



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 3, March 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com



IOT Based Auto Temperature Scan Entry System with Mask Detection Automatic Hand Sanitizer for Covid Prevention at Large Scale

Faysal Ibrahim Abdi¹, Neeraj Sharma², Sandeep Kumar Jain³

P.G. Student, Department of ECE, Vivekananda Global University, Jaipur, India¹

Associate Professor, Department of ECE, Vivekananda Global University, Jaipur, India^{2,3}

ABSTRACT: Following the rapid emergence of a new coronavirus disease (COVID-19) case in China in December 2019, in the opinion of the World Health Organization, this is a highly contagious virus that may spread by droplets and airborne transmission. Wearing a face mask while going outside or interacting with others is important for prevention. Some irresponsible people, on the other hand, refuse to wear masks for a variety of reasons. Furthermore, in this scenario, establishing a face mask detector is critical. Face mask detector that could identify any sort of face mask is the purpose of this research. The facial mask was detected using Opencv deep learning as mask detection technique. The results of the experiments were produced in real time, and so was the device. This technology can accurately detect people who are wearing or are not wearing masks, even if they are moving around.

KEYWORDS: Covid-19, Opencv deep learning, IoT, Raspberry Pi, IR Sensor, Camera.

I. INTRODUCTION

Now that many stores, offices, and institutions have reopened following the lockdown due to Corona, As a result, many firms have the issue of offering best possible coverage for its workers and consumers. Protection measures must include the use of face masks and regular monitoring of one's core temperature.

Despite the fact that this is currently done on a broad scale at airports as well as railway stations, many companies and organisations are struggling to keep up with the demand. Face mask monitoring usually needs hiring of extra staff. At the same time, staff body temperature checks pose some risks in terms of hygiene and data privacy.

The solution package, designed for lobbies and indoor entrances, consists of a freely placeable unit with LCD display, integrated IR-thermometer (thermoscan), and video camera. To provide fully automated controlled access, the solution integrates seamlessly with existing door opener mechanisms.

The user interface is simple and straightforward. This only takes a few seconds. The outcome is displayed immediately on the screen. After sanitization, access is granted if both requirements are met. Anyone that isn't using a face mask is being asked to do so by Acoustic. If the scanned temperature is in the fever range, the device automatically activates an alert buzzer to notify service personnel.

II. METHODOLOGY

HARDWARE DESCRIPTION:

Microprocessor: Using singular integrated circuit or an limited quantity of integrated circuit, microprocessor has data processing logic as well as control. Multipurpose digital integrated circuit powered by a clock and employing registers to process binary data and output results is what we mean by a microprocessor (even in binary form). Microprocessors have both combinational sequential as well as digital logic. binary number system is used by microprocessors to represent numbers and symbols.

Power Supply: To get the necessary dc output voltage, the ac voltage, usually 220V, is stepped down using a transformer. Full-wave diode rectifier supplies the rectified voltage, and simple capacitor filter is used to filter the output voltage. The ripple or ac voltage change in resultant dc voltage is common.

Removes ripples and maintains a constant dc value regardless of changes in input voltage or load linked to output voltage. Among most common voltage regulator IC devices is used to achieve this level of voltage control.



Transformer: When converting through one voltage to other, transformers do not lose much power in process. Because transformers are AC-only, mains supply of power is AC as well.

Transformers may be used to enhance or decrease voltage. In order to lower the high mains voltage (230V in India) towards more manageable level, many power supplies are using step-down transformer.

The transformer lowers the supply voltage from 0 to 230 volts to 0 to 6 volts. With PN junction diodes in bridge rectifier, potential transformer's secondary will be linked. The use of a bridge rectifier has benefit of providing DC output at peak voltage.

Rectifier :Diodes may be connected in a variety of ways to create rectifier that converts AC to DC. As the name implies, a bridge rectifier generates DC that is capable of being varied over whole waveform. Because diodes are so inexpensive, this technique of making full-wave rectifier is no longer employed because it requires transformer with centre tap. Only the positive (+) components of AC wave are employed by single diode rectifier to create half-wave changing DC voltages.

Voltage Regulators :Voltage regulators are one of the most common types of integrated circuits. The reference source, control device, comparator amplifier and overload safety circuitry are all integrated into a single regulator IC. Fixed positive, fixed negative, or adjustable voltage control are all possible with IC devices. There are regulators available that can handle loads ranging from milliamperes to tens of milliamperes, with power ratings ranging from milliwatt to megawatt.

There is an uncontrolled D.C input voltage (V.i) applied to one of the 3 input terminals of fixed three-terminal voltage regulator, which is linked to ground.

Voltages ranging from 5 to 24 volts are provided by series 78 regulators. Similar to the Series 79 regulators, these devices produce set negative regulated voltages between 5 and 24 volts, as well. Variable and fixed output voltages are offered in voltage regulator ICs. They are also graded in terms of amount of current they are capable of carrying. It's possible to employ a negative voltage regulator in dual supply systems. Overload protection (also known as "thermal protection") and overcurrent protection (also known as "overload protection") are standard features in most regulators.

Many fixed voltage regulator ICs, such the 7805 +5V 1Amp regulator, have three leads and appear like power transistors, like a power transistor. If required, a heat sink may be attached via a hole in case.

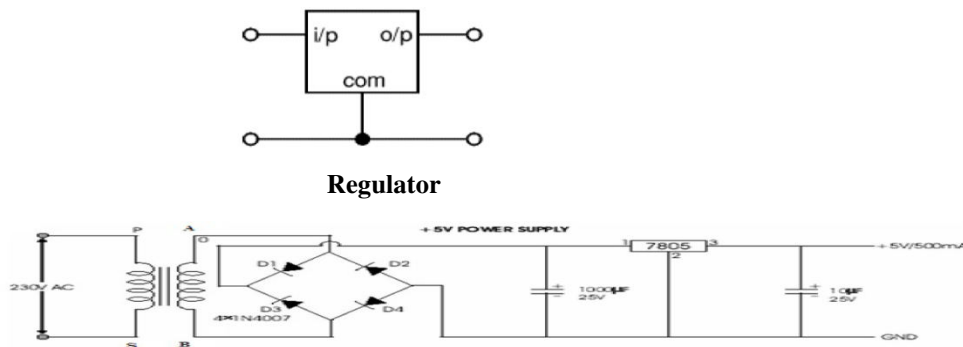


Fig.1: Circuit Diagram of Power Supply

Circuit Software Requirements:

- PYTHON
- OPENCV
- INTERNET OF THINGS(IOT)

Python Version 3.7.5:

Because it's simple to learn (both to read and write) and works well with the Raspberry Pi, Python is a great tool for connecting project with real world. Python's syntax is simple and easy to understand, with a focus on readability.





Running Python on Raspberry Pi

In Raspberry Pi, Python is a first-class citizen, which is one of the greatest aspects about working with Python. Since Python is powerful, versatile, and easy to use, the Raspberry Pi Foundation chose it as the primary programming language. On Raspbian, Python is preloaded, so you can get started right away.

The Raspberry Pi offers a wide range of Python programming choices. The raspberry pi is programmed using python using thonny. One of the new features of the current version of Raspbian with PIXEL is Thonny, an integrated development environment (IDE).

Open the programme by selecting it from the menu bar and selecting Programming. The IDLE software, which is still included with Raspbian, does not have many of the more complex functions that this one has.

You'll notice a new script editor and a shell when you open Thonny. Scripts are written in the script editor and executed on the command line as in Python 2/3 IDLE. Using the shell, you may access variables, objects, and other components of the programme directly.

Thonny comes with several useful extras for budding programmers. A robust debug mode that's very simple to use is one of the nicest parts of this tool. Instead of executing your programme, it takes you through it line by line. Values are supplied into functions or compared by comparators to produce variables and objects.

IDEs with strong debuggers frequently need you to set breakpoints manually (places where the programme freezes so you can examine the code). There is a much more clear technique in Thonny. Variables, objects, and the heap may all be inspected using the different panels provided (the memory space where items are stored).

OPENCV

Today, real-time operations are very crucial, and OpenCV is a massive open-source library for computer visioning, image processing as well as machine learning. Using it, one may recognise, people, items or even human handwriting in films or pictures.



Face Detection by OpenCV

OpenCV will be used in this part to do real-time face recognition from a webcam stream.

Frames, or static pictures, are what make up a video, as you may know. Every frame of a video is subjected to facial detection. For example, when it comes to face detection, there is little difference between a still picture and a video stream.

Face detection will be accomplished via the use of the Haar Cascade technique, commonly referred to as the Viola-Jones algorithm. ML object detecting technique is utilised for identifying items in an video or image using machine learning. We contain number of trained Haar Cascade models stored in XML files in OpenCV. Instead of starting from scratch, we'll utilise this file to train the model. An "haarcascade_frontalface_alt2.xml" file is the one we'll be utilising in this project.

Internet of Things

Prototypes and real-world IoT systems are often in need of rapid and effective development. Programming the IoT devices and creating a backend that communicates with these devices quickly spring to life when this occurs.

Use Python as your programming language for both operations. If you want to work on devices with limited computational power and hence at a cheap cost, you may use a fully functioning and practical version of Micro Python.

IoT devices can be programmed and their backends built using Python.

IoT Backend with Python

One of the most common methods for connecting IoT devices is MQTT, which is easily implemented in Python.

As a publish/subscribe message transport for M2M and the Internet of Things, the MQTT protocol is meant to be as light as possible. A tiny code footprint and/or limited network capacity are both advantages of using it while connecting to faraway destinations.

The Eclipse Paho M.Q.T.T Python client library supports versions 5.0,3.1.1, and3.1 of M.Q.T.T protocol.

In order to post messages, subscribe to topics, and receive messages that have been broadcast, the Paho library code includes a client class. In addition, it includes a number of methods that make it easy to publish one-time messages to



MQTT servers. That Python isn't what makes interacting with IoT devices and the backend so easy could surprise some people. Python's IoT usefulness is aided by a number of aspects that all operate in coordination.

ALGORITHM: Initialization An initial message appears on the LCD. When the camera starts up, IOT detects it and checks the live view for a head option. For face masks, a green border was produced and for no mask, a red border was created. If the mask is on, switch on the door motor to enable people to enter in and check if the door motor is not activated, update the total number of masks and no masks detected on IOT check for temperature below 90* normal, >90* abnormal

FLOWCHART:

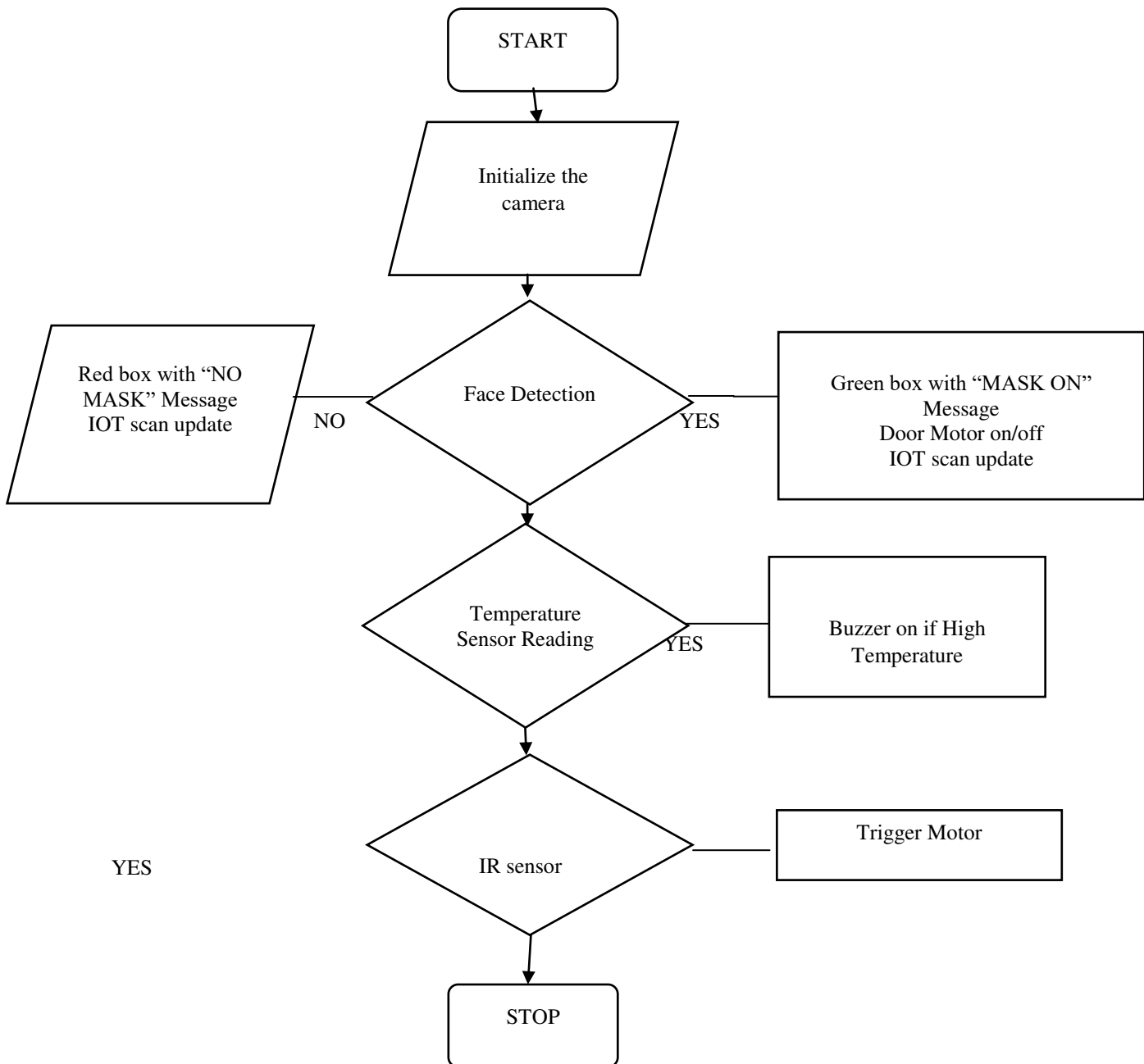


Fig 1: FLOWCHART

III. EXPERIMENTAL RESULTS AND EXECUTION

Finally, we've reached our aim. The hardware must be implemented since we have access to all of the necessary tools. So, to summarise, this is how it all works:

- Initialization LCD and initial message is displayed on start up.
- The Camera is initialized with IOT.
- The camera starts detecting the live view to check for the head option in the frame.
- If the head is detected, create a green border for the face mask and a red border for no mask.
- If the mask is on it checks for temperature and then sanitizes. Then turn on the door motor to allow it to get in.
- Check if no mask then the door motor is not triggered and rings the buzzer.
- Update the total number of masks and no mask detected on IOT.
- Check for temperature below $<90^{\circ}$ normal, $>90^{\circ}$ abnormal.
- Check for IR sensor if triggered, turn on the sanitizer motor.

PROJECT CIRCUIT CONNECTIONS:

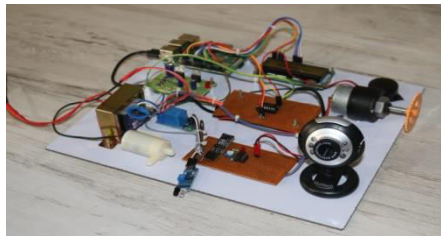


Fig 2: HARDWARE IMPLEMENTATION

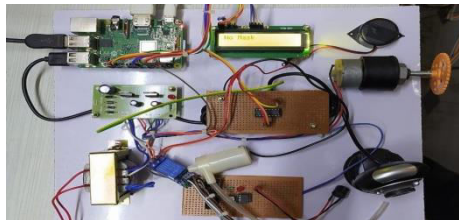


Fig 3 : INITIALIZATION

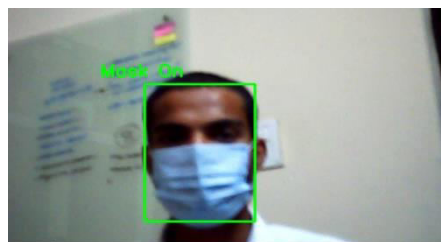


Fig 4: MASK DETECTED

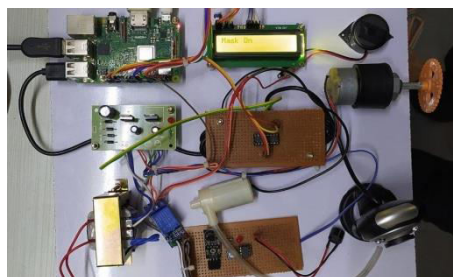


Fig 5: MASK ON MESSAGE DISPLAYED

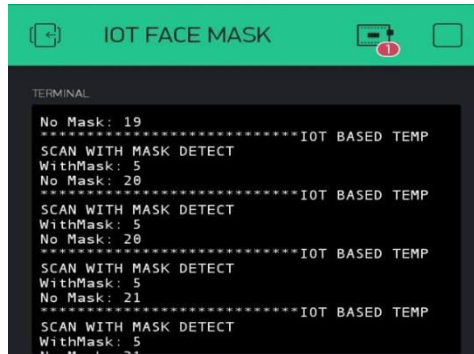


Fig 6: IOT MONITORING WITHOUT MASK ON

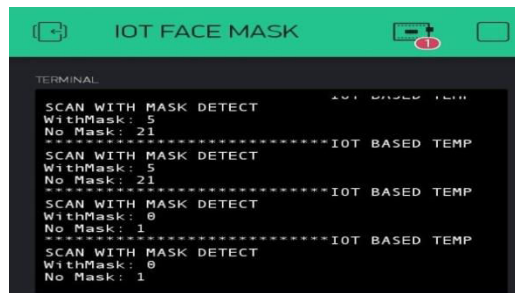


Fig 7: IOT MONITORING WITH MASK ON

At last, we have successfully executed the circuit. It can be easily implemented in public places.

IV. CONCLUSION

The project “IOT BASED AUTO TEMPERATURE SCAN AND ENTRY SYSTEM WITH MASK DETECTION AUTOMATIC HAND SANITIZER FOR COVID PREVENTION AT LARGE SCALE” is magnificently developed as well as trailed. It was created by combining best qualities of many pieces of hardware that went into it. The optimum operation of the unit is further enhanced by the fact that each module's presence and placement have been carefully considered. Secondly, project was finished successfully thanks for using advanced ICs and rising technology.

REFERENCES

- [1] Susanto.E. Rudiawan.R.Analia. D. S. Pamungkas.And H. Soebekti.“The deep learning development for real-time ball and goal detection of barelang-FC.”In 2017 International Electronics Symposium on Engineering Technology and Applications (IES-ETA).Surabaya.pp.146-151, 2017.doi: 10.1109/ELECSYM.2017.8240393.
- [2] C. Liu. Y. Tao. J. Liang. K. Li and Y. Chen. “Object detection based on the YOLO network.” in 2018 IEEE 4th Information Technology and Mechatronics Engineering Conference (ITOEC). Chongqing. China.2018. pp. 799-803. doi10.1109/ITOEC.2018.8740604.
- [3] W. Yang and Z. Jiachun. “Real-time face detection based on YOLO.” in 2018 1st IEEE International Conference on Knowledge Innovation and Invention (ICKII). Jeju.pp. 221-2242018.doi: 10.1109/ICKII.2018.8569109.
- [4] D. Ciarg. P. Cioel. S. Pandya. A. Cianatra and K. Kotecha. “A deep learning approach for face detection using YOLO.” in 2018 IEEE Punecon.Pune.India.pp.1-4,2018.doi:10.1109/PUNECON.2018.8745376.
- [5] C. Kim et al., “Implementation of Yolo-v2 image recognition and other testbenches for a CNN accelerator,” in 2019 IEEE 9th International Conference on Consumer Electronics(ICCE-Berlin),Berlin,Germany,pp.242-247,2019,doi:10.1109/ICCE- Berlin47944.2019.8966213.
- [6] H. V and K. R, “Real time pedestrian detection using modified YOLO['] V2,” in 2020 5th International Conference on Communication and Electronics Systems (ICCES), COIMBATORE, India, pp. 855-859,2020, doi: 10.1109/ICCES48766.2020.9138103.
- [7] CDC COVID-19 Response Team. Preliminary estimates of the prevalence of selected underlying health conditions among Patients with coronavirus disease 2019—United States, February 12–March 28, 2020. Morb.Mortal. Wkly. Rep. , 69, 382–386,2020.



- [8] CDC COVID-19 Response Team. Severe Outcomes among Patients with Coronavirus Disease 2019 (COVID-19)-United States, February 12-March 16, 2020, 69, 343–346, 2020
- [9] Moriyama, M.; Hugentobler, W.J.; Iwasaki, A. Seasonality of respiratory viral infections. *Annu. Rev. Virol.* 7, 83–101, 2020,
- [10] Yang, J. Reuter, T. Three Ways China Is Using Drones to Fight Coronavirus; World Economic Forum: Geneva, Switzerland, 2020
- [11] Gupta, P. Agrawal, D. Chhabra, J.Dhir, P.K. IoT based smart healthcare kit. In Proceedings of the IEEE 2016 International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT), New Delhi, India, 11–13, pp. 237–242. March 2016
- [12] Dong, E. Du, H. Gardner, L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect. Dis.* 2020



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details