PATIENT HEALTH MONITORING SYSTEM

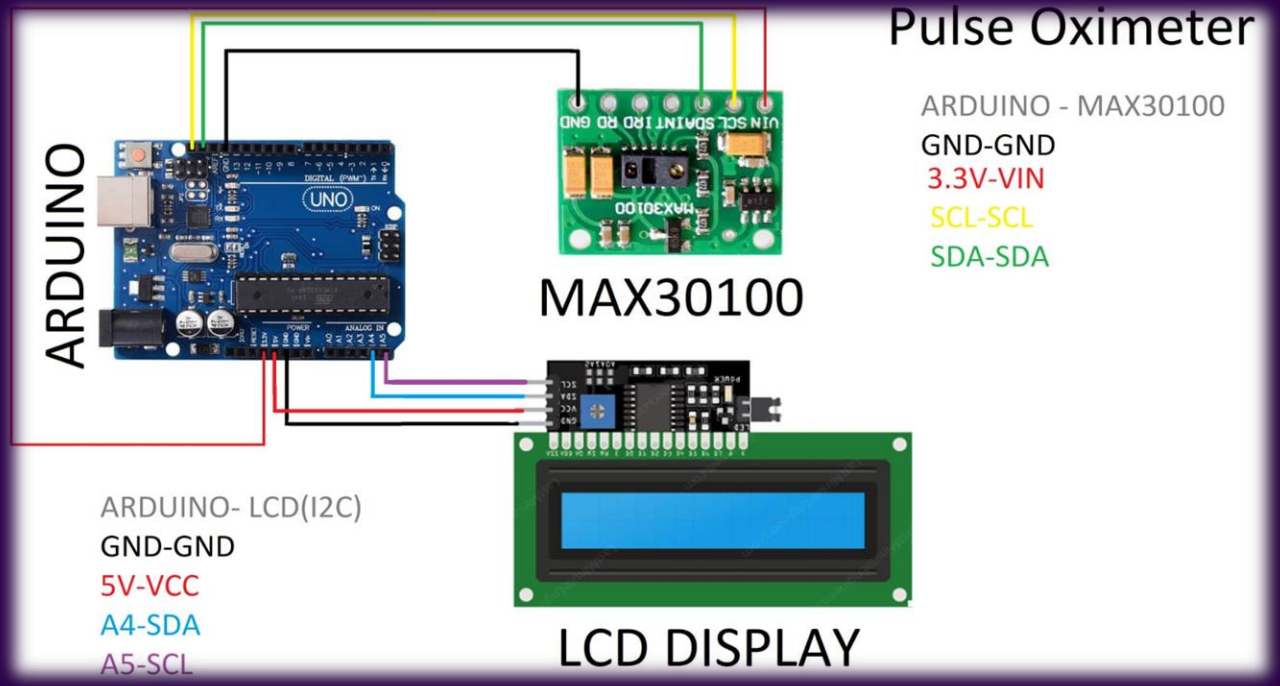
INTRODUCTION

IoT based patient health monitoring system is a generic term given to any medical equipment that has internet capability and can measure one or more health data of a patient who is connected to the device such as heartbeat, body temperature, blood pressure, ECG, steps etc. The equipment can record, and detect if there is any abrupt change in the patient’s health .

COMPONENTS

Arduino UN0
J2C Based 16*2 LCD Display
Jump Wires
Max 30100 Pulse Oximeter Sensor
Mini Breadboard
DC Jack to HW Battery Connector

CIRCUIT DIAGRAM



This is the circuit diagram for the system. An Arduino Uno microcontroller, one sensor (MAX30100), a 16 × 2 I2C LCD display. The whole system is powered by 5V. The microcontroller (Arduino Uno) is connected to the computer using a USB (Universal Serial Bus) that sends commands to the device.

HARDWARE/SOFTWARE SPECIFICATIONS

HARDWARE

This health monitoring system consists of sensors and a microcontroller. We used the Arduino Uno as the microcontroller, and the sensor are MAX30100 (pulse rate and SPo2 measurement sensor) to connect the Arduino with the mobile application and LCD display.

SOFTWARE

The Arduino is connected to a device with the help of a USB, which will help power up the system. When we upload data to the Arduino, the system starts working, and the measurement data will be shown in the serial monitor of the Arduino Integrated Development Environment (IDE) and the Liquid Crystal Display (LCD) display.

WORKING

The system’s goal is to build a health monitoring system that can quickly measure a variety of health factors. The system’s structure is depicted in the Circuit Diagram. Here, patients will measure their pulse rate and SpO2 using the max30100 sensor and patients can see measurement data in the LCD display. The data will be shown in the LCD Display. From there the patients can view the measurement of the health parameters. After measuring the physiological vital data of the human body, it will be sent to the Arduino UNO, which will process the analog data into digital. After that, the Measured data from the human body can be seen on the LCD display as well.

CODE

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Arduino Uno

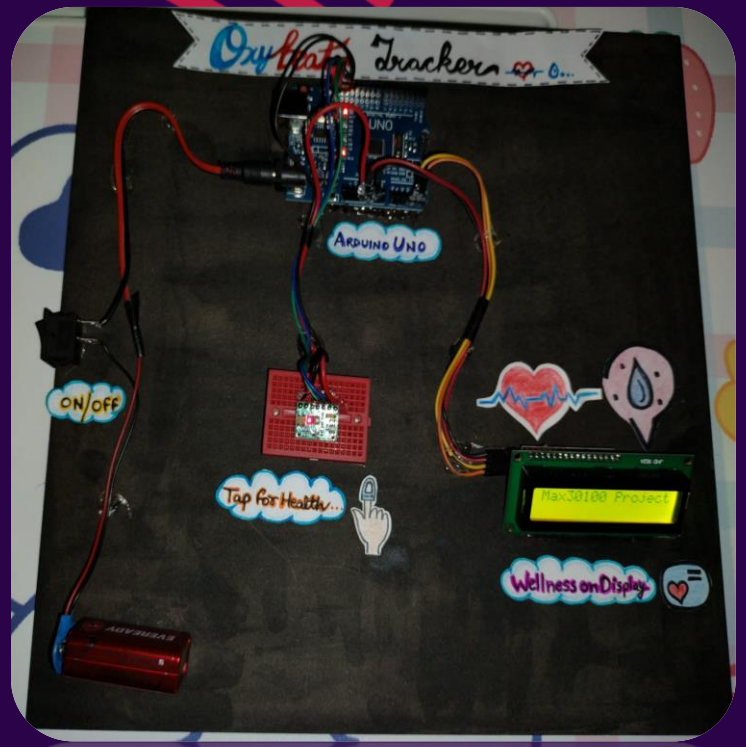
MAX30100_I2C_LCD.ino

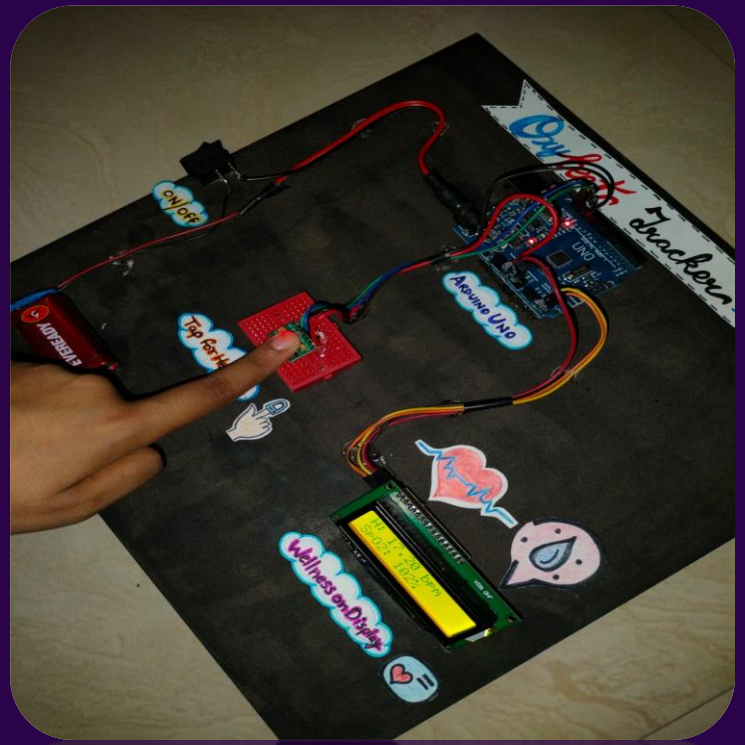
```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2); // change the value to 27 if display not working

#include "MAX30100_PulseOximeter.h"
#define REPORTING_PERIOD_MS     1000
PulseOximeter pox;
uint32_t tsLastReport = 0;

void onBeatDetected()
{
    Serial.println("Beat!");
}

void setup()
{
  lcd.init();
  lcd.clear();
  lcd.backlight();
  Serial.begin(9600);
    Serial.print("Initializing pulse oximeter..");

    if (!pox.begin()) {
        Serial.println("FAILED");
        for(;;);
    } else {
        Serial.println("SUCCESS");
    }
```

```
    }

  // Configure sensor to use 7.6mA for LED drive
  pox.setIRLedCurrent(MAX30100_LED_CURR_11MA);
  pox.setOnBeatDetectedCallback(onBeatDetected);
}

void loop()
{
    pox.update();
    if (millis() - tsLastReport > REPORTING_PERIOD_MS)
      {
        lcd.clear();
          if(pox.getSpO2()>0)
          {
          Serial.print("Heart rate:");
          Serial.print(pox.getHeartRate());
          Serial.print("bpm / SpO2:");
          Serial.print(pox.getSpO2());
          Serial.println("%");

          lcd.setCursor(0,0);
          lcd.print("H: ");
          lcd.print(pox.getHeartRate());
          lcd.print(" bpm");
          lcd.setCursor(0,1);
          lcd.print("SpO2: ");
          lcd.print(pox.getSpO2());
```

```
            Serial.print("bpm / SpO2:");
            Serial.print(pox.getSpO2());
            Serial.println("%");

            lcd.setCursor(0,0);
            lcd.print("H: ");
            lcd.print(pox.getHeartRate());
            lcd.print(" bpm");
            lcd.setCursor(0,1);
            lcd.print("SpO2: ");
            lcd.print(pox.getSpO2());
            lcd.print("%");
            }
            else if (pox.getHeartRate()>0)
            {

              lcd.setCursor(0,0);
              lcd.print("Finger Detected");

            }
            else
            {
              lcd.setCursor(0,0);
              lcd.print("Max30100 Project");
            }
            tsLastReport = millis();
        }
}
```

PROJECT SNAPSHOTS





RESULT AND ANALYSIS

The health monitoring system accurately measures pulse rate and blood oxygen saturation levels. It provides real-time feedback to the user, allowing for immediate health assessment.

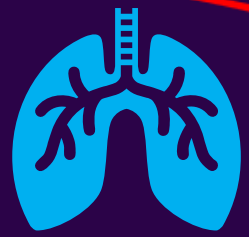
FUTURE SCOPE

a) Integration with mobile apps for data logging and analysis.

b) Adding additional sensors for measuring other vital parameters like body temperature, blood pressure, etc.

c) Exploring wireless communication options for remote monitoring.

d) Enhancing the user interface for better user experience.



REFERENCES

- https://youtu.be/TbBDGqN7YfE?si=-_k4GxfnhM2cCKip

THANK YOU !

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