IV DRIP RATE MONITORING SYSTEM

A PROJECT REPORT

Submitted by

DAKSHITA L **(713321EC009)**

JEEVANYAA R **(713321EC021)**

MAREESWARI M **(713321EC028)**

In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

in

Electronics and Communication Engineering

SNS COLLEGE OF ENGINEERING

COIMBATORE-641 107

IV DRIP RATE MONITORING SYSTEM

A PROJECT REPORT

Submitted by

DAKSHITA L **(713321EC009)**

JEEVANYAA R **(713321EC021)**

MAREESWARI M **(713321EC028)**

In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

in

Electronics and Communication Engineering

SNS COLLEGE OF ENGINEERING

COIMBATORE-641 107

ABSTRACT:

Whenever saline is fed to any patient, he/she must be constantly monitored by a nurse or any relatives.Just after the saline finishes, blood rushes back to the saline bottle from the vein which causes a shortage of red blood cells (RBCs) in the patient's blood causing tiredness.To overcome these situations, we have developed a monitoring system where it can monitor the glucose stream. The weighing scale will control the flow of the fluid.The container will drain and the stopper will close the valve to prevent the backflow of blood into the bottle.

CH.NO	TITLE	PG.NO
	ABSTRACT	
1	INTRODUCTION	1
2.	LITERATURE SURVEY	2
3	EXISTING SYSTEM	3
4	PROPOSED SYSTEM	4
5	HARDWARE REQUIREMENTS	5
6	SOFTWARE REQUIREMENTS	8
7	RESULT AND DICUSSION	9
8	CONCLUSION	10
	REFERENCE	11

CHAPTER 1

INTRODUCTION:

In the present-day science and technologies are ground breaking. Due to the technological evolution many refined techniques haveunrolled to ensure the fast recovery of the patients in hospitals. In most of the hospitals a nurse is held accountable for monitoring the IV (Intravenous) fluid level endlessly.But in the government hospitals due to the unavailability of enough number of nurses, observing the fluid is become a major problemin most of the hospitals. This may cause serious problems to the patients such as backflow of blood, blood loss etc. In case nurse isn't available at that time, the patient's blood will flow into the bottle in the invert bearing. By observing theframework and in order to overcome these situations, we have developed a monitoring system where it can monitor the glucose stream. In this we will consider the glucose bottle weight. For measuring the weight of the bottle, we use a weighing scale. As indicated, the weighing scale will control the flow of the fluid. On the other hand, the container will drainand the stopper will close the valve to prevent the backflow of blood into the bottle.

CHAPTER 2

LITERATURE SURVEY:

LITERATURE SURVEY NO 1:

The work presented by Cheng-Ta Chiang demonstrates a CMOS fluid level to recurrence converter with alignment circuits for distinguishing fluid degree of intravenous dribble. An additive innovation to this idea is that the outputs are directly digitized so that their transmission could be possible directly over radio, IR sensors, ultrasonic sensors, PSN etc. Also, a calibration technique used here, before performing adjustment the most extreme straight mistake is 46.44% and post performing adjustment it's reduced to 2.04%. The chip which is proposed is suitable for spotting fluid levels of arterial liquids.

LITERATURE SURVEY NO 2:

The system used power line communication device and telemetry intravenous drip monitoring system an additional LAN network is not required for data communication, using PLC the costs were reduced by using already formed power grids. Additionally, a wireless capacitive sensor was used to detect the remaining amount of IV set, and for transmission of result by RF communication microcontroller was used.

LITERATURE SURVEY NO 3:

Smart Saline stage monitoring device the use of ESP32 and MQTT-S, DebjaniGhosh, AnkitAgarwal, IEEE 20th global convention fitness networking, 2017,IEEE. The valve collects float pulse signs from the Impeller hall glide sensor thruthe load sensor. This load sensor will feel the weight of the glucose and displayedit at the lcd display and send the facts to the health facility personnel's Androidapp.

CHAPTER 3

EXISTING SYSTEM

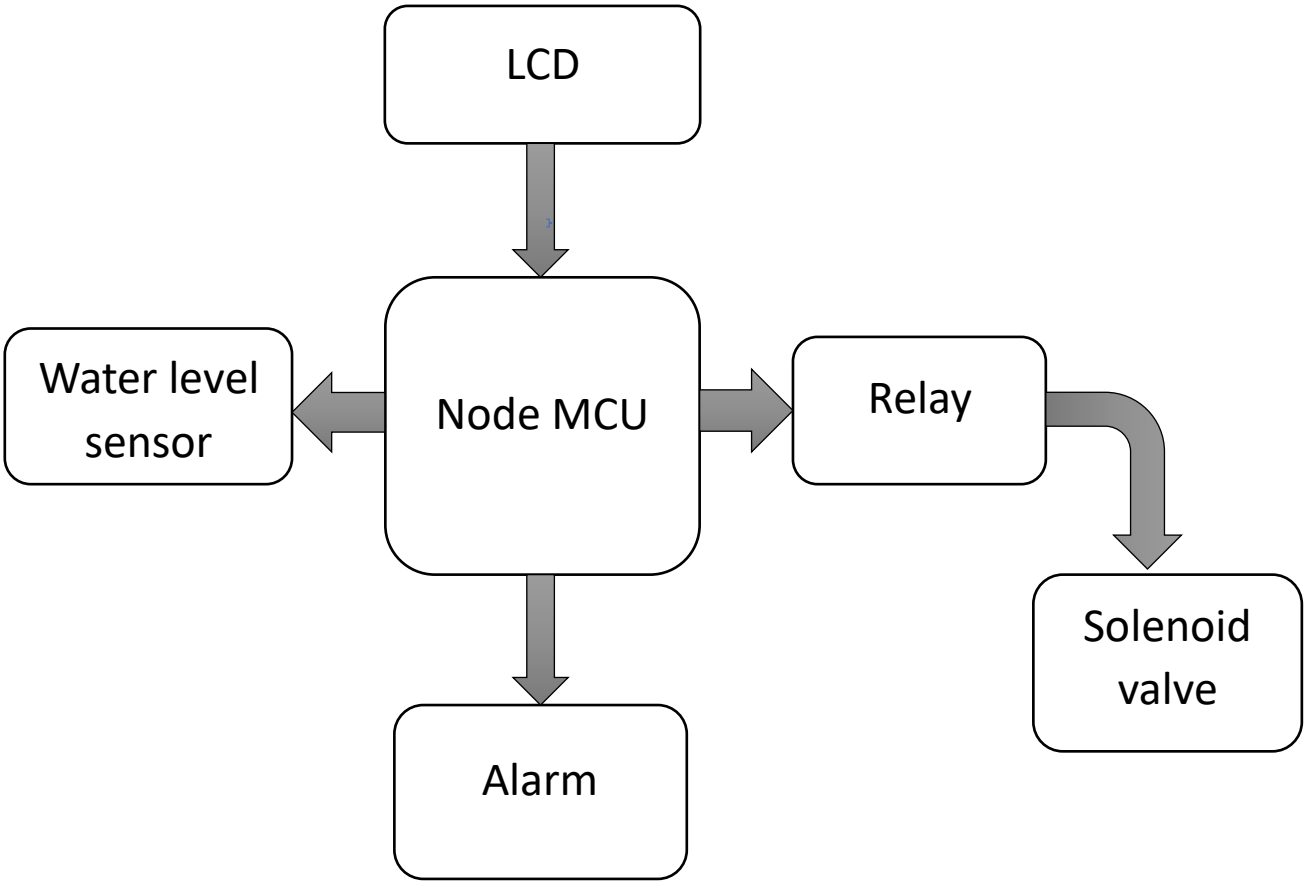
Another dribble imbuement arrangement checking framework has been producedfor emergency clinic and cares office use. At the point when an imbuement liquiddrop is framing, its length and distance across, and in this manner the tricklechamber capacitance, are expanding, causing the change in the yield signal. Thedribble chamber cathode can distinguish the fall of each trickle chamber drop ofliquid. At the point when the mixture arrangement turns out to be free-stream, animbuement liquid drop isn't shaping and the implantation liquid streamsceaselessly. In this manner, the capacitance of the terminal around the dribblechamber doesn't change the yield signal. Then again, the terminal folded over themixture supply polyvinyl chloride tube under the dribble chamber distinguishes thethirty kHz sine wave directed by the implantation liquid. The dribble chamberterminals and the implantation supply PVC tube under the trickle chamberdistinguish each drop of liquid and free-stream, individually.

For patient's consideration in medical clinics, appraisal of the influencedindividual's liquid and electrolyte needs is the greatest fundamentals required. Inall the wellbeing offices, a medical caretaker is accountable for observing the IVliquid stage continually. In any case, the medical caretaker may neglect to replacethe glucose container at the right time due to their bustling timetable. That canmake various issues for the patients which incorporates reverse of blood, loss ofblood, numerous others. To beat a particularly significant circumstance, a lowesteemed RF gadget is proposed in which an IR sensor is utilized as a level sensor. It chips away at the rule of IR sensor yield voltage degree alterations while theintravenous liquid level is beneath the edge esteem. A comparator is utilized toassess the IR yield with a predefined edge process.

CHAPTER 4

PROPOSED SYSTEM:

Observing the patients is done manually which may result in backflow of blood. At the point where bottle gets empty and if health care faculties are not aware of it, it might end up in reverse blood flow. Observing patients in latenightis troublesome and communication between the specialist and patient is less. The answer for this issue is, simultaneously close the valve without human administrator. The water level sensor is used to constantly screen the amount of the saline and it will be shown on the LCD display.After reaching a particular point of a saline water the buzzer alarms and simulatenouly the solenoid valve will be closed and it prevents the back flow of blood.



CHAPTER 5

HARDWARE REQUIREMENTS:

- NodeMCU
- Solenoid valve
- Water level sensor
- LCD Display
- Buzzer

1. NodeMCU :

The NodeMCU (Node MicroController Unit) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains all crucial elements of the modern computer: CPU, RAM, networking (wifi), and even a modern operating system and SDK. When purchased at bulk, the ESP8266 chip costs only $2 USD a piece. That makes it an excellent choice for IoT projects of all kinds.

2. Solenoid valve:

A solenoid valve is one which interprets electrical commands to execute mechanical task, the customary application of this device is with stopping/controlling the flow of fluids and gases. Diversifications of the same are many but the fundamental variations are the command driven ones and the straight approached ones. Command driven valves, the most broadly utilized, use framework line strain to lock and unlock primary hole in the device framework.

3.Water level sensor

The water level sensor is a device that measures the liquid level in a fixed container that is too high or too low. According to the method of measuring the liquid level, it can be divided into two types: contact type and non-contact type. The input type water level transmitter we call is a contact measurement, which converts the height of the liquid level into an electrical signal for output. It is currently a widely used water level transmitter.

4.LCD Display:

An LCD is a small low cost display. It is easy to interface with a microcontroller because of an embedded controller. This controller is standard across many displays which means many micro-controllers have libraries that make displaying messages as easy as a single line of code. It offers high flexibility to users.

5.Buzzer:

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

CHAPTER 6

SOFTWARE REQUIREMENTS:

Embedded C

```
#include <Wire.h>
#include <LCD_I2C.h>
LCD_I2C lcd(0x27);



#define water A0
#define relay D5
#define buzzer D8
int waterval;
void setup()
{
 Serial.begin(9600);
  Wire.begin(); // gpio 2 and gpio 0 which are D4, and D3
  pinMode(relay,OUTPUT);
  pinMode(water,INPUT);
    pinMode(buzzer,OUTPUT);
  lcd.begin();                //Init the LCD
  lcd.backlight();            //Activate backlight
  lcd.home();
  lcd.setCursor(0,0);

  lcd.print("TRIP LEVEL ");
 lcd.setCursor(0,1);
lcd.print("MONITORING");
delay(3000);
lcd.clear();
}
```

```
void loop()
{
waterval=analogRead(water);

  waterval=map(waterval,0,1023,0,100);
 lcd.setCursor(0,0);
lcd.print("GLUCOSE : ");

lcd.print(waterval);
 lcd.print("              ");
  lcd.setCursor(0,1);
lcd.print("                        ");


  if(waterval<=50){

    lcd.setCursor(0,0);
    lcd.print("TRIP LEVEL LOW");
    lcd.setCursor(0,1);
    lcd.print("VALUE OFFED");
    digitalWrite(relay,HIGH);
    digitalWrite(buzzer,LOW);
    delay(1000); digitalWrite(buzzer,HIGH);
    }
  else{digitalWrite(relay,LOW);}


  delay(300);

}
```

CHAPTER 7

RESULT AND DICUSSION:

This automation system with solenoid system is developed for the healthcare system of the human beings. The control system can be the better in time consumption, the system can easily control the hardware by use the Node MCU controller. This project provides the advantages for nurse/assists in healthcare system .

CHAPTER 8

CONCLUSION:

This paper overcomes the consequences that occurs due to negligence of monitoring the IV flow. Using proposed monitoring, one can monitor the level of saline bottle from a distant position which will aid in building smart health care system. Affordable, precise and efficient system that undoubtedly works in a smooth manner. Electronic valve with Quantitative control system, in order to realize for flow control in drip, as a small, compact and advanced technology in the medical field. Here the continuous flow of medicine through drip to the patient is automatically controlled for three different flow rates 25 %, 50%, 75% of the IV cannula pipe. This can be done by measuring the level of medicine through the drip and is compared with set point and flow of medicine is stopped when it reaches the desired critical point. Here IOT replaces manual switches by software like user friendly mobile apps so that doctors can control flow rate by sitting at place. IOT concept models can be implemented for remote destinations like villages. Doctors can sit in a different city, different floor of a building, or in their house and patient can be anywhere, monitoring and flow rate controlling can be done.

REFERENCE

[1] Hikaru Amano, Hidekuni Ogawa, Hiromichi Maki, Sosuke Tsukamoto, Yoshiharu Yonezawa, W. Morton Caldwell, “A remote drip infusion monitoring system employing Bluetooth ”EMBC, IEEE. ISSN:1557-170X.

[2] Xinling Wen, “Design of Medical Infusion Monitor and Protection System Based on Wireless Communication Technology” IITA '08. ISBN: 978-0-7695-3497-8(Volume: 2)

[3] Hiromichi Maki, Sosuke Tsukamoto, Yoshiharu Yonezawa, Hikaru Amano, W. Morton Caldwell, Hidekuni Ogawa, “A new drip infusion solution monitoring system with a free-flow detection function”EMBC, IEEE. ISSN: 1557- 170X.

[4] Priyadharshini.R, Mithuna.S, VasanthKumar.U, KalpanaDevi.S, Dr.SuthanthiraVanitha.N, “Automatic Intravenous Fluid Level Indication System for Hospitals”, IJRASET.ISSN: 2321-9653 1093

[5] Bailey Flynn, Matthew Nojoomi, Michael Pan, Kamal Shah, “Intravenous Dehydration Relief in Pediatrics”, IGHT

[6] Smart Saline Level Monitoring System using ESP32 And MQTTS,Debjanighosh,AnkitAgarwal, IEEE 20th international conference health networking.

[7] Smart Drip Infusion Monitoring System for Instant Alert– Through nRF24L01, Ramisha Rani K ,Shabana N, Tanmayee, Loganathan S, Dr.Velmathi G,2017,IEEE.

[8] Research on Embedded Electro-hydraulic proportional valve Controller, Lu Quan Sen, Bao Hong, Li Jun,2009.

[9] V.Ramya, B.Palaniappan, Anuradha Kumari “Embedded Patient Monitoring System” International Journal of Embedded Systems and Applications (Ijesa) Vol.1, No.2, December 2011.

[10] “Solenoid-operated valve control under adverse mechanical conditions such as vibrations or shocks” by Barleanu.A, Faculty of Automation & Control Engineering, University of Lasi,Romania published in 16th International Conference on System Theory,Control and Computing (ICSTCC) held between 12-14 Oct’2012.

[11] K. Yasoda, R. Ponmagal, K. Bhuvaneshwari, and K. Venkatachalam, "Automatic detection and classification of EEG artifacts using fuzzy kernel SVM and wavelet ICA (WICA)," Soft Computing, vol. 24, no. 21, pp. 16011-16019, 2020.

[12] C. Viji, N. Rajkumar, S. Suganthi, K. Venkatachalam, and S. Pandiyan, "An improved approach for automatic spine canal segmentation using probabilistic boosting tree (PBT) with fuzzy support vector machine," Journal of Ambient Intelligence and Humanized Computing, pp. 1-10, 2020