

IOT Pulse Oximeter

Project Exhibition -II

Submitted in partial fulfilment for the award of the degree of

**Bachelor of Technology
In
ELECTRICAL AND ELECTRONICS ENGINEERING**

Submitted to

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CANDIDATE'S DECLARATION

We hereby declare that the Dissertation entitled "IOT Pulse Oximeter" is our own work conducted under the supervision of Dr. Pallabi Sarkar, Assistant Professor, Electrical and electronics department at VIT University, Bhopal.

We further declare that to the best of our knowledge this report does not contain any part of work that has been submitted for the award of any degree either in this university or in other university / Deemed University without proper citation

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CERTIFICATE

This is to certify that the work embodied in this Project Exhibition -2 report entitled **“IOT PULSE OXIMETER”** has been satisfactorily completed by **Ms. RADHIKA GURJAR** Registration no: **19BEE10027**, **Mr. KRITIK KUMAR SAINI** Registration no: **19BEE10016** and **Mr. DHEERENDRA KUMAR** Registration no: **19BEE10025** in the School of Electrical & Electronics Engineering VIT University, Bhopal. This work is a Bonafide piece of work, carried out under our guidance in the School of Electrical and Electronics Engineering for the partial fulfilment of the degree of Bachelor of Technology.

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Acknowledgement

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EXECUTIVE SUMMARY

This research is based on Real time IOT based system. In this DIY IOT Project, we will try to make a Smart Health Monitoring Device that can measure **SpO2** (percentage of oxygen in the blood) and heart rate in BPM (Beat Per Minute). This wearable device can be used by athletes to monitor their heart rate and blood oxygen levels during a workout. The Best part of this project is that you can connect this device to Thing-Speak that will record and regularly update the data for both SPO2 & BPM on the internet. Even anyone can monitor the data from any part of the world as data are uploaded on server.

LIST OF SYMBOLS & ABBREVIATIONS:

OLED - Organic Light Emitting Diode

SpO₂ - Peripheral capillary oxygen saturation

MCU - Micro-Controller Unit

IOT - Internet of Things.

BPM - Beats Per Minute.

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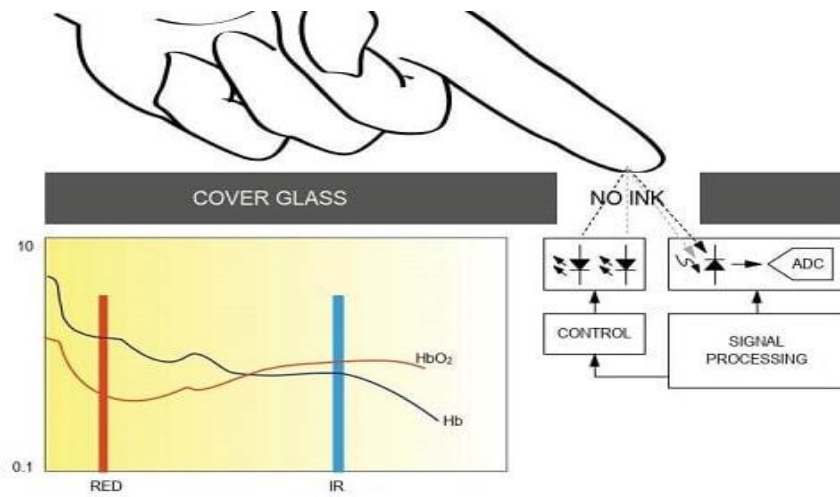
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CHAPTER -I

INTRODUCTION

Today people is becoming more lazy and lazy due to laziness many disease produces. They are such as fattiness, low BP and high BP, plaque deposition in coronary artery so due to this heart problem generate, due to radiation skin cancer produces, for using of tobacco mouth and lung cancer produces. There are two or three positive conditions to utilizing IOT in human organizations, running from improving structure sort out to supporting remote patient checking and telemedicine. After a genuine long time, IOT keeps on displaying its catalyst in remedial organizations. Both IT and clinical masters are amped up for the utilization of IOT in remedial organizations and the open gateways it passes on to the table. The business Centre offers various related gadgets to examine that can screen patients' vitals progressively and give alerts or commitment on their condition. This kind of information improves quiet results. So if people will have an electronics device then they can measure their heart and oxygen saturation level and pulse rate. We are living in electronics age so every person want to save our time. This research is based on Real time IOT based system because heart is the main body's blood supply part without heart pumping human cannot live. It works all life from birth to till the human death.

A normal human's pulse rate is 60 -100 bpm and pulse rate changes according to people activities like sleeping, exercising, playing any sports and normal condition. Age factor is also a part of changing oxygen level and pulse rate of all people.



Keywords-

Max30100 sensor, pulse sensor, Node MCU board, Arduino Nano board etc .

CHAPTER -II

PROPOSED METHODOLOGY:

In this project, we will learn how to interface MAX30100 Pulse Oximeter with NodeMCU ESP8266. We will monitor the Blood Oxygen & Heart Rate online on ThingSpeak. As there is an availability of online data, so this project can be used to monitor the health of a patient online. The pulse oximeter available in the market is very expensive, but with this simple & low-cost pulse oximeter module.

CHAPTER -III

LIST OF COMPONENTS –

1. OLED
2. NODEMCU ESP8266
3. MAX30100 Pulse Oximeter
4. JUMPER WIRES

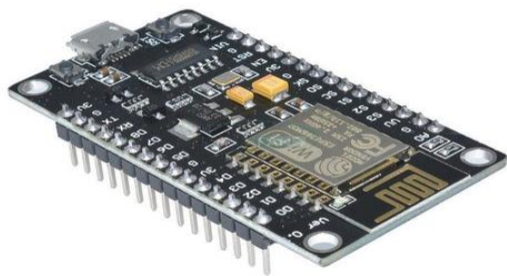
1.OLED

OLED stands for *Organic Light Emitting Diode*; TVs that use this technology have a thin carbon-based film built into the screen. When electricity hits the organic material, it lights up.



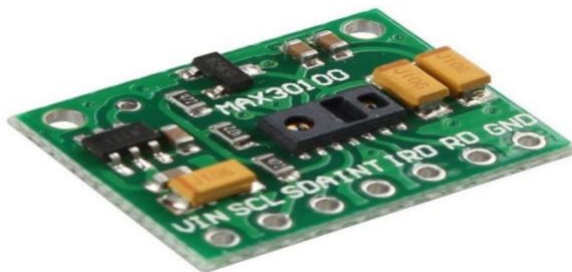
2.NODEMCU ESP8266

NodeMCU is an open source development board and firmware based in the widely used ESP8266 -12E WiFi module. It allows you to program the ESP8266 WiFi module with the simple and powerful LUA programming language or Arduino IDE.



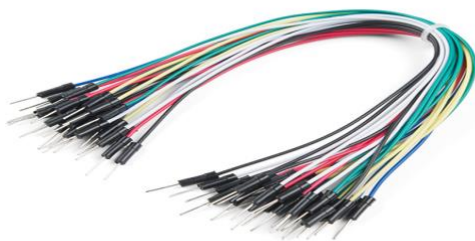
3.MAX30100 Pulse Oximeter

The MAX30100 is an integrated pulse oximetry and heart- rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals.



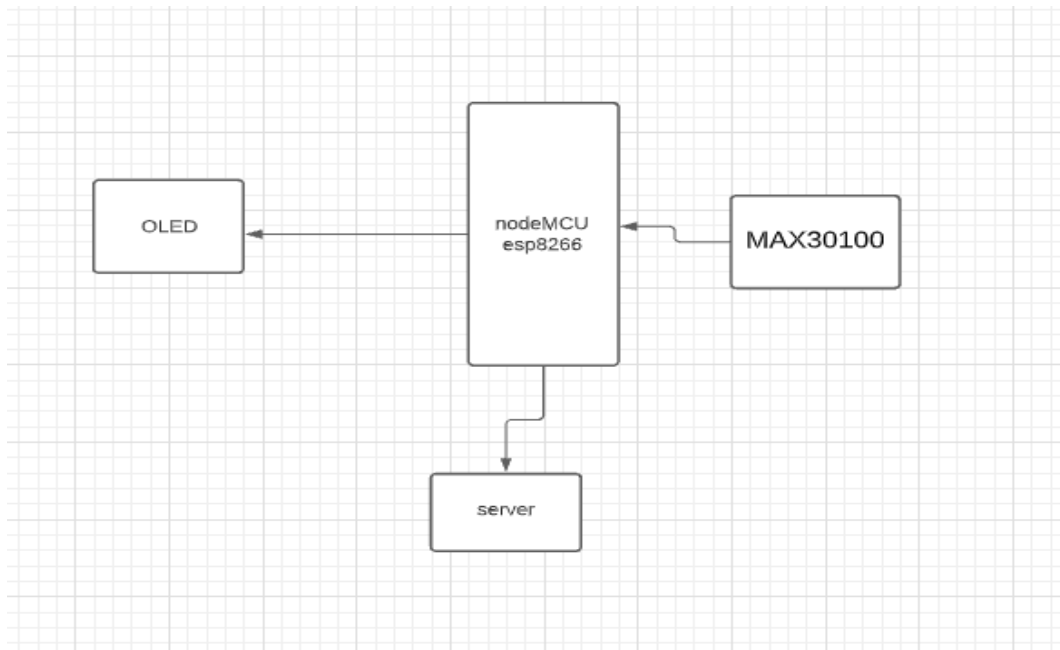
4.Jumper Wires

A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test.



CHAPTER - IV

BLOCK DIAGRAM



CHAPTER - V

Arduino Code:

```
#include <Wire.h>

#include "MAX30100_PulseOximeter.h"

#define REPORTING_PERIOD_MS    1000

PulseOximeter pox;

uint32_t tsLastReport = 0;

void onBeatDetected()

{

    Serial.println("Beat!");

}

void setup()

{

    Serial.begin(115200);

    Serial.print("Initializing pulse oximeter..");

    if (!pox.begin()) {

        Serial.println("FAILED");

        for(;;);

    } else

    {

        Serial.println("SUCCESS");

    }

    pox.setIRLedCurrent(MAX30100_LED_CURR_7_6MA);
```

```

    // Register a callback for the beat detection

    pox.setOnBeatDetectedCallback(onBeatDetected);
}

void loop()
{
    // Make sure to call update as fast as possible

    pox.update();

    if (millis() - tsLastReport > REPORTING_PERIOD_MS) {

        Serial.print("Heart rate:");

        Serial.print(pox.getHeartRate());

        Serial.print("bpm / SpO2:");

        Serial.print(pox.getSpO2());

        Serial.println("%");

        tsLastReport = millis();

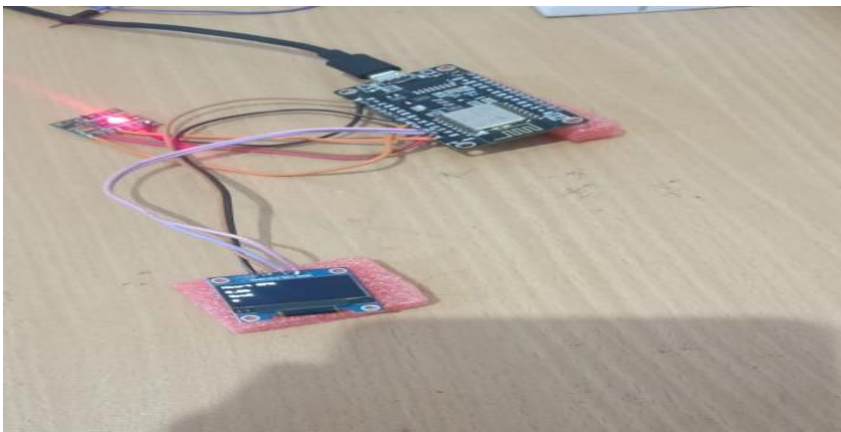
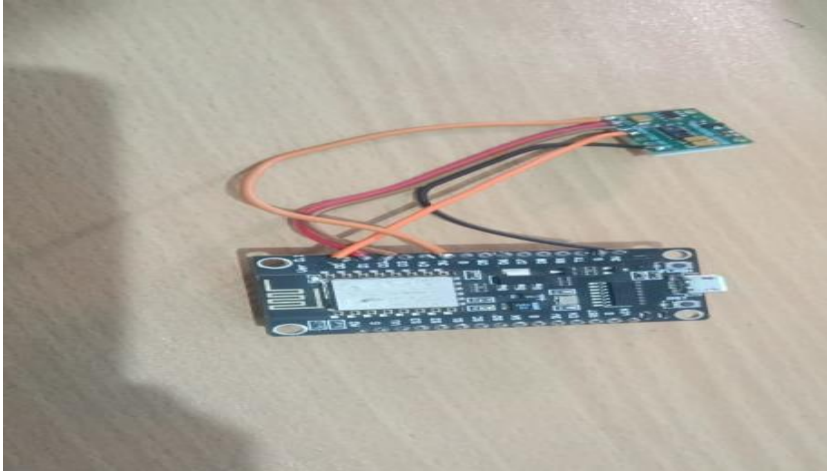
    }
}

```

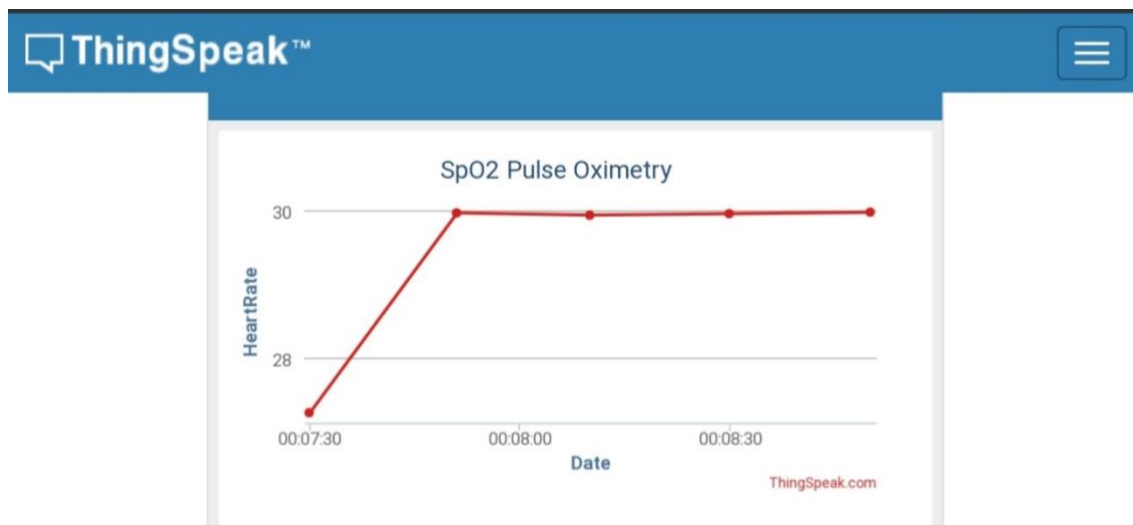
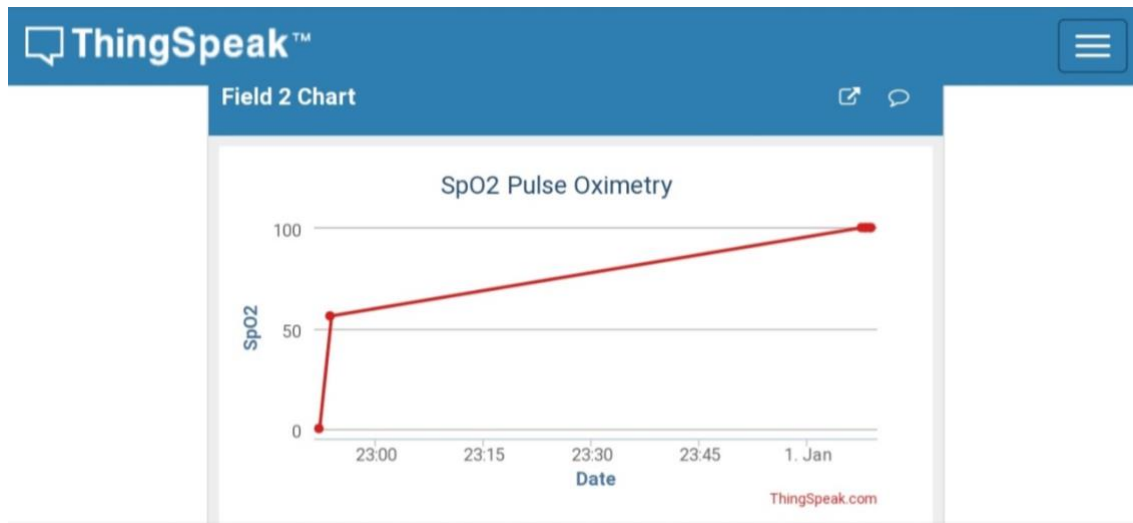

PRESENT AND FUTURE SCOPE OF PROJECT:

During the ongoing coronavirus disease (COVID-19) pandemic, reports in social media and the lay press indicate that a subset of patients are presenting with severe hypoxemia in the absence of dyspnea, a problem unofficially referred to as "silent hypoxemia." To decrease the risk of complications in such patients, one proposed solution has been to have those diagnosed with COVID-19 but not sick enough to warrant admission monitor their arterial oxygenation by pulse oximetry at home and present for care when they show evidence of hypoxemia.

HARDWARE PART:



THINGSPEAK OUTPUT



CONCLUSION

- *Light weight and Compactness.*
- *User-friendliness.*
- *Accuracy.*
- *Fast response time.*
- *Convenience.*
- *Give continuous measurement.*

This research main aim is design an accurate electronics device which will be given correct reading, because in heart case the number of beat per minute when doctor see in monitor then start the treatment. Many cases nurses care the patient when pules vary then nurses cannot informed all doctor on correct time so then time patient could not get a proper treatment. In this case many patients have died by the reason of not getting a treatment on time. So this types electronics devices will be informed all doctor through Wi-Fi or by message then the doctor can give the treatment on time. In this case there is no need of calling doctor for giving treatment again and again

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