espressif Systems' Smart Connectivity Platform (ESCP) is a set of high performance, high integration

wireless SOCs, it consists of inbuilt Wi-Fi and it is a version 3 model. Its features consists of Integrated 10-bit ADC, Wi-Fi 2.4GHz, support WPA and its operating temperature ranges from -4c-125c.

- **Ultrasonic sensor**

Ultrasonic sensors emit short, high-frequency sound pulses at regular intervals. If they strike an object, then they are reflected back as echo signals to the sensor. Ultrasonic sensor consists of transmitter and emitter, where the transmitter emits the ultrasonic waves and the receiver receives the echo reflected back from target.

- **Keypad Matrix 4x4**



The 4*4 matrix keypad usually is used as input in a project. It has 16 keys in total, which means the same input values.4*4 Matrix Keypad Module is a matrix non- encoded keypad consisting of 16 keys in parallel. The input flow rate is given to the device with the help of this keypad matrix 4x4.

- **Servo motor**

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. The servo motor consists of simple DC motor and the potentiometer, it consists of three pins two pins for power supply and the remaining pin is for transmitting and receiving the signal. Based upon the input flow rate given to the keypad or android based smart phone the servomotor will rotate.

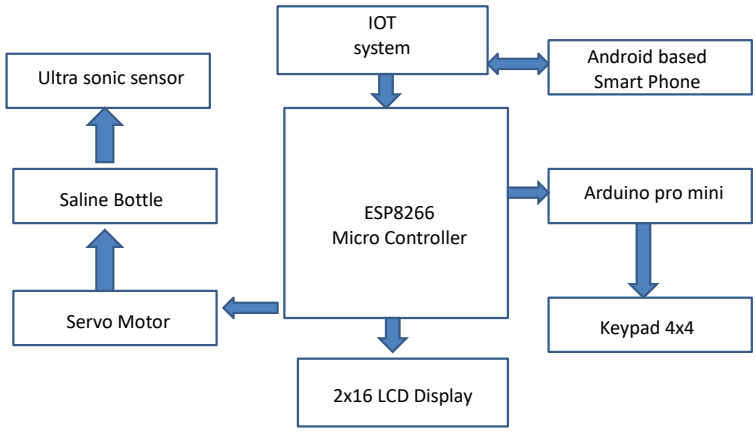
- **LCD Display**

This display has 2 rows and can display 16 characters on each line. The Display Controller takes commands and data from a microcontroller and drivers the LCD panel .This LCD display consists of 2 rows and 16 column, it is used for displaying the output of the system and it shows the quantity of fluid remaining in the bottle.

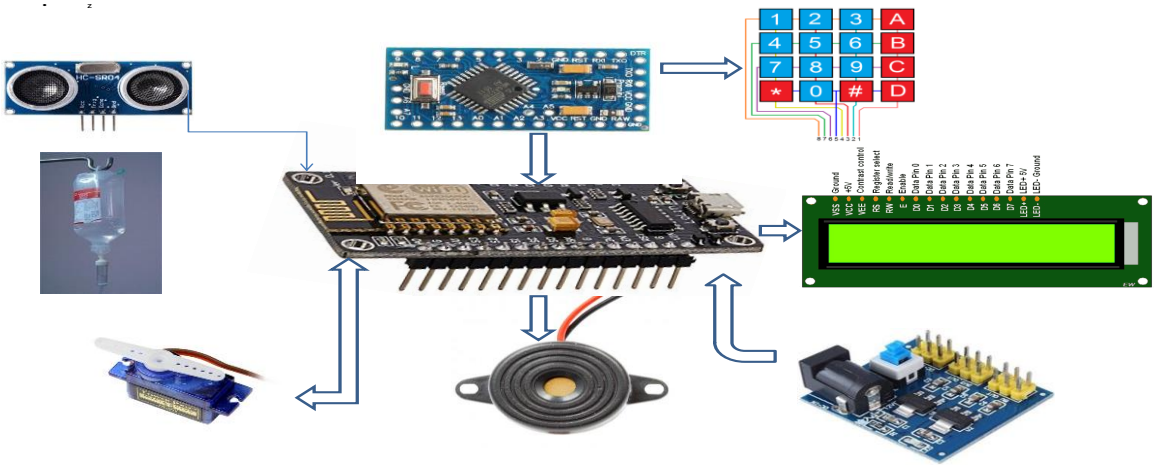
➢ **Power supply Board**

The power supply board is a basic essential interface for regulating and supplying power to the connected components. The female jack connector placed on the power board, which acts as the input terminal and the terminal on the power supply board helps to connect the male pin to connect the components.Theof the power supply board consists of 12v input and its output varies from 12v, 5v, 3.3v.

IV. BLOCK DIAGRAM



V. FUNCTIONAL DIAGRAM OF HARDWARE ARRANGEMENT OF PROPOSED SYSTEM



VI. FUTURE SCOPE

This project can also be implemented to other fields like chemical industry, textile industry to monitor the chemicals 9 dye level using IOT based technology. Rather than alarm buzzer we used hire, we can use calling and message system to indicate the progress. And also we can replace the ultrasound sensor in order to use live video capturing to intimate the faculty.

VII. CONCLUSION

In our IOT based saline monitoring system, the manual effects of the faculty become feasible, it requires very human monitoring. So, it will be advantageous to implement in medical field hence it saves time and makes work easier to doctor and other faculties. So, it is user to utilize the IOT based saline monitoring system. To avoid frequent human intervation to know the saline level.

VIII. REFERENCE

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