FACE INTRUDER SYSTEM WITH COVID-19 PREVENTION SYSTEM

[1]Vaishali Bagade, [2]Kalpesh Kashivale, [3]Shubham Singh, [4]Aman Sharma

[1]Assistant Professor, [2]UG Student, [3]UG Student, [4]UG Student

[1] Department of Electronics and Telecommunication Engineering,

[1] Alamuri Ratnamala Institute of Engineering and Technology (of Mumbai University) Shahapur, Thane

Abstract: It is essential to have an improved security system that can provide security and identity recognition to prevent security breaches in restricted areas. The current security system which is using the method of security cards and keys is outdated and insecure. This paper aims to improve the door security system by using biometric technology of face detection and recognition (face intruder system) with additional features which include the measure to take to Counteraction of current pandemic Covid-19. The system consists of face detection and recognition using Esp-32 Cam with an FTDI chip. The Esp-32 Cam works with Arduino IDE which provides face detection and recognition algorithm.

In this pandemic, situation Implements IOT based applications using Microcontroller (Arduino) based IR Temperature sensing Sensors for monitoring body temperature, and a heartbeat sensor (Pulse monitor) that can be counts the heartbeat per minute. Esp-32 Cam module has features to provide remote access using an in-built Wi-Fi module. The System is also capable of recording the entries and Health Data with time and date in Excel format. If an unauthorized person is detected by the system, it creates the entry and alerts the system or authorized person.

Keywords: Face Intruder, ESP-32 CAM, Heart-beats monitoring, temperature Monitoring, ARDUINO UNO, **Covid-19.**

I. INTRODUCTION

Internet of Things technology provides types of applications for modern issues which include healthcare and security surveillance. Biometrics plays an essential role in identifying Human beings. One of the Examples of biometrics is face-recognition and detection. IoT also provides the solution regarding E-health. Facial recognition is the technique of biometrics it takes a picture or video of a human face or compares it with the stored data or database of the system.

This project aims to solve the current outdated system of attendance systems or security systems as well as providing the solution for the current pandemic Covid-19. The Attendance systems which are using in various institutes are the register method that used journals for attendance and security system. The problem with this process is targets like students can fake the system. Another existing method includes the RFID (Radio Frequency Identification). RFID is a wireless gadget that uses electromagnetic waves for corresponding between an RFID reader and an RFID tag. Though RFID-based security systems also have certain problems or limitations such as the system is complex, costly, and absent student's card can be swiped by other students.

By implementing better systems for surveillance, healthcare contagious diseases will have less chance of spreading. In this venture, we will plan a Face acknowledgment Based Attendance and temperature detector System utilizing Arduino. Just we will be interfacing the Esp32 cam with OV2640 and temperature sensor and pulse oximeter sensor with Arduino, LCD Display to design the desired project. In this operation, we utilized the face recognition Module to take and keep participation information and records as well as the E-health sensor device & Arduino to read the target body condition. The health data shows on Display. We need an Arduino Uno board for interfacing the microcontroller with the Temperature and pulse oximeter sensor (GY-906, Max30102). So with the assistance of an E-health sensor device (GY-906, Max30102), we show the temperature and value of blood oxygen in a display. With the assistance of face recognition (Esp32 cam), we store the face of all the students and once they are stored, the Esp32-cam compare the present face and the previously-stored face on the memory. If any face matches, the Esp32- cam display the person's name in the desktop excel file and marks their attendance in Excel File. The Esp32 cam provides remote access by an inbuilt wi-fi module

II. PROBLEM DEFINITION

This research paper aims to develop a Face Intruder system with a COVID-19 prevention system, where the traditional methods of door security commonly use Physical keys, RFID tags, etc. But our implementation is different because of using the IoT-based system for security purposes. So the Face Intruder system is using Biometrics techniques for security. The face Intruder system has inbuilt Wi-Fi for remote login. The system owner can access their system data at any place in this world. The system can also monitor human body temperature and Heartbeats. In this pandemic situation, we all need a health monitoring system.

A. SUB PROBLEM I

1. Develop a Face Intruder system, where the High-security area can be monitor remotely. The ESP-32 CAM has an inbuilt Wi-Fi module for remote login.
2. Most of the Organization or industries are using traditional methods for security but face Intruder system is also capable of searching the person in a crowded area and, use for attendance marking.

B. SUB PROBLEM II

1. In this pandemic situation, we all need to monitor our health status. Industries or organizations, do not have any system like Temperature or Heart rate monitor. So our system helps for preventing the COVID-19.
2. If the person/employees have a Covid-19 infection, then the human body increases the temperature or change in Heartbeats or blood oxygen level. So, our system can send the alert to employees or authorized persons.

III. PROBLEM SOLUTIONS

Following are the solutions for the above problems:

A. SUB PROBLEM I

To create a face Intruder system with a COVID-19 prevention system for security and Health purpose. The manual verification of identification is extremely tedious and requires additional staff. So, the problem solution is a Face recognition and detection system.

B. SUB PROBLEM II

In the Covid-19 situation, industries have thousand of employees or workers. If anyone can be infected with COVID-19 infection then it infects other workers so, our system helps to prevent Covid-19 infection using Heart rate, blood oxygen level, or temperature monitoring.

IV. RESEARCH METHODOLOGY

A. SYSTEM I

Working on this face recognition attendance system has given below. As a matter of first importance, the user needs to enroll the facial data with the assistance of pushbuttons. To do this, ESP32 CAM connects with a desktop with the FTDI connecter then the user takes their image with the assistance of OV2640 and stores their image memory.

➢ The ESP32-CAM is in profound rest mode.
➢ Press the reset catch to instate the board.
➢ The camera snaps a picture.
➢ The photograph is saved in the memory card by the name: picX.jpg, where X relates to the image number.
➢ The picture number will be recorded in the ESP32 streak memory with the goal that it isn't eradicated by RESET and, we can monitor the number of photographs taken.
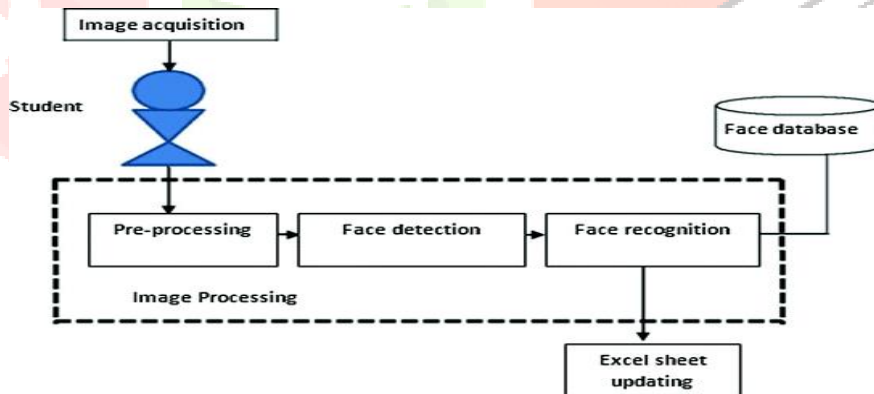

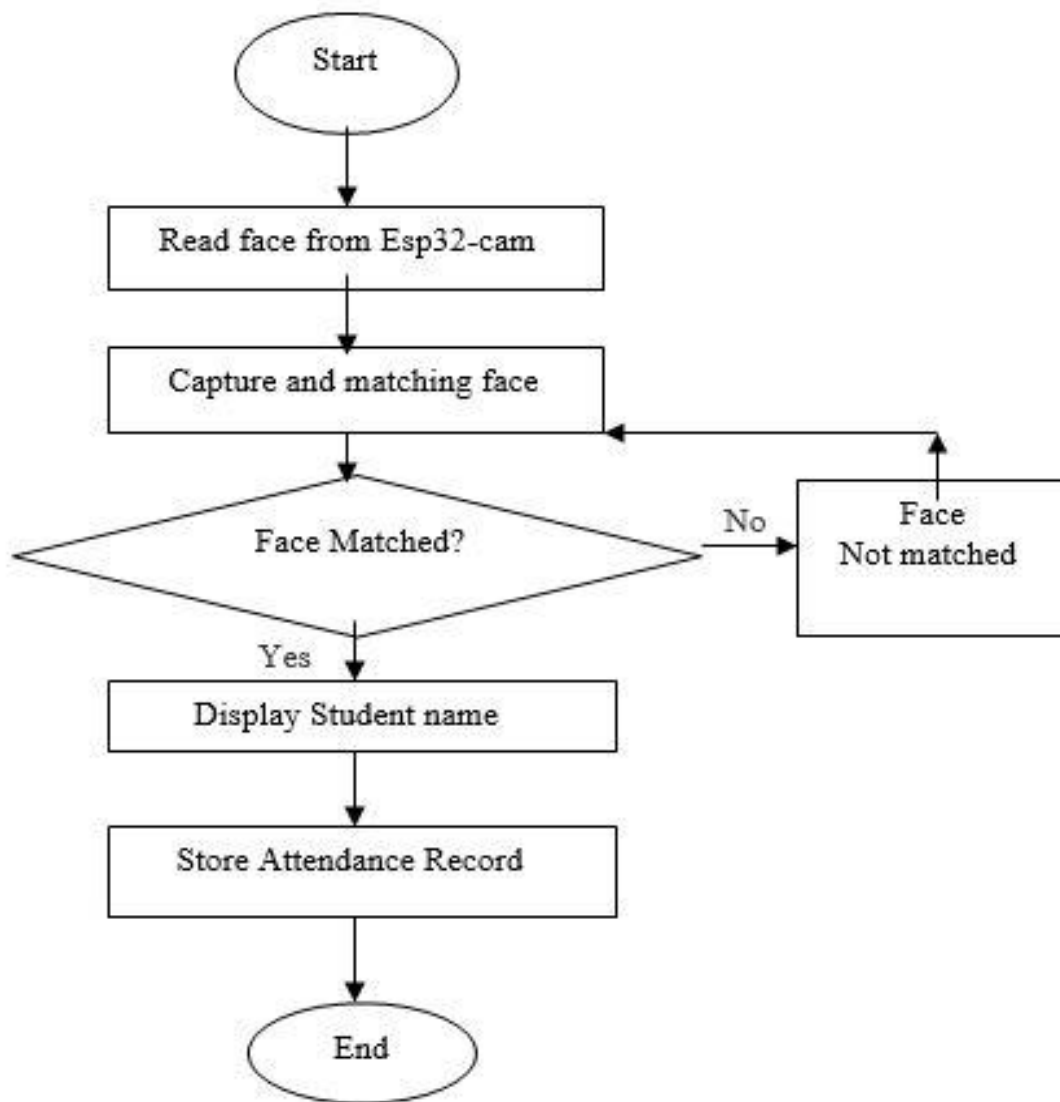Figure 1. Block diagram of Face recognition-based Attendance System

Figure 2. Working of Face recognition-based Attendance System

STEPS FOR WORKING OF SYSTEM I

    A. Step for System
- Initialize an into variable called picture number that will produce the photograph name: pic1.jpg, pic2.jpg, etc.
- Define the camera settings.
- Use the code settings for a camera with PSRAM.
- If the board doesn't have PSRAM, set the different code.
- Initialize the camera.
- Initialize the microSD card.
- The coding lines take a photo with the camera.
- After that, instate the EEPROM with the size characterized earlier.
- The picture number is produced by incrementing one to the present number saved within the non-volatile storage.
- To add the photograph on the microSD card, make a way to your record. The next step is to add the photograph in the essential file of the microSD card and, the document name will be pic1.jpg, etc.
- After saving a photo, we save the current picture number in the storage memory to monitor the number of photographs taken.
- When the ESP32-CAM takes a photo, it on the onboard LED. After taking the photo, the LED switch on already, so the next instruction is to switch it off. The LED is connected by GPIO 4.

    B. Uploading in ESP32-cam Using Arduino IDE.
    C. Getting the IP Address
    D. Creating the video stream.
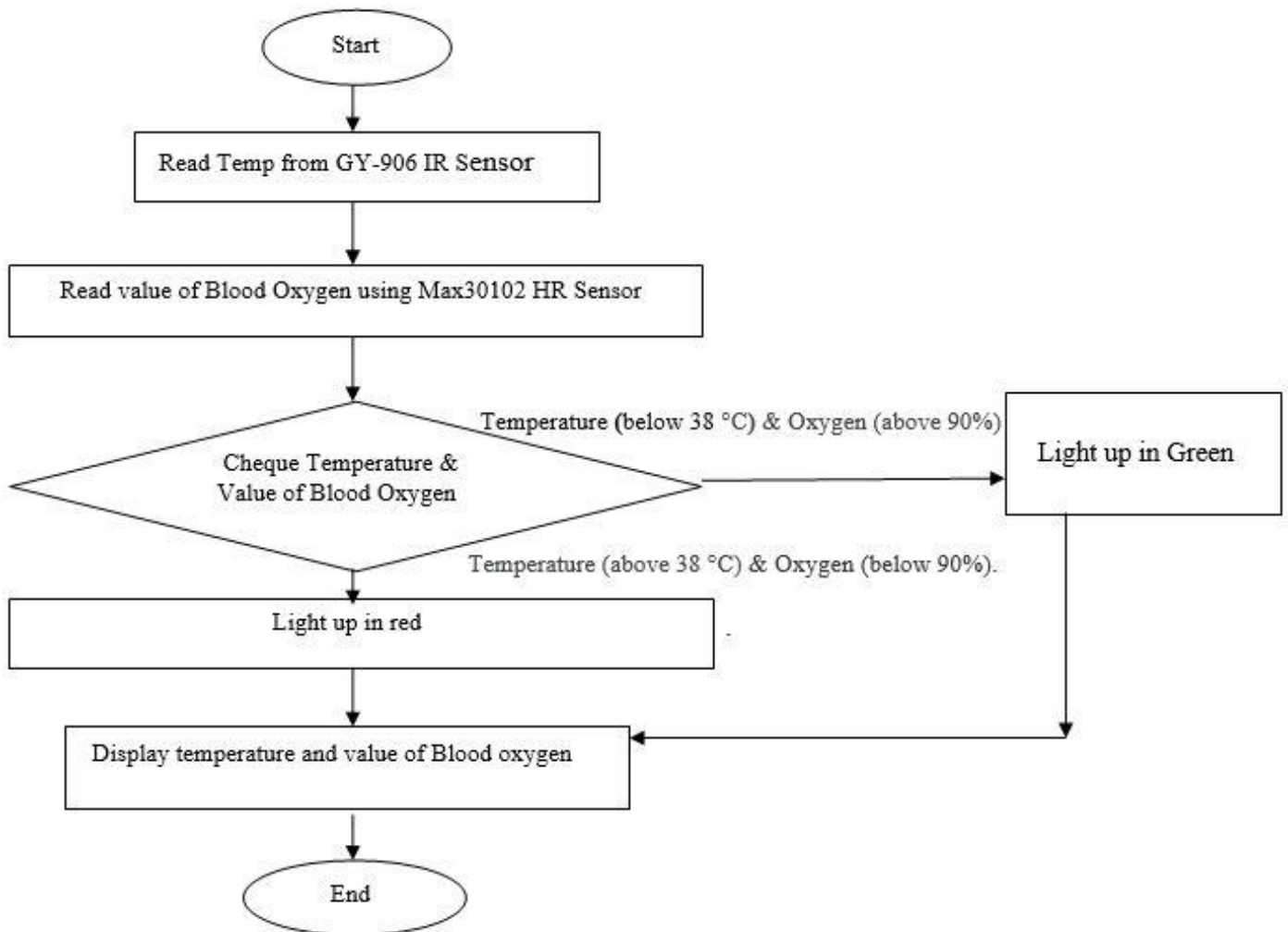   E. The face recognition and detection proceed
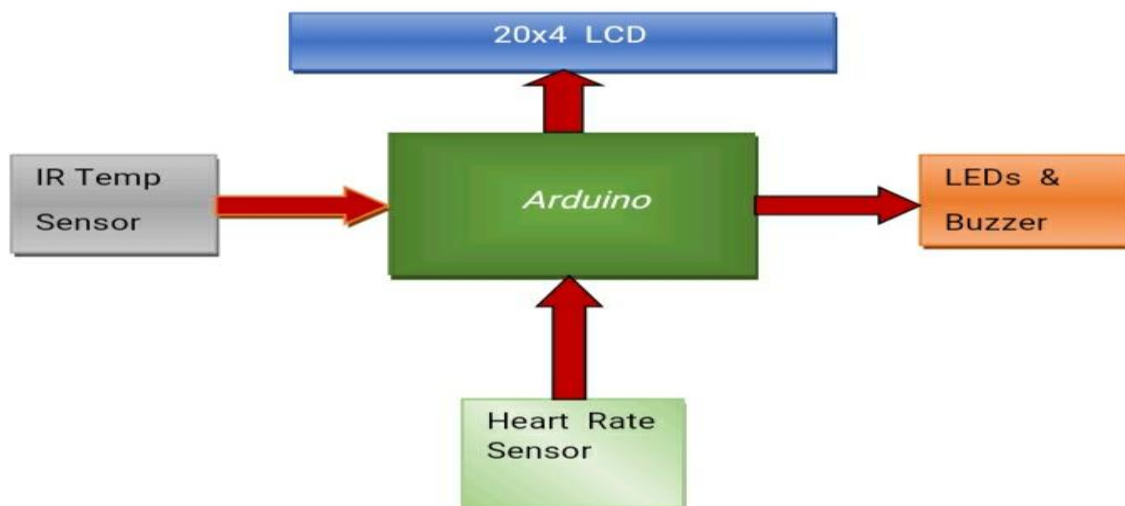
Figure 3. Working of Covid 19 prevention System

Figure 4. Block diagram of Covid 19 prevention System

B. SYSTEM II

Working on this covid 19 prevention system project is fairly simple. As a matter of first importance, the blood oxygen module's important thing needs to be natural should be normally positioned your finger on it for recognition, and no compelling reason to put as well much pressing factor, in any case, the worth will not be right.

The MLX90614 comprises of two gadgets inserted as one sensor, one gadget goes about as a detecting unit and along these lines, the other gadget goes about as a handling unit. The sensor Infrared Thermopile Detector is called MLX81101. When an object appears in the sight of a sensor which calculates the temperature of an object by estimating the measure of IR energy emitted from it. And the processing unit could also be one molding ASSP called MLX90302 which changes the signal from the sensor over to computerized esteem and communicates using I2C protocol. The MLX90302 features a low noise amplifier, 17-bit ADC, and a strong DSP which helps the sensor to possess high accuracy and determination.

The sensor requires no outer parts and might be straightforwardly interfaced with an Arduino. The capacitor C1 is optional and is employed to filter noise and supply optimum EMC (Electromagnetic Compatibility). The pins (SCL and SDA) for use for I2C correspondence and might be associated with a microcontroller working on the 5V rationale.

V. TECHNOLOGY IMPLEMENTATION
A. HARDWARE IMPLEMENTATION

➢ Esp32-cam: In this Esp32 cam Based Biometric Attendance System, we used an Esp32-cam with an OV2640 module to authenticate an authorized person or employee by taking their real-time face input in the system. We are implementing four push buttons to register a new face or delete stored face or match stored face.

➢ ARDUINO UNO: Arduino UNO is used here to control the operations involved in check a person's health data. The four operations that are to be performed are to detect temperature and blood oxygen, cheque temperature & blood oxygen condition, control the light according to the condition, display the temperature & value of the blood oxygen, delete and reset. Arduino is chosen here as simple to use, code, handle, and has many modules which add on features to the Arduino board.

➢ GY-906-BCC Infrared Temperature Sensor: This temperature sensor measures human body temperature. It is an infrared thermometer intended for non-contact temperature detecting and, It has a large number of applications which include body temperature measurement and motion detector. The sensor features a line of vision of 35 degrees and returns the typical temperature value of all objects within this line of vision. It has a working range from 4 cm up to 10 cm.

➢ Max30102 Heart Rate Sensor: The MAX30102 is an integrated pulse oximeter and heart rate module. It has to build LEDs and a photodetector for measurement. Using this module, we can measure heartbeat rate and oxygen level in blood. It comes with an I2C interface and, you can use it with any host with support I2C communication. You can easily use it in an Arduino environment. MAX30102 utilizes a two-wire I2C connection to interface with the Arduino board. I utilize the I2C ports on the A4/A5 ports on the Arduino board.

➢ 20 x 4 I2C LCD: LCD Display provides messages to the user to have a proper interaction with the device. LCD Display has Blue light in the background with characters displayed on them in white. It can show 20x4 characters on two lines. It is using an I2C communication interface. With this I2C communication, only two lines (I2C) requires to display the data on any Arduino-based projects.

B. SOFTWARE IMPLEMENTATION

Arduino IDE: You will be using Arduino IDE software to write and upload the programming logic onto Arduino.

VI. ADVANTAGES

1. Automated time tracking system- In Industries or working, environments or even open where the section and leave seasons of representatives or an individual are noted down will have an instant mechanized framework to record the passage and leave the season of every representative or individual for a given time.
2. Cost-effective- Since the entire cycle will be finished by a mechanized framework or customized framework, it implies the all-out computation will be robotized or modified and done by the actual framework.
3. Increased security- Face Intruder-based attendance management system won't just calculate attendance but also note down the entry and exits time or date of visitors in the place.
4. Quick Response- The entire world is suffering from COVID19, so we all need a health monitoring system. The system gives the quick status of your body temperature or Heartbeats or Blood oxygen level.
5. Portability- The whole framework is Automated or Portable, so the system is connected to the internet or wirelessly accessible.
6. Power consumption- The whole framework is required a small amount of power. It also works with Rechargeable batteries. The system requires only a 5v power supply to operate.

VII. LIMITATIONS

1. If in some unacceptable hands, it will be a catastrophe-The framework touchless Face Intruder or biometric participation framework will record everything and is a helpful technique to enroll an individual or workers. If in the wrong hands can cause a genuine level of protection penetrates.
2. Low reliability- Some times where the identity of a person or employee is not able to get verified. And also cases where the identity of persons or employees is verified with another person or employees identity.
3. Accuracy- The system is not Perfect 100% accurate. They have some flows. Sometimes it showing the wrong Health status.

VIII. APPLICATIONS

1. In Industrial use- In Industries uses conventional strategies of attendance marking or employment verification. But the system is using the latest technology for monitoring. The whole system is automated.
2. In institutes- colleges have thousands of students so, manually student verification is time-consuming. So, the system is fully automated it work itself.
3. In public places- In crowded areas, it is troublesome to search for a specific person. But our system is to find the wanted persons immediately.

IX. CONCLUSION AND FUTURE WORK

Lately, face detection and recognition have accomplished impressive consideration from analysts in bio-measurements. There is endless security, and legal applications requiring the utilization of face recognition and detection technologies. As you can see, face recognition and detection system are vital in our everyday life. Among the whole kinds of biometric strategies, the face detection and recognition framework is the most exact. It is exciting to see facial recognition and detection techniques be increasingly used in real-world applications and products. Applications and challenges face recognition and detection also likewise talked about which propelled us to do explore face detection and recognition. The clearest future bearing is to additionally improve face recognition and detection in presence of certain issues like face impediment and non-uniform enlightenment. A ton of work has been finished in face recognition and detection, but not in presence of the problem of the presence of occlusion and non-uniform illumination. On the off chance that it occurs, it will assist a ton with confronting face recognition and detection, facial expression recognition, etc. so forth As of now numerous organizations giving facial biometric in the cell phone for the motivation behind access or security. In the future it will be utilized for installments, security, medical care, promoting, criminal ID, participation in the board, and so on, etc.

This system plan is defined on a heartbeat monitor and body temperature monitoring system which can screen the pulse and internal heat level perusing of patient or employees at any time. The framework decides The beat rate beat each moment and internal heat level in which the physiological information is shown on a 20x4 LCD. The data then is automatically log into Microsoft Excel. Hence, by having the system, the healthcare professionals or doctors can monitor and Diagnose their patients or employees from a laptop at any time. They can easily monitor their patients or employees from their Workstations or offices, especially for emergency cases. The framework can save information with a timestamp with a Date for future reference. The usefulness of this Monitoring framework (Covid-19 anticipation framework) likewise has been tried on a respondent who is a youthful grown-up with fever. It is Successfully functioning or operated with a minimal percentage of error when compared the value with conventional Devices or equipment's; thermometer and digital pulse monitor.

X. REFERENCES

1. IEEE: https://ieeexplore.ieee.org/document/7916753
2. IEEE: https://ieeexplore.ieee.org/document/7391943
3. IEEE: https://ieeexplore.ieee.org/document/6670976?reload=true
4. ResearchGate: https://www.researchgate.net/publication/317117507_Heartbeat_and_Temperature_Monitoring_System_for_Remote_Patients_using_Arduino
5. Creat.arduino: https://www.google.com/url?sa=t&source=web&rct=j&url=https://create.arduino.cc/projecthub/DKARDU/how-to-make-blood-oxygen-body-temperature-measurement-583c31&ved=2ahUKEwism-PN9aLwAhVJWysKHbT4DocQtwIwAHoECAgQAg&usg=AOvVaw3U4jrhNwLoNvdVuwOYjLgq
6. IJARTET: https://www.google.com/url?sa=t&source=web&rct=j&url=https://ijartet.com/2317/v4s20april2017kamarajece/conference&ved=2ahUKEwjQ2Na-9qLwAhXRIqYKHYdIBBM4ChAWMAZ6BAgEEAI&usg=AOvVaw3r5rwjlVG0PZhgXmMa1Gtu
7. IJAERS: https://www.google.com/url?sa=t&source=web&rct=j&url=https://ijaers.com/uploads/issue_files/10%2520IJAERS-MAY-2017-25-Heartbeat%2520and%2520Temperature%2520Monitoring.pdf&ved=2ahUKEwitn4yw96LwAhULH7cAHWyeDkIQFjAAegQIBRAC&usg=AOvVaw2RXhNS14r6sbDxlokKSiv0