



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 10, Issue 11, November 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

 9940 572 462

 6381 907 438

 ijrset@gmail.com

 www.ijrset.com



Implementation of Intelligent Face Mask & Body Temperature Detection System With Alerting Devices Using AI

T.S.S. Naga Pavan Kumar¹, Aremanda Divya Sri², Kishore Babu Kodali³

Asst. Professor, Vignan's Lara Institute of Technology & Science, Vadlamudi, Guntur, India¹

B.Tech (ECE), Vignan's Lara Institute of Technology & Science, Vadlamudi, Guntur, India²

Research Engineer(R&D), Department of Electronics, Guntur, India³

ABSTRACT: Present days the world is suffering with COVID-19 pandemic. The coronavirus is spreading through the droplets of an infected person's saliva or droplets from the nose. Due to this action the virus is spreading everywhere when we touch those devices or places. To protect yourself, clean your hands frequently with an alcohol-based hand rub or wash them with soap and water & wear mask every time. This virus influences the decrease of economy and increases the death rate of our world to avoid this we are implementing a device which can help to the people, companies and organizations. In this device we are placing an IR based sensing device to operate a motor for release of sanitizer when we place the hands there. Then it will check the mask whether the person is wearing or not using pc webcam and serial monitor software which consists of group of images having people wearing mask images.

It will be operating by using the one part of image processing techniques such as Facial Landmarking, Region based boundary detection technique. Whenever the person wear mask then he will be allowed to check temperature using non-contact IR thermopile sensor. Whenever the person not wear the mask, he will not be allowed to check temperature and it will alert using the danger LED. Whenever the person's temperature is below the threshold value 98.6F then he will allow into the workplaces by using door motor connected to it. Else it will enable the buzzer to intimate the security. The total device will be human free and contact free device and will continuously monitors based on Artificial intelligence technique enabled to it. This project can be used in schools, hospitals, banks, airports, and etc. as a digitalized scanning tool.

KEYWORDS: Buzzer, Motor, LED, Sanitizer, Sensor, Serial Communication, Temperature.

I. INTRODUCTION

Present scenario the world is facing the main issue i.e., COVID-19 due to this pandemic the borders of every country, state, city had closed and due to that impact people are losing their incomes and farmers got loss by not selling their food products in the markets due to lack of transportation. Every people are facing lot of issues with this pandemic. If any person got this disease due to lack of medicines some people are dying and world's economy also disturbed due to this activity. By this impact the WHO and Governments of every country issuing a rule that is every person need to wear the mask for to stop spread of covid-19 virus. The coronavirus is spreading through the droplets of an infected person's saliva or droplets from the nose. Due to this action the virus is spreading everywhere when we touch those devices or places.

To protect yourself, clean your hands frequently with an alcohol-based hand rub or wash them with soap and water & wear mask every time. This virus influences the decrease of economy and increases the death rate of our world to avoid this we are implementing a device which can help to the people, companies and organizations.

In this device we are placing an IR based sensing device to operate a motor for release of sanitizer when we place the hands there. Then it will check the mask whether the person is wearing or not using pc webcam and serial monitor software which consists of group of images having people wearing mask images.

It will be operating by using the one part of image processing techniques such as Facial Landmarking, Region based boundary detection technique. Whenever the person wear mask then he will be allowed to check temperature using non-contact IR thermopile sensor. Whenever the person not wear the mask, he will not be allowed to check temperature and it will alert using the danger LED. Whenever the person's temperature is below the threshold value



98.6F then he will allow into the workplaces by using door motor connected to it. Else it will enable the buzzer to intimate the security.

The total device will be human free and contact free device and will continuously monitors based on Artificial intelligence technique enabled to it. This project can be used in schools, hospitals, banks, airports, and etc. as a digitalized scanning tool.

II. SYSTEM DESCRIPTION

In this system we are controlling all the devices using Atmega328 microcontroller. In this system IR sensor pair, Ir temperature sensor and pc web cam acting as an input devices and sanitizer motor, led and buzzer acts as an output device to the proposed system. In this system the pc web cam continuously monitors that whether the person is wearing mask or not. The device is connected to database having mask and without mask images those can be activated by using HTML web page.

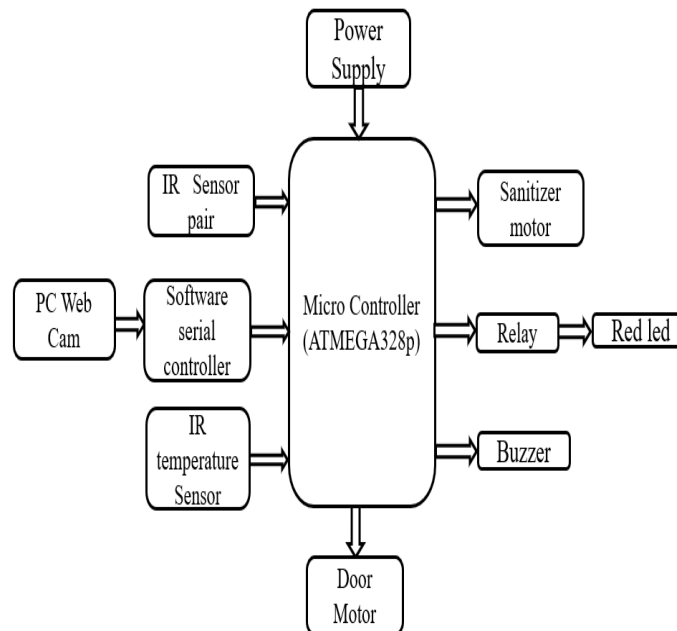


Fig.1 Block diagram of proposed system

In this system it will detects the mask based on the facial landmarking and boundary detection with region of interest technique. In this technique the total face is divided into regions format and those are detected by using rectangular blocks. By this scenario we will align the values to the image. If the image part inside the ROI, then it represented as 1 and other than part represented as 0. As clearly shown in the figure.

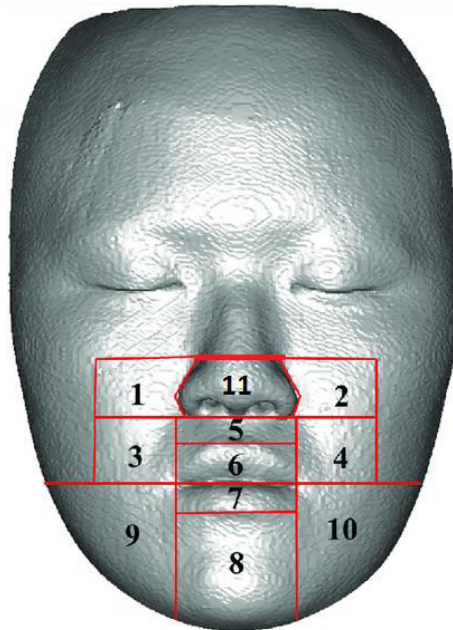


Fig.2 Roi mapping on desired area

From the above diagram it is clearly showing that the ROI is mapped with rectangular blocks and if the points covered by the mask, then it will show the 1 value at output and if this not covered then it shows the value as 0. The remaining part is neglected and all these iteration images are stored in the database and this data base is connected to MATLAB software and web page. This web page has an option to capture the images from outside and checking with described values whenever it shows 1 or 0 based on conditions of mask wearing and not wearing. These values are sent to the microcontroller attached to system. Based on the conditions the microcontroller performs the specified operations.

$$Y = \log(1 + a * b * X) / (a * b * X)$$

Where: Y=constant positive value when mask is wearing

a=iteration starting point

b=changing pattern length

x=total space

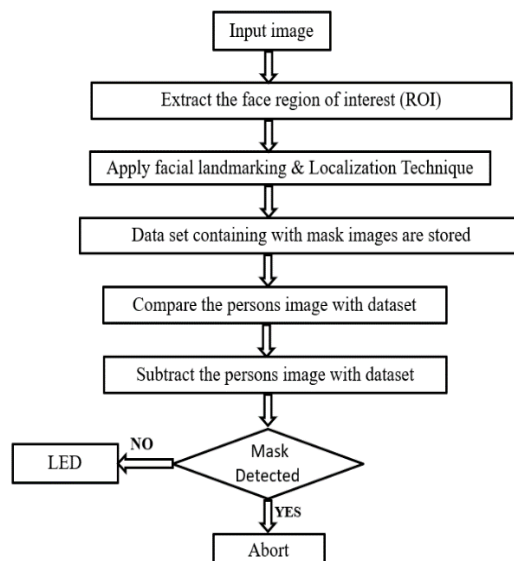


Fig.3 Mask detection flow Diagram



In this system we have other parameters like Temperature detection using IR temperature sensor. The IR temperature sensor will detect the temperature of the any living creature from certain distance. If the distance is increased the sensitivity of sensor may change. In this project Initially it will take the human temperature in the form of IR signals. These analogue signals converted into digital signals by using ADC components attached to it. then we will calculate the temperature by using Stefan-Boltzmann’s law

$$V_{TP} = A * (T_O^4 - T_S^4)$$

Where: V_{TP} =Thermopile Voltage
A = Stefan-Boltzmann’s Constant
 T_O^4 = object Temperature
 T_S^4 = Sensor Temperature.

III. DEVICE FUNCTIONALITY

Whenever device is in ON condition then it will continuously check for human to operate sanitization motor by using IR pair sensor. If human is present and places the hands below the IR pair sensor it will start sanitization.

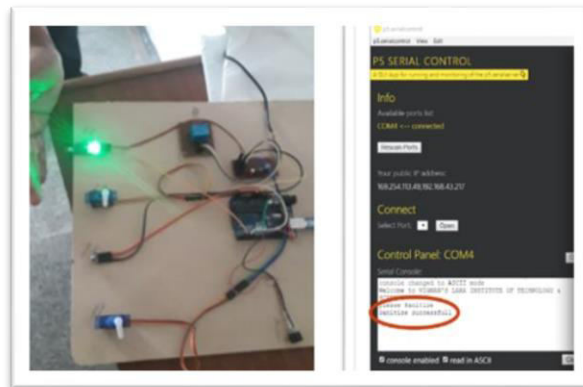


Fig.4 IR pair Sensor detection for sanitization.

These values are seen in the software serial monitor software. And then it will check whether the person is wearing the mask or not. Whenever the person wears the mask then it will allow to temperature detection. If person not wear the mask, then it will turn on the Red LED light connected to Relay.

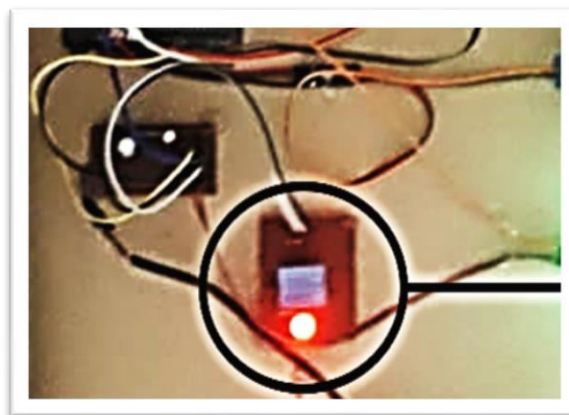


Fig.5 Red Led is in ON condition.

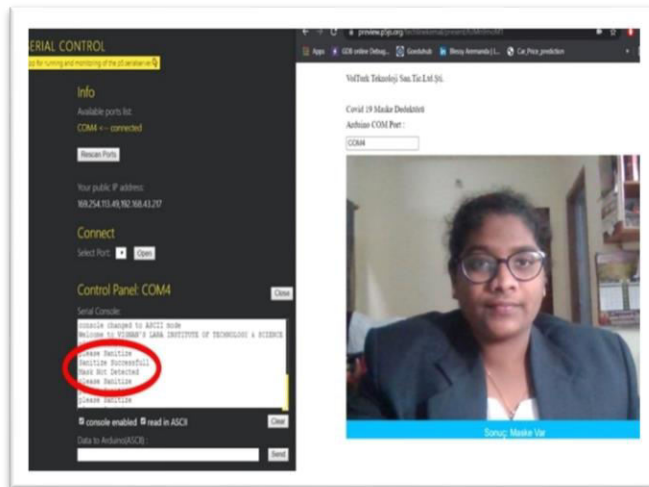


Fig.6 Mask not detected Condition.

If mask is detected by the system, then it will go to temperature detection case.

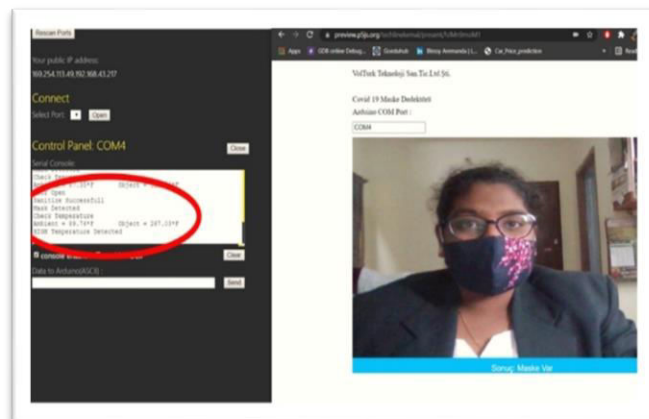


Fig.7 Mask is detected by the software condition

Whenever mask is detected by the system it will go to temperature detection case. In this system we employing a MLX90614 IR Temperature sensor can detect the persons temperature from certain distance. That's why this is call it as a non-contact AI Device. If the temperature value is greater than the 98.6F then it will give the alert by using buzzer. Attached to it. If the temperature of the person is below the threshold value, then it will allow the person into the office using door motor attached to it.

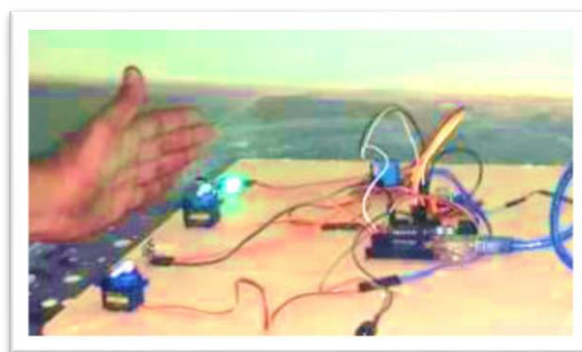


Fig8: Temperature Detection condition

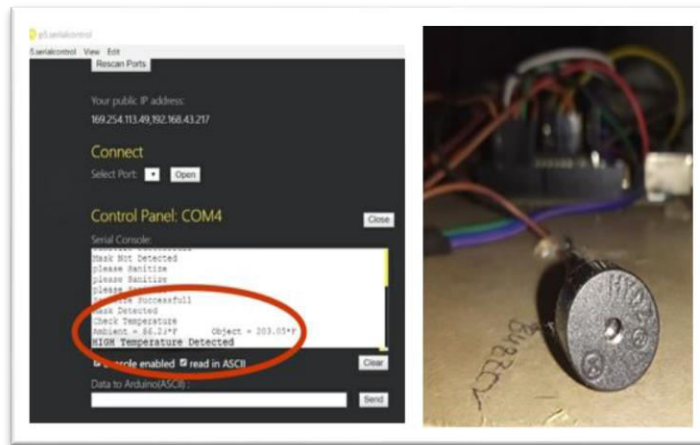


Fig.9 Temperature Detection values in Serial monitor & Buzzer is in On Condition

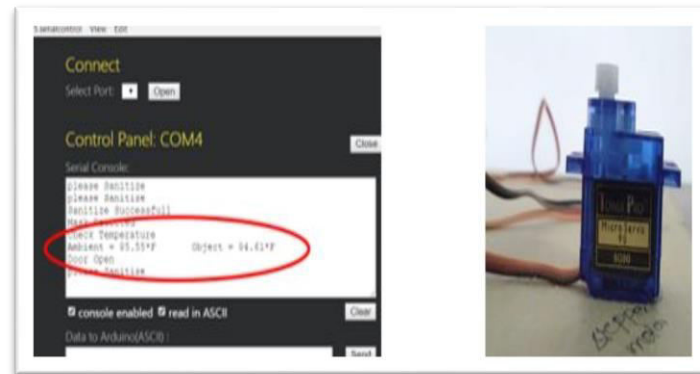


Fig.10 Door motor is in ON condition

IV. APPLICATIONS

This project can be used in the areas where there is more intensity of people. It is useful in various scenarios where people pass, like transport hubs, offices, warehouses and large shops. This means it's quicker, easier, and safer to monitor the people. Used in museums, Airport, exam centres etc.

V. CONCLUSION

We are developing a system that will check whether the human wearing the mask or not and contact less temperature detection using a real-time camera and various sensors attached to the device. This project is a simple device can easily install can monitor the persons state efficiently without contact. By using this device, we can perform the 3 manmade tasks without human intervention. By this device we can save over time and money. This device can also reduce the Spreading of corona disease from one person to another. The total device is working based on Artificial intelligence technique.

REFERENCES

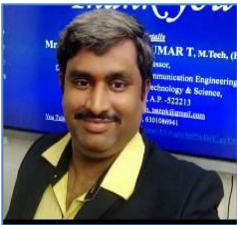
- [1] "What Countries Require or Recommend Masks In Public?". #Masks4All. Retrieved 1 May 2021.
- [2] "Considerations for Wearing Masks". Centers for Disease Control and Prevention. Retrieved 25 January 2021.
- [3] "Personal Protective Equipments (PPE) -Prerequisites, Rationale and Challenges during COVID 19 Pandemic". ResearchGate. Retrieved 17 February 2021.
- [4] Covid-19 Face Mask Detection Using TensorFlow, Keras and OpenCV <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&number=9342585>
- [5] An Automated System to Limit COVID-19 Using Facial Mask Detection in Smart City



Network <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9216386>

- [6] Thermal Imaging for Detecting Potential SARS Infection (also covers non-imaging infrared thermometers)
- [7] "A Roissy, le "thermomètre laser" pour détecter Ebola". Libération. 2014-10-18. Retrieved 2014-10-18. A peine descend d'avion, les passagers du vol Conakry-Paris ont été accueillis samedi avec des thermomètres laser pour détecter d'éventuels cas de fièvre, mesure la plus spectaculaire prise par le gouvernement pour prévenir l'éventuelle arrivée en France du virus Ebola
- [8] Health, Center for Devices and Radiological (2020-06-23). "Non-contact Temperature Assessment Devices During the COVID-19 Pandemic". FDA
- [9] <https://www.ideas2it.com/blogs/face-mask-detector-using-deep-learning-pytorch-and-computer-vision-opencv>/https://www.researchgate.net/publication/344173985_Face_Mask_Detector.

BIOGRAPHY



Mr. T.S.S. NAGA PAVAN KUMAR working as an Assistant Professor in the Department of Electronics and Communication Engineering (2010 to till today) at Vignan's Lara Institute of Technology and Science. He received the MTech Degree from NOVA Engineering College, JNTU Kakinada with the stream of VLSI System Design. He received the B. Tech Degree from Progressive Engineering College, JNTU Hyderabad with the stream of Electronics and Communication Engineering. His current research interests include in the field of Image processing for Bio-Medical Applications. He guided 25 UG Level and 5 PG Level Projects. His research areas are Bio-Medical Engineering, VLSI System Design and Antennas.



Ms. Aremanda Divya Sri, Studying B. Tech (ECE) in Vignan's Lara Institute of technology & Science and she has interests in VLSI, Embedded Systems and block chain technology. Want to work as electronics engineer in MNC's like INTEL IBM, BOSCH and National Instruments.



Mr. Kishore Babu Kodali, M. Tech (Embedded Systems) Working as a Research and Development Engineer in Electronics domain. He has done the Researches on Embedded systems, Sensor Designing's and PCB Manufacturing and Developments. Also acts as a trainer who Trains the Students to do their mini and major as their own. Given the Instructions to the Various College Students in their Project Developments. He has interests in designing of innovative projects, electromagnetic fields and Sensor designing's.



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