NETTUR TECHNICAL TRAINING FPUNDATION

DTC-BELUR

PROJECT REPORT

ON

"IOT BASED INDUSTRIAL MONITORING AND CONTROLLING SYSTEM "

PROJECT DONE BY,

PROJECT GROUP (W)

SHIVANAND K PATTAR   [DTC1516146]

MANJUNATH G L   [DTC1516146

SHASHIKUMAR I HULIKATTI   [DTC1516142]

SUNIL REDDY   [DTC1516163]

GUIDE   :   Mr. PRAVEENKUMAR S.

Securing your Future with your own Hands

Certificate of Excellence

This is to certify that the dissertation work entitled "IOT BASED INDUSTRIAL MONITORING AND CONTROLLING SYSTEM" has been submitted by,

SHIVANAND K PATTAR   [DTC1516146]

SHASHIKUMAR I HULIKATTI   [DTC1516142]

SUNIL REDDY   [DTC1516163]

SREESHA T   [DTC1516158]

In partial fulfillment for the award of the Diploma in Mechatronics Training, NTTF in the year 2018-2019

EXAMINER 1   EXAMINER 2

PROJECT GUIDE   PRINCIPAL

[Mr. PRAVEEN S]   [Mr. SUDHINDRA RAO SUNKAD]

NETTUR TECHNICAL TRAINING FPUNDATION

DTC-BELUR

IMS POLICY

We are committed to improve training services through

Systematic training responsive to customer needs and emerging technology

Engagement of stakeholders at all levels

Fulfilling compliance obligations

Protection of environment and prevention of environmental pollution

Providing clean, healthy and safe work environment and preventing ill health and injury

Continual improvement in integrated management system performance

IMS OBJECTIVES

- To train the youth in employable skills throughout holistic training

- To inculcate the culture "produce while learning and learn while producing"

- To keep pace with the technological developments

- To support industries and institutes in dissemination of technical and industrial knowledge and skill

- Enhance the quality status of centres

- Achieve training man hours

- Energy and resource conservation

- Reduction in waste generation

- Ensure accident free work environment

- Compliance to EOHS legal and other requirements

<u>PROJECT BRIEF</u>

The purpose of this project is to   control and monitoring the industry from anywhere in the world through internet .

The primary objective of this project is to replace a wiring and switches with node mcu and wireless communication.

Internet of things is an fourth generation of industry which is trending now and in future .

We can control physical object anywhere in the world using applications in android smart phones.

The next future is industry 4.0 ,so we choose this project.

ACKNOWLEDGEMENT

I feel privileged to acknowledge the contribution of several people for the successful completion of the project. My report acknowledges some guidance, supervision and lot of inspiration. It is time to acknowledge my obligations to all who have extended their cooperation directly or indirectly all along my study tenure of project work.

First and foremost I would like express my sincere thanks to beloved **Mr. SUDHINDRA RAO SUNKAD Principal, DTC centre, and NTTF** for providing the academic environment, which nurtured practical skills, contributing to the success of my project.

I take this opportunity to express indebt gratitude to **Mr. SHANKAR MAROL** Vice principal, for his continual support & inspiration to us, which contributed to success of our project.
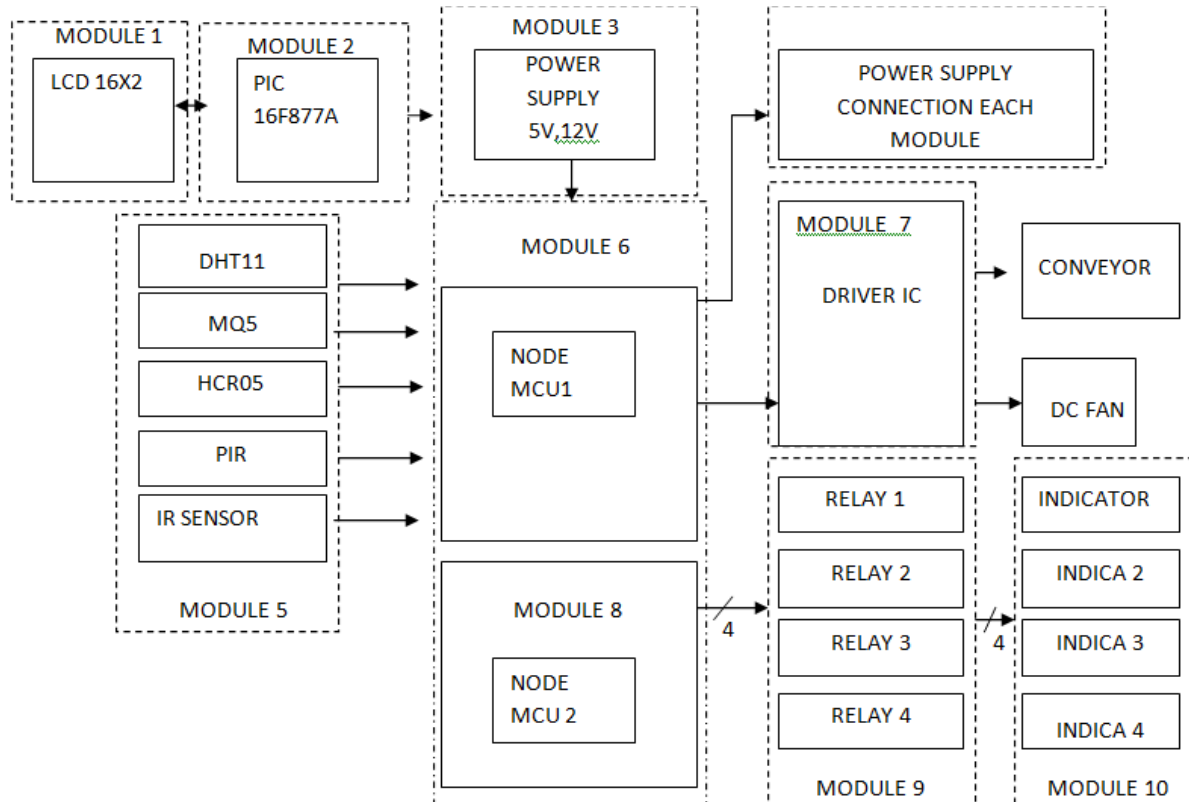
We would like to express our sincere thanks to

"Mr. PRAVEENKUMAR SURYAVANSHI" With whom we had numerous discussions and whose valuable suggestions made us feel comfortable throughout the project.

Our sincere thanks to all teaching & non-teaching staff of **Mechatronics Department, DTC centre, NTTF** for all the facilities provided without which, we could not have been progressed with our project work.

CONTENTS

MODULAR BLOCK DIAGRAM

MODULE 1	MODULE 2	MODULE 3	POWER SUPPLY
LCD 16X2	PIC 16F877A	POWER SUPPLY 5V,12V	CONNECTION EACH MODULE

MODULE 6

MODULE 5
- DHT11
- MQ5
- HCR05
- PIR
- IR SENSOR

NODE MCU1

NODE MCU 2

MODULE 8

MODULE 7

DRIVER IC → CONVEYOR

DC FAN

MODULE 9
- RELAY 1
- RELAY 2
- RELAY 3
- RELAY 4

4

MODULE 10
- INDICATOR
- INDICA 2
- INDICA 3
- INDICA 4

4

- In this block diagram there are 10 modules but we considered all sensors as a one module so totally there are 6 modules.
- we are using two node MCU for controlling and monitoring purpose
- the sensors like temperature ,humidity, ultrasonic , PIR, and ir sensors are used for monitoring purpose.
 For controlling we are using led's, fan, siren, and motors.

MSD Project Process Chart

GROUP NAME:	"W"
PROJECT TITLE :	*" INDUSTRIAL MONITORING SYSTEM USING IOT"*
GUIDE NAME:	*Mr.PRAVEEN SURYAVANSHI*

NTTF
Securing your Future with your own Hands

SL.NO.	TASK	SEP WEEK 1	SEP WEEK 2	SEP WEEK 3	SEP WEEK 4	OCT WEEK 1	OCT WEEK 2	OCT WEEK 3	OCT WEEK 4	NOV WEEK 1	NOV WEEK 2	NOV WEEK 3	NOV WEEK 4	DEC WEEK 1	DEC WEEK 2	DEC WEEK 3	DEC WEEK 4
1	SYNOPSIS SUBMISSION	██	██	██													
2	COMPONENTS SELECTION			██	██												
3	CIRCUIT DESIGN					██											
4	MECHANICAL DESIGN					██	██										
5	MODULE 1 &2(SOLDERING &						██	██									
6	MODULE 3&4 (SOLDERING & TESTING)						██	██									
7	MODULE 5&6 (SOLDERING & TESTING)								██	██							
8	MODULE 7&8 (SOLDERING & TESTING)								██	██							
9	MECHANICAL DESIGNING & ASSEMBLY										██	██					
10	PROGRAMMING & SIMULATION											██	██				
11	TROUBLE SHOOTING												██				
12	WIRE HARNASSING & LABELING												██	██			
13	DOCUMENTATION	██	██	██	██	██	██	██	██	██	██	██	██	██			
14																	

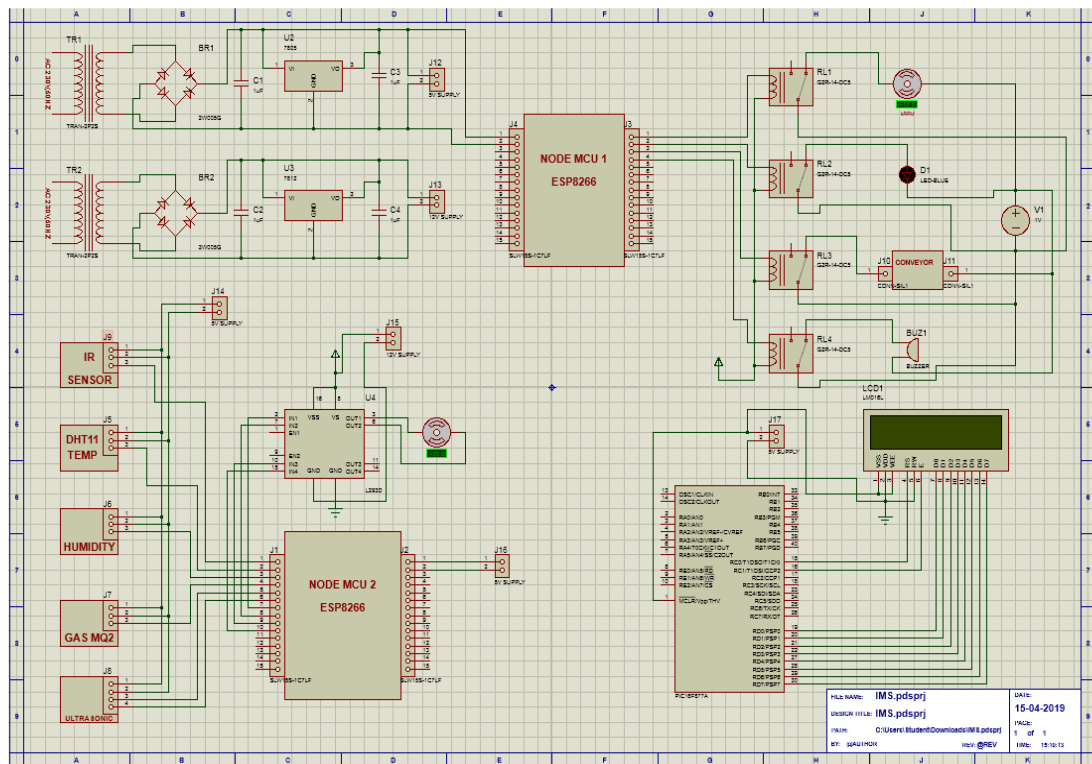| PLANNED	██
ACTUAL	██

PROJECT GUIDE   SECTION IN CHARGE

HARDWARE LAYOUT – 3D
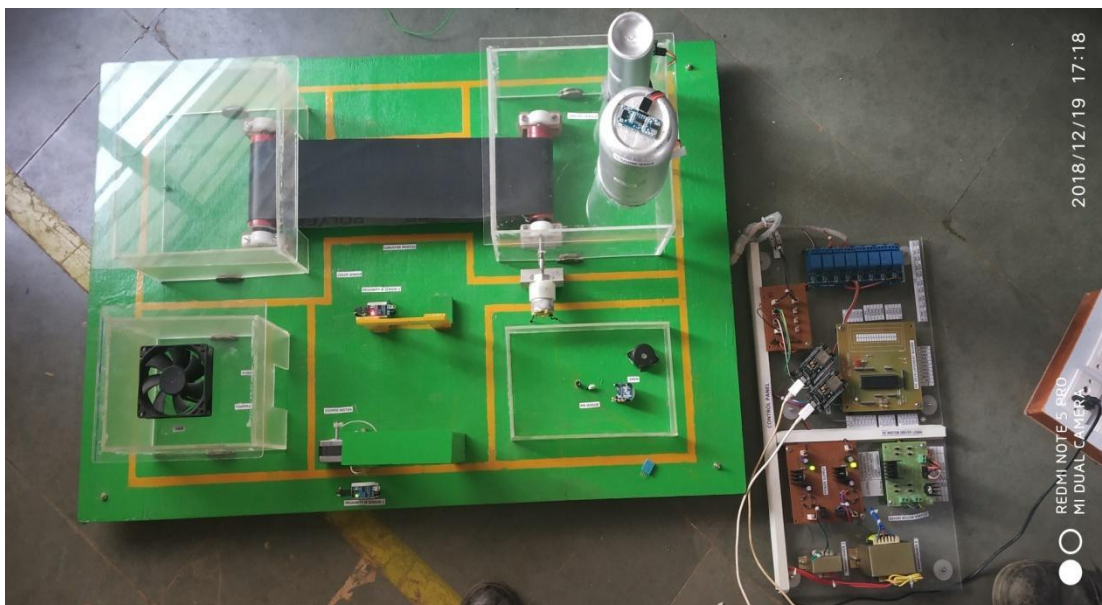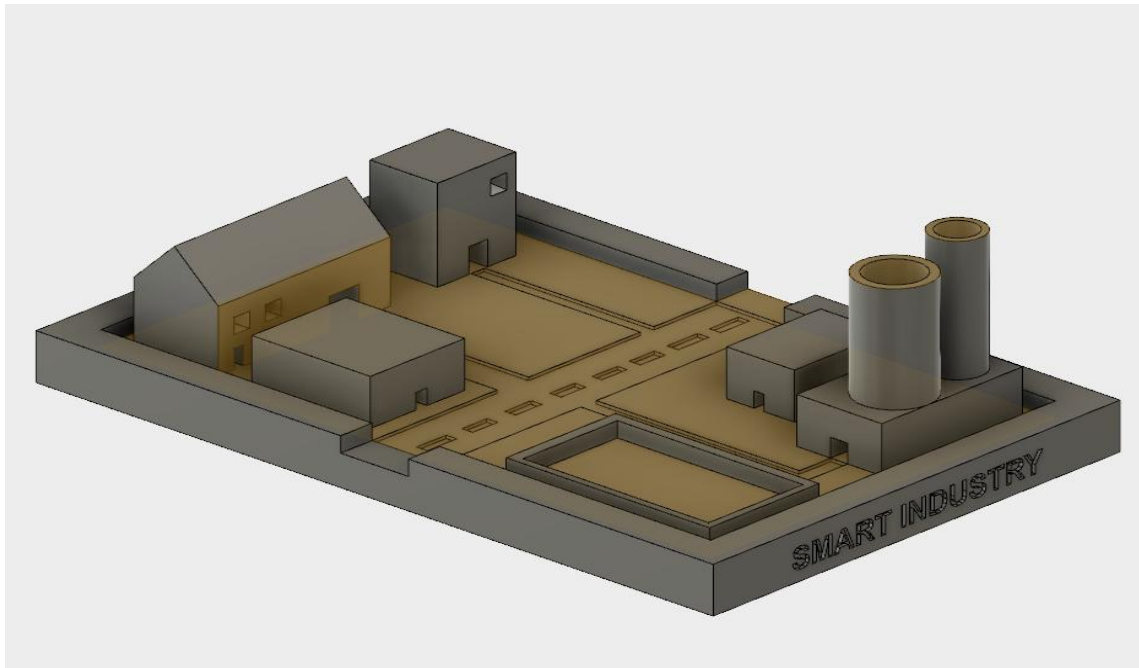
INTER CONNECTION DIAGRAM
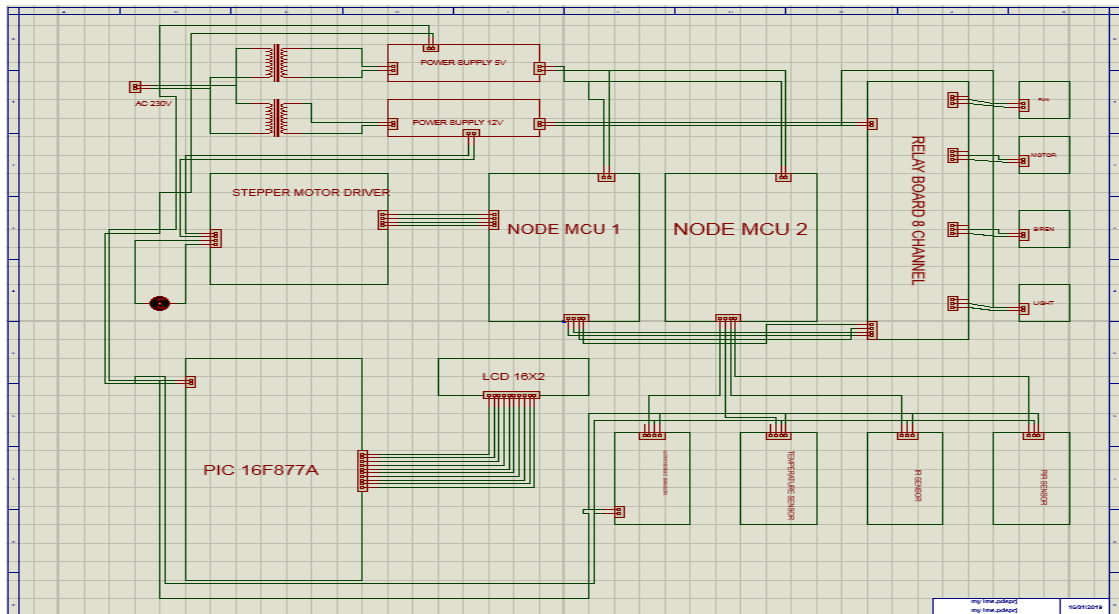
SCHEMATIC DIAGRAM

INTRODUCTION

- Internet of things [IOT] is an fourth generation of industry which is trending now and in future

- Main aim of our project is to monitoring and controlling the industry through internet.

- sensors and actuators are the main components of this project which interfaces to the controller
- Node MCU

- Industry 4.0 is trending now.

- We can control physical object anywhere in the world using applications in android smart phones

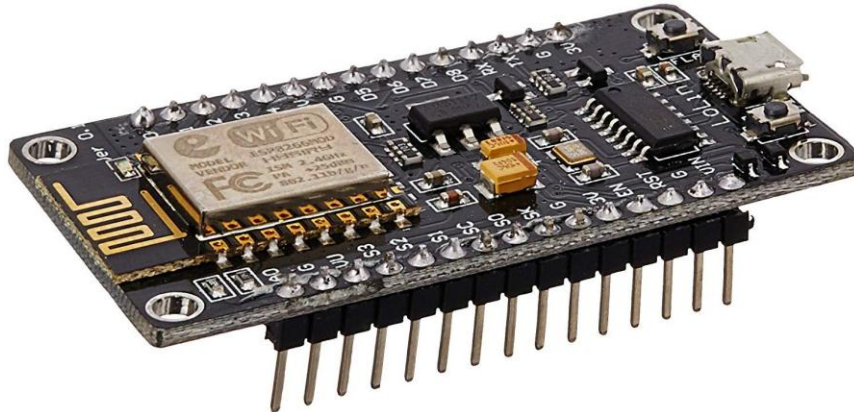- The next future is industry 4.0, so we choose this project.

THE PROJECT CONSISTS OF MAJOR PARTS LIKE

Module 1	POWER SUPPLY 12V AND 5V
Module 2	PIC DEVELOPMENT BOARD
Module 3	NODE MCU ESP8266
Module 4	ALL SENSORS AS A MODULE
Module 5	8 CHANNEL RELAY MODULE
Module 6	L298N MOTOR DRIVER MODULE

ABSTRUCT

MODULE1 : NODE MCU

WHAT IS Node MCU?

- Node MCU is an open source IOT platform based on ESP8266 -12E.
- It is one of the most stable ESP8266 Boards.
- Node MCU supports a variety of development environments. Eg. node Lua , Arduino etc.
- The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.
- It can be integrated with sensors and actuators
- It includes firmware which runs on the ESP8266Wi-Fi SoC from Espress if Systems, and hardware which is based on the ESP-12 module.
- The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language.
  - It is based on the Lua project, and built on the Espress if Non-OS SDK for ESP8266.
- NodeMCU was created shortly after the ESP8266 came out. On December 30, 2013
- Another important update was made on 30 Jan 2015, when Devsaurus ported the NodeMCU project, enabling NodeMCU to easily drive LCD, Screen, OLED, even VGA displays.
- By summer 2016 the NodeMCU included more than 40 different modules

FEATURES

Arduino like hardware IO

- Advanced API for hardware IO, which can dramatically reduce the redundant work for configuring and manipulating hardware. Code like arduino, but interactively in Lua script.

Nodejs style network API

- Event- driven API for network application, which facilities developers writing code running on a 5mm*5mm sized MCU in Nodejs style. Greatly speed up your IOT application developing process.

Lowest cost WI-FI

- Less than $2 WI-FI MCU ESP8266 integrated and easy to prototyping development kit. We provide the best platform for IOT application development at the lowest cost.

Writing sketches/program:

- Programs written using arduino software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extention.ino.
- The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving the exporting and also display errors.
- The console displays text output by the arduino software (IDE),including complete error messages and other information. The bottom right hand corner of the window displays the configured board and serial port.
- The tool bar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Verify

Check your code for errors compiling it.

Upload

Compiles your code and uploads it to the configured board. See uploading below for details.

Open

Present a menu of all the sketches in your sketchbook, clicking one will open it within the current window overwriting its content.
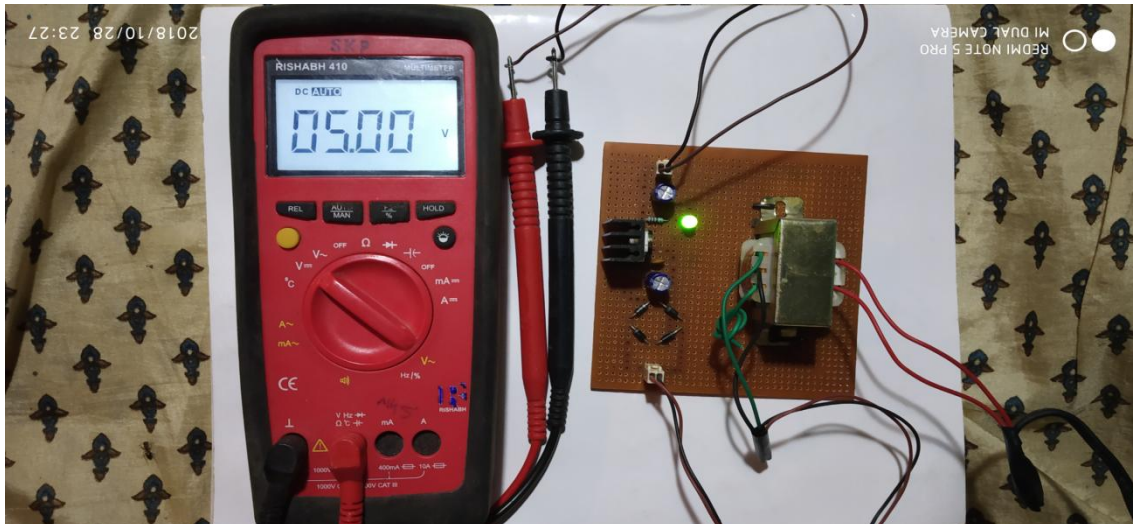
Save

Save your sketch.

Serial monitor

Open the serial monitor.

MODULE 2

5V-POWER SUPPLY

- 5v power supply is used for PIC boards and node mcu and for all sensors.
- 5v power supply by using regulator IC 7805, input voltage range is 7v to 35v and current up to 1A.
- Regulator we are using here to give the fixed output voltage and current.
- Here we are using the step-down transformer for our desired output voltage.
- We used 9-0-9, 2A step-down transformer because the regulator IC need 7v minimum voltage for that reason we are using this transformer.
- Diode we are used here is 1N4007 because it will convert the AC to DC with high current.
- Capacitors , IC's, resistors etc…. many other components are used in this module.

DESIGN FOR 5V POWER SUPPLY

1) SELECTION OF REGULATOR IC:-

LM 7805:-
Input voltage range =7v-35v.
Output voltage range = V max 5.2v, V min 4.8v.

2) SELECTION OF TRANSFORMER:-

Stepdown transformer :- secondary voltage is
Greater then the primary voltage.(rectifier has is own voltage drop 1.4v)
V sec=7v + 1.4v
V sec= 8.4v (peak value)

3) SELECTION OF DIODE:-
1N4007=Capable of withstanding a higher reverse voltage of 1000V, 1A

4) SELECTION OF CAPACITOR:-

1) C= I out/2*3.142*F V out
2) C=500/2*3.142*50*5
3) C= 3.1847*10'-4
4) C=318 uf
5) C= nearly =470uf

5) RIPPLE FACTOR:-

Y=0.6928
Y=1/(4sqrt3FRC)
C=1/(4sqrt3 F R Y)
C=1/(4*1.7*50*100 *0.6928)
C=0.000428   WHICH IS <1

12V POWER SUPPLY

- 12v power supply is used for PIC boards and node mcu and for all sensors.
- 12v power supply by using regulator IC 7812, input voltage range is 7v to 35v and current up to 2A.
- Regulator we are using here to give the fixed output voltage and current.
- Here we are using the step-down transformer for our desired output voltage.
- We used 12-0-12, 2A step-down transformer because the regulator IC need 7v minimum voltage for that reason we are using this transformer.
- Diode we are used here is 1N4007 because it will convert the AC to DC with high current.
- Capacitors, IC's, resistors etc…. many other components are used in this module.

CIRCUIT DIAGRAM
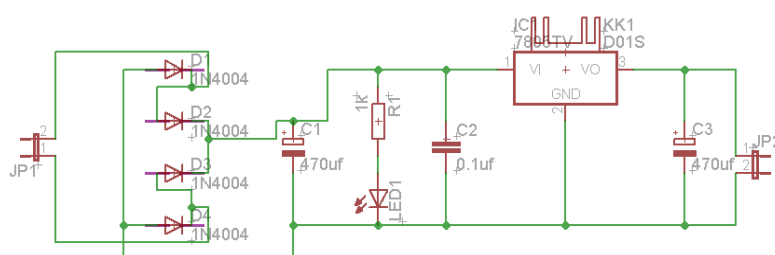
DESIGN FOR 12V POWER SUPPLY

1) SELECTION OF REGULATOR IC:-

   LM 7812:-
   Input voltage range =13v-35v.
   Output voltage range =V max 12.2v, V min 11.8v.

2) SELECTION OF TRANSFORMER:-

   Stepdown transformer :- secondary voltage is
   Greater then the primary voltage.(rectifier has is own
voltage drop 1.4v)
   V sec = 10v + 1.4v
   V sec = 11.4v (peak value)

3) SELECTION OF DIODE:-

   1N4007 = Capable of withstanding a higher reverse voltage
of 1000v , 1A

4) RIPPLE FACTOR:-

   Y=0.6928
   Y=1/(4sqrt3FRC)
   C=1/(4sqrt3 F R Y)
   C=1/(4*1.7*50*100 *0.6928)
   C=0.000428   WHICH IS <1

5) SELECTION OF CAPACITOR:-

   6) C= I out/2*3.142*F V out
   7) C=500/2*3.142*50*5
   8) C= 3.1847*10'-4
   9) C=318 uf
   10)   C= nearly =470uf

MODULE 3

8-CHANNEL RELAY
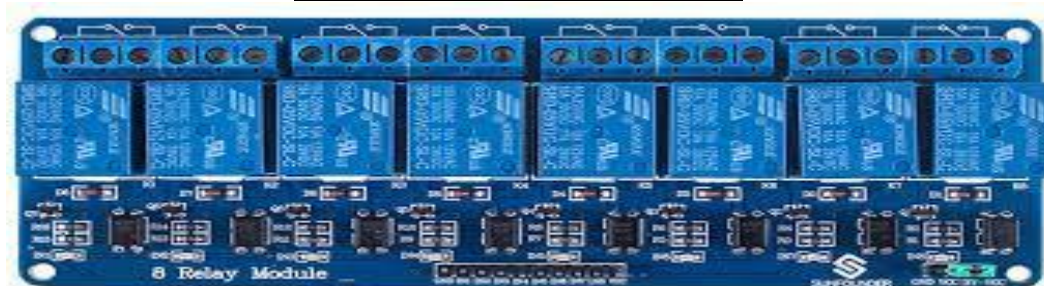
- 8- Channel 5v relay module.
- This is a 5v 8-channel relay board, able to control various appliances, and other equipments with large current.
- A relay is an electrically operated switch.
- Many relays use an electromagnet to mechanically operate the switch and provide electrical isolation between two circuits.
- It works well with 3.3v and 5v logic requiring little current drive.
- Max voltage can apply from 3.3v to 35v and current up to 2A.
- In our project we are using the relay as a actuating the motors, fans, conveyor, lights on/off and alarm signal.
- For boosting the current in the circuit we are using the ULN2803 IC.
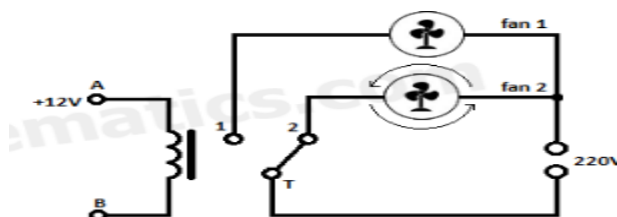
- This is the internal connection of the all relay
- A relay is an electrically operated switch.
- Many relay use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays.

MODULE 4-ALL SENSORS AS A MODULE

SENSOR 1-PROXIMITY IR SENSOR

- A proximity IR (INFRARED SENSOE) sensor is a sensor able to detect the presence of nearby objects without any physical contact.
- A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation.
- In our project we are using this sensor is to detect the object in prohibited area and near the conveyor.
- Whenever it will detect the signal it will send to our IOT web page
- For door opening or closing system and head count in industry.
- COMPONENTS FOR IR SENSOR
    1) LM358 IC
    2) RESISTORS
    3) LED(Light Emitting Diode)

- When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC.

SENSOR 2-PIR SENSOR

- It is a passive infra red sensor is an electronic sensor that measures infrared light radiating from objects on its field of view.
- In our project we are using the PIR sensor to detect the motion in prohibited area.
- When it will detect the motion in the prohibited area it will send the signal through the node MCU to the web page
- 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.
- Features
    1. Complete with PIR, Motion Detection.
    2. Dual Element Sensor with Low Noise and High Sensitivity.
    3. Supply Voltage – 5V.
    4. Delay Time Adjustable.
    5. Standard TTL Output.

SENSOR 3-ULTRASONIC SENSOR

- Ultrasonic transducer or sensor are a type of acoustic sensor divided into three broad categories.

- Ultrasound can be used for measuring speed and direction.
- Here we are using it as a fuel level indicator in the tank.

- Sensor specification is HC-SR04

- Also it measures the distance of the object.

- It will work on transmitter and receiver.

- Transmitter sends the signal when it reflects back the receiver will response to the signal.

SENSOR 4 - GAS SENSOR (MQ2)

- The Grove - Gas Sensor (MQ2) module is useful for gas leakage detection (home and industry).

- It is suitable for detecting H2, LPG, CH4, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurement can be taken as soon as possible.

- The sensitivity of the sensor can be adjusted by potentiometer

- In our project we are using this sensor for detecting the leakage of gas in the specific area.

- This sensor having a quick output response whenever it will sense the gas.

- It will send the data to the webpage we created in the things speak graph.

SENSOR-5 TEMPERATURE SENSOR

DHT11
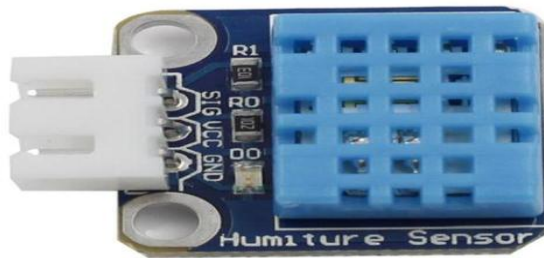
- The digital temperature and humidity sensor DHT11 is a composite sensor that contains a calibrated digital signal output of temperature and humidity

- The sensor includes a resistive sense of wet component and an NTC temperature measurement device, and is connected with a high-performance 8-bit microcontroller.

- 1) A humiture sensor module to test temperature and humidity, which uses the sensor DHT11.
  2) Humidity measurement range: 20 - 90%RH
  3) Temperature measurement range: 0 - 60℃
  4) Output digital signals indicating temperature and humidity.

- In our project we are using this sensor for the measuring of both humidity and temperature in the plant.

- It will send the data of both temperature and humidity to the web page.

- It is having a quick response to the input and it will give the output.

MODULE-5

MOTOR DRIVER

- The L298N is a dual H-Bridge motor driver which allows speed and direction control of two DC motors at the same time

- The module can drive DC motors that have voltages between 5 and 35V, with a peak current up to 2A

- In our project we are using the motor driver for the opening and closing of the door at the industry.

- By using the L298N motor driver IC we are controlling the motor.

- The reason to choose the motor driver is it boost the current and increases the motor rotating speed.

- Here we are connecting the enabling signal from the node MCU to the motor driver to control the direction of the motor.

MODULE 6

PIC DEVELOPMENT   BOARD
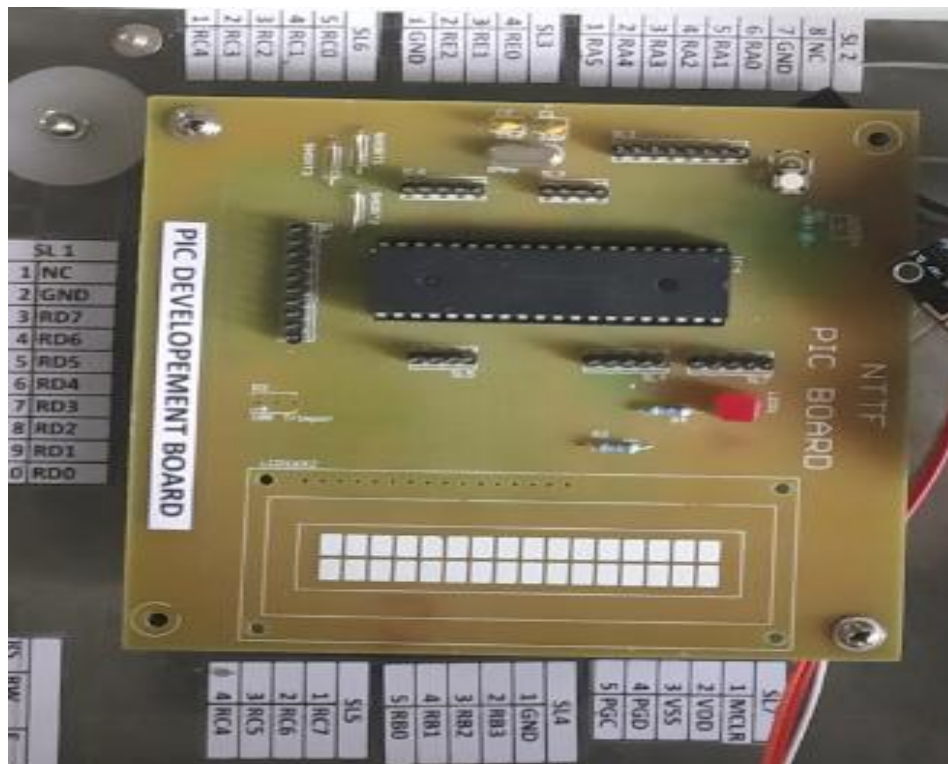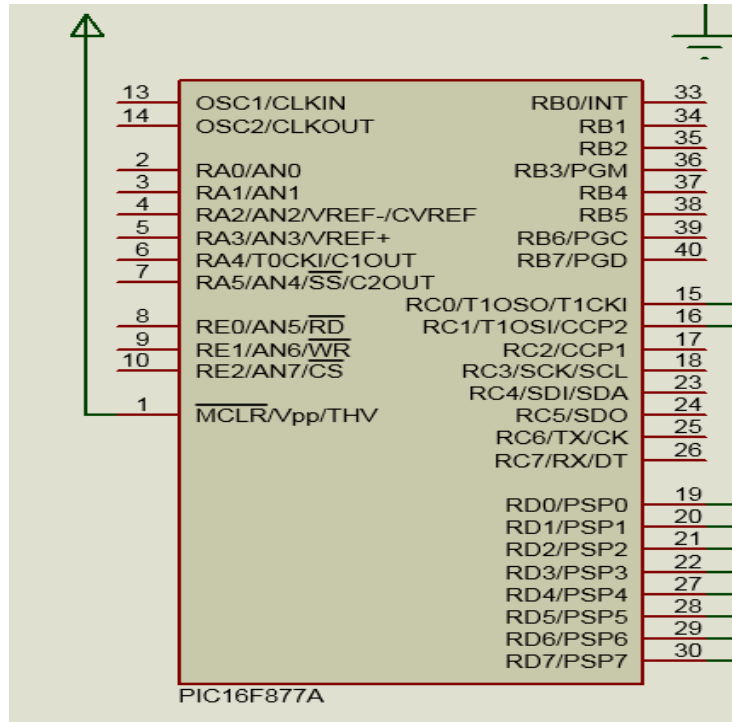
EXPLAINATION

- This PIC board is used in our project to display our project name continuously

- To do this PIC development board some components are required that is crystal,   resisters, capacitor, IC PIC16F877A and lcd 16x2.

- LCD is connected with PIC controller in port d.

- According to the delay the name of the project will continuously display the name

PROGRAM FOR PIC16F877A

LIST P=16F877A

#INCLUDE<P16F877A.INC>

_CONFIG 0X3F7A

START:

BSF STATUS,RP0

MOVLW 0X00

MOVWF TRISD

BCF TRISC,0

BCF TRISC , 1

BCF STATUS , RP0

BCF PORTC,1

MOVLW 0X38

MOVWF PORTD

CALL CLK

MOVLW 0X0C

MOVWF PORTD

CALL CLK

MOVLW 0X01

MOVWF PORTD

CALL CLK

MOVLW 0X80

MOVWF PORTD

CALL CLK

BSF PORTC,1

MOVLW 'I'

MOVWF PORTD

CALL CLK

MOVLW 'N'

MOVWF PORTD

CALL CLK

MOVLW 'D'

MOVWF PORTD

CALL CLK

MOVLW 'U'

MOVWF PORTD

CALL CLK

MOVLW 'S'

MOVWF PORTD

CALL CLK

MOVLW 'T'

MOVWF PORTD

```
CALL CLK

MOVLW 'R'

MOVWF PORTD

CALL CLK

MOVLW 'I'

MOVWF PORTD

CALL CLK

MOVLW 'A'

MOVWF PORTD

CALL CLK

MOVLW 'L'

MOVWF PORTD

CALL CLK

BCF PORTC,1

MOVLW 0X0C0

MOVWF PORTD

CALL CLK

MOVLW 0X01

MOVWF PORTD

CALL CLK

MOVLW 0X80

MOVWF PORTD

CALL CLK

BSF PORTC,1


MOVLW 'M'
```

MOVWF PORTD

CALL CLK

MOVLW 'O'

MOVWF PORTD

CALL CLK

MOVLW 'N'

MOVWF PORTD

CALL CLK

MOVLW 'I'

MOVWF PORTD

CALL CLK

MOVLW 'T'

MOVWF PORTD

CALL CLK

MOVLW 'O'

MOVWF PORTD

CALL CLK

MOVLW 'R'

MOVWF PORTD

CALL CLK

MOVLW 'I'

MOVWF PORTD

CALL CLK

MOVLW 'N'

MOVWF PORTD

```
CALL CLK

MOVLW 'G'

MOVWF PORTD

CALL CLK

BCF PORTC,1

MOVLW 0X0C0

MOVWF PORTD

CALL CLK

MOVLW 0X01

MOVWF PORTD

CALL CLK

MOVLW 0X80

MOVWF PORTD

CALL CLK

BSF PORTC,1


MOVLW 'S'

MOVWF PORTD

CALL CLK

MOVLW 'Y'

MOVWF PORTD

CALL CLK

MOVLW 'S'

MOVWF PORTD

CALL CLK

MOVLW 'T'
```

MOVWF PORTD

CALL CLK

MOVLW 'E'

MOVWF PORTD

CALL CLK

MOVLW 'M'

MOVWF PORTD

CALL CLK

MOVLW '-'

MOVWF PORTD

CALL CLK

MOVLW 'S'

MOVWF PORTD

CALL CLK

MOVLW 'T'

MOVWF PORTD

CALL CLK

MOVLW 'A'

MOVWF PORTD

CALL CLK

MOVLW 'R'

MOVWF PORTD

CALL CLK

MOVLW 'T'

MOVWF PORTD

CALL CLK

```
MOVLW 'E'

MOVWF PORTD

CALL CLK

MOVLW 'D'

MOVWF PORTD

CALL CLK

MOVLW '.'

MOVWF PORTD

CALL CLK

MOVLW '.'

MOVWF PORTD

CALL CLK

MOVLW '.'

MOVWF PORTD

CALL CLK


GOTO START


CLK:BSF PORTC,0

CALL DELAY

BCF PORTC,0


DELAY:MOVLW 0X01

MOVWF 0X20

L2:MOVLW 0X07
```

```
MOVWF 0X21

L1:MOVLW 0X0FF

MOVWF 0X22

L:DECFSZ 0X22,1

GOTO L

DECFSZ 0X21,1

GOTO L1

DECFSZ 0X20,1

GOTO L2

RETURN

END
```

<u>BLYNK APPLICATION</u>

- Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device.

- After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen.

- Whatever your project is, there are likely hundreds of tutorials that make the hardware part pretty easy, but building the software interface is still difficult.

- In our project we have controlling and monitoring parts.
- Here we are using the blynk app for controlling part in our project.

- And also to see the fuel level in the tank by the graphical method.

- The app is connected with the node MCU to perform the tasks.

- Through the app we are sending the signal to the node MCU to perform the selected function.

BLYNK APP DESIGN OF OUR PROJECT
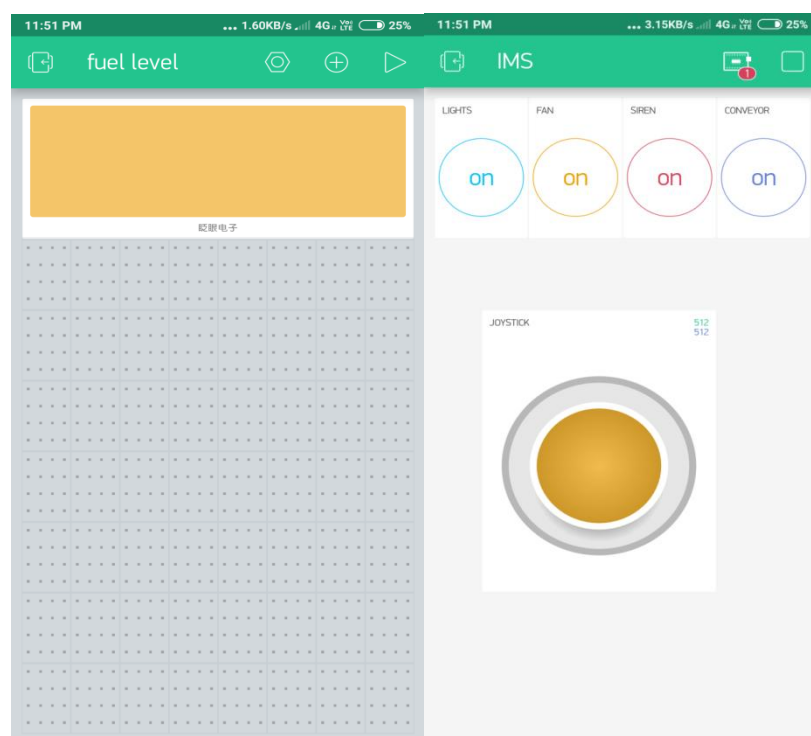
THINGSPEAK
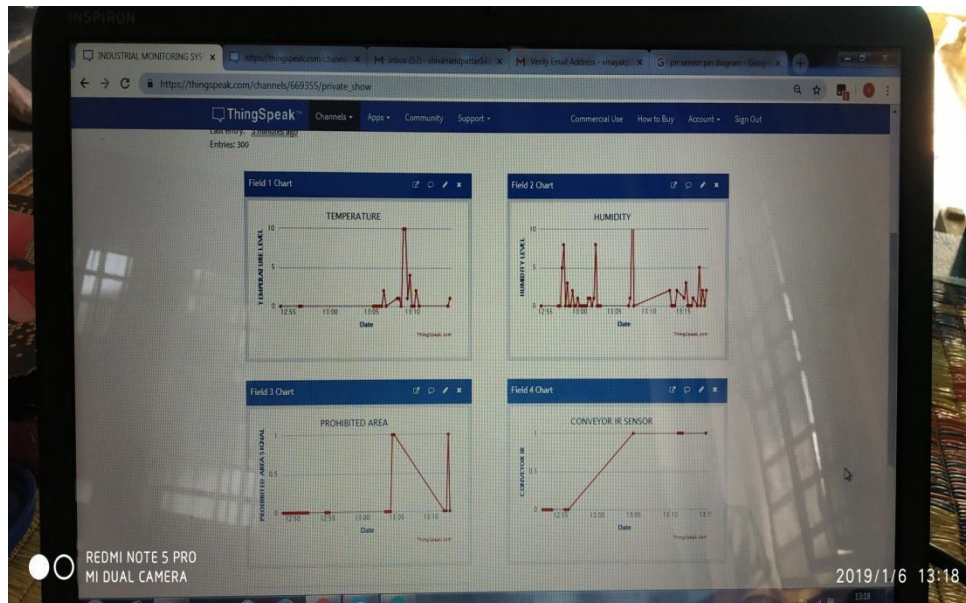
- ThingSpeak is an open source internet of things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network.

- ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.

- ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications.

- ThingSpeak has integrated support from the numerical computing software MATLAB from Math work.

- Here we are using this website to show the data in graphical method.

- It is easy to understand the data analysis.

- It is very easy to set the data limit and the data will updates according to the timing what we set.

IMS FEEDS DATA IN XL SHEET

	A	B	C	D	E	F	G	H
1	created_at	entry_id	field1	field2	field3	field4	field5	field6
2	2018-12-06 12:11:39 UTC	1	0					
3	2018-12-06 12:11:54 UTC	2	0					
4	2018-12-06 12:12:10 UTC	3	58					
5	2018-12-06 12:12:32 UTC	4	0					
6	2018-12-06 12:12:48 UTC	5	6					
7	2018-12-06 12:13:03 UTC	6	0					
8	2018-12-06 12:13:19 UTC	7	116					
9	2018-12-06 12:13:34 UTC	8	0					
10	2018-12-06 12:13:50 UTC	9	874					
11	2018-12-06 12:14:05 UTC	10	874					
12	2018-12-06 12:14:21 UTC	11	867					
13	2018-12-06 12:14:36 UTC	12	869					
14	2018-12-06 12:14:51 UTC	13	652					
15	2018-12-06 12:15:07 UTC	14	654					
16	2018-12-06 12:15:22 UTC	15	860					
17	2018-12-06 12:15:38 UTC	16	873					
18	2018-12-06 12:15:54 UTC	17	651					
19	2018-12-06 12:16:12 UTC	18	861					
20	2018-12-06 12:16:28 UTC	19	871					

PROGRAM FOR MONITORING IN THINGSPEAK

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
WiFiClient client;
String thingSpeakAddress=
"http://api.thingspeak.com/update?";
String writeAPIKey;
String tsfield1Name;
String request_string;
HTTPClient http;
void setup()
{
  pinMode(5, INPUT);
pinMode(4, INPUT);
pinMode(0, INPUT);
pinMode(2, INPUT);
pinMode(14, INPUT);
  WiFi.disconnect();
   WiFi.begin("shivanand","8050587017");
  while ((!(WiFi.status() == WL_CONNECTED))){
    delay(300);

 }

}

void loop()
{

   if (client.connect("api.thingspeak.com",80)) {
     request_string = thingSpeakAddress;
     request_string += "key=";
     request_string += "YGYLHACAMUUI2HDP";
     request_string += "&";
     request_string += "field1";
     request_string += "=";
     request_string += analogRead(A0);
     http.begin(request_string);
     http.GET();
```

```
    http.end();
    delay(3000);

  }
  if (client.connect("api.thingspeak.com",80)) {
    request_string = thingSpeakAddress;
    request_string += "key=";
    request_string += "YGYLHACAMUUI2HDP";
    request_string += "&";
    request_string += "field2";
    request_string += "=";
    request_string += analogRead(A0);
    http.begin(request_string);
    http.GET();
    http.end();
    delay(3000);

  }
  if (client.connect("api.thingspeak.com",80)) {
    request_string = thingSpeakAddress;
    request_string += "key=";
    request_string += "YGYLHACAMUUI2HDP";
    request_string += "&";
    request_string += "field3";
    request_string += "=";
    request_string += digitalRead(5);      //lpg gAS
    http.begin(request_string);
    http.GET();
    http.end();
    delay(3000);

  }
  if (client.connect("api.thingspeak.com",80)) {
    request_string = thingSpeakAddress;
    request_string += "key=";
    request_string += "YGYLHACAMUUI2HDP";
    request_string += "&";
    request_string += "field4";          //prohibited area
pir
    request_string += "=";
    request_string += digitalRead(4);
```

```
       http.begin(request_string);
       http.GET();
       http.end();
       delay(3000);

     }
     if (client.connect("api.thingspeak.com",80)) {
       request_string = thingSpeakAddress;
       request_string += "key=";
       request_string += "YGYLHACAMUUI2HDP";
       request_string += "&";
       request_string += "field5";
       request_string += "=";
       request_string += digitalRead(0);        //conveyor ir
       http.begin(request_string);
       http.GET();
       http.end();
       delay(3000);

     }
     }
```

PROGRAM FOR CONTROLLING BLYNK APP

```
   #define BLYNK_PRINT Serial
   #include <ESP8266WiFi.h>
   #include <BlynkSimpleEsp8266.h>
   #define TRIGGERPIN D1
   #define ECHOPIN    D2
   // You should get Auth Token in the Blynk App.
   // Go to the Project Settings (nut icon).
   char auth[] = "1d94534218bd48898941921aa687c09b";

   // Your WiFi credentials.
   // Set password to "" for open networks.
   char ssid[] = "shivanand";
   char pass[] = "8050587017";
```

```
WidgetLCD lcd(V1);

void setup()
{
  // Debug console
  Serial.begin(9600);
pinMode(TRIGGERPIN, OUTPUT);
  pinMode(ECHOPIN, INPUT);
  Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk-cloud.com",
8442);
  //Blynk.begin(auth, ssid, pass,
IPAddress(192,168,1,100), 8442);

  lcd.clear(); //Use it to clear the LCD Widget
  lcd.print(0, 0, "Distance in cm"); // use: (position X: 0-
15, position Y: 0-1, "Message you want to print")
  // Please use timed events when LCD printintg in void
loop to avoid sending too many commands
  // It will cause a FLOOD Error, and connection will be
dropped
}

void loop()
{
  lcd.clear();
  lcd.print(0, 0, "Distance in cm"); // use: (position X: 0-
15, position Y: 0-1, "Message you want to print")
  long duration, distance;
  digitalWrite(TRIGGERPIN, LOW);
  delayMicroseconds(3);

  digitalWrite(TRIGGERPIN, HIGH);
  delayMicroseconds(12);

  digitalWrite(TRIGGERPIN, LOW);
  duration = pulseIn(ECHOPIN, HIGH);
  distance = (duration/2 ) /29;
  Serial.print(distance);
  Serial.println("Cm");
```

```
  lcd.print(7, 1, distance);
  Blynk.run();

  delay(3500);
}
```

PROGRAM FOR FUEL LEVEL MONITORING

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#define TRIGGERPIN D1
#define ECHOPIN    D2
// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "1d94534218bd48898941921aa687c09b";

// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "shivanand";
char pass[] = "8050587017";

WidgetLCD lcd(V1);

void setup()
{
  // Debug console
  Serial.begin(9600);
pinMode(TRIGGERPIN, OUTPUT);
  pinMode(ECHOPIN, INPUT);
  Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk-cloud.com",
8442);
  //Blynk.begin(auth, ssid, pass,
IPAddress(192,168,1,100), 8442);

  lcd.clear(); //Use it to clear the LCD Widget
```

```
  lcd.print(0, 0, "Distance in cm"); // use: (position X: 0-
15, position Y: 0-1, "Message you want to print")
  // Please use timed events when LCD printintg in void
loop to avoid sending too many commands
  // It will cause a FLOOD Error, and connection will be
dropped
}

void loop()
{
  lcd.clear();
  lcd.print(0, 0, "Distance in cm"); // use: (position X: 0-
15, position Y: 0-1, "Message you want to print")
  long duration, distance;
  digitalWrite(TRIGGERPIN, LOW);
  delayMicroseconds(3);

  digitalWrite(TRIGGERPIN, HIGH);
  delayMicroseconds(12);

  digitalWrite(TRIGGERPIN, LOW);
  duration = pulseIn(ECHOPIN, HIGH);
  distance = (duration/2 ) /29;
  Serial.print(distance);
  Serial.println("Cm");
  lcd.print(7, 1, distance);
  Blynk.run();

  delay(3500);
}
```
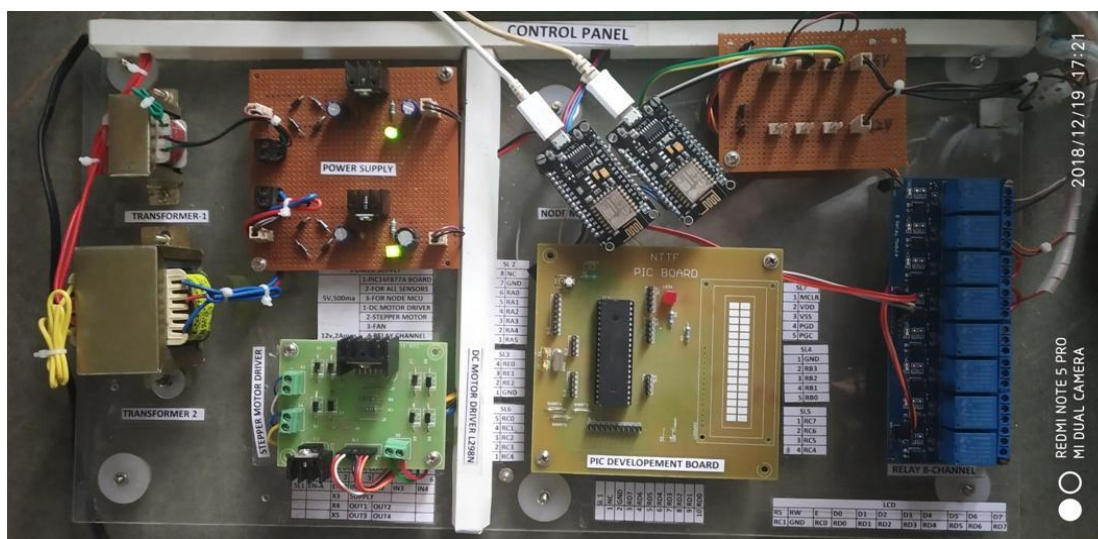
CONTROL PANEL

BILL OF MATERIALS

BILL OF MATERIALS (ELECTRONICS)				
SL.NO	ITEM DESCRIPTION	SPEC	QUANTITY	COST IN RUPEES
1	Transformer	9-0-9, 500mA 12-0-12 ,1A	2	480
2	Diode	1N4007	8	16
3	Voltage regulator	7805,7812	1 each	20
4	Capacitor	470uf,0.01uf,33pf	2 each	28
5	IC	PIC16F877A	1	120
6	CRYSTAL	16MHZ	1	7
7	RMC connector	2 pin	4	36

8	Resistor	220,330, 1k OHM	2 each	8
9	LED	1.5V ,3MM	2	4
10	NODE MCU	ESP 8266 LOLIN ,V3	2	760
11	COLOUR SENSOR	8 PIN	1	177
12	PIR SENSOR	ANY	1	140
13	ULTRASONIC SENSOR	HC-SR04	1	140
14	PROXIMITY SENSOR	IR	3	180
15	STEPPER MOTOR IC	ULN 2003	1	40
16	GAS SENSOR	MQ5	1	118
17	MOTOR DRIVER IC	L298N IC	1	18
18	SCREW TERMINALS	TWO WAY	10	90
19	HEAT SINK	100 DEGREE C,	2	20
20	SCREW TERMINAL	3 WAY	8	30
21	RESISTOR	330 OHM	8	8
22	RELAY	12V	-	-
23	RELAY MODULE IC	ULN 2803APG	1	300
24	DC MOTOR	12V ,WITH GEAR	2	240
25	JUMPER WIRES	M TO F	100	200
26				
TOTAL				**3180=00**

MECHANICAL COMPONENTS

BILL OF MATERIALS (MECHANICAL)				
SL.NO	ITEM DESCRIPTION	SPECIFICATION	QTY	COST IN RUPEES
1	BEARINGS	DIAMETER 12	4	200
2	IRON ROD	6MM ,1 FEET	2	50
3	PLYWOOD	3FEET*2FEET	1	216
4	ACRYLIC SHEET	4MM,PLANE,(5*2FEET)	1	570
5	ACRYLIC SHEET	4MM,BLUR,(3*2FEET)	1	250
6	FEVIQUICH ADHESIVE		2	140
7	CONVEYOR BELT	34 INCH *4.5INCH	1	50
8	HINGIS	3 INCH	1	80
9	PAINT	MINT GREEN ,500ml	1	283
TOTAL				**1839=00**

OVERALL BILL OF MATERIALS

SL. No.	MODULE	DESCRIPTION	COST IN RUPEES
1	MODULE 1	POWER SUPPLY	250
2	MODULE 2	CONTROLLER	250
3	MODULE 3	SENSOR	400
4	MODULE 4	RELAY	180
5	MODULE 5	NODE MCU	360

6	MODULE 6	MECHANICAL STRUCTURE	3879
TOTAL			5019=00

ADVANTAGES

- **LOW COST CONTROLLING AND MONITORING PROJECT**
- **EASY USAGE**
- **NO MAINTENANCE**
- **ONE TIME INVESTMENT**
- **REDUCES HUMAN EFFORT**
- **24X7 WORK**

APPLICATIONS

- **FACTORY AUTOMATION**
- **INDUSTRIAL APPLICATION**
- **HOME AUTOMATION**
- **OFFICE AUTOMATION**

CONCLUSION

- **DESIGNED THE CIRCUIT**
- **CREATED THE MECHANICAL STRUCTURE**
- **LEARNED THE IOT CONCEPT**
- **LEARNED REAL TIME APPLICATION SYSTEM**
- **LEARNED HOW TO CREATE APPS AND GRAPHS**

REFERENCES

- WWW.YOUTUBE.COM
- WWW.WIKIPEDIA.COM
- WWW.THINGSPEAK.COM
- WWW.BLYNKCOMMUNITY.COM
- WWW.ARDUINO.COM
- WWW.INSTRUCTABLES.COM

<u>SOFTWARES USED</u>

- **FUSION 360**
- **PROTEOUS**
- **MPLAB IDE**
- **PIK KIT 3**
- **ARDUINO**
- **BLYNK**
- **THINGSPEAK**
- **EAGLE**
- **MS OFFICE**