INTERNATIONAL JOURNAL OF
MULTIDISCIPLINARY RESEARCH
IN SCIENCE, ENGINEERING AND TECHNOLOGY

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.54

Real Time Face Mask with Temperature Detection for Automatic Door Opening Using IoT

M.Sabarish[1], S.Sathesh[2], G.Selvaganapathi[3], R.Sagayaraj[4], S.Saravanan[5]

UG Scholars, Department of Electrical and Electronics Engineering, Muthayammal Engineering College,

Tamilnadu, India[1, 2, 3],

Professor, Department of Electrical and Electronics Engineering, Muthayammal Engineering College,

Tamilnadu, India[4,5]

ABSTRACT: According to data obtained by the World Health Organization (WHO). The global pandemic of COVID-19 has severely impacted the world and has now infected more than eight million people worldwide. Wearing face masks and following safe social distancing are the two enhanced safety protocols need to be followed in public places in order to prevent the virus spreads. To create safe environment that contributes to public safety, we propose an efficient computer vision based approach focused on the real-time automated monitoring of people to detect both temperature and face masks in public places by implementing raspberry Pi4 to monitor the activity and detect violations through camera and buzzer sound. After detection of breach, the raspberry Pi4 sends an alert signal to control the door opening system and enables an alarm to public. In this proposed system Deep Learning Algorithm have been mixed with Geometric Techniques for building a robust model which coverts three aspects such as detection, tracking, and validation. Thus, the proposed system contributes the society by saving time and aids in minimizing the spread of corona virus. Automated inspection reduces manpower to inspect the public and. It can be implemented effectively in current situation during lockdown period on schools, colleges, temples, shopping malls, etc.

KEYWORDS: Mask Detection, Temperature Detection, Raspberry PI, PI Camera.

I. INTRODUCTION

Recently India along with almost all big and small countries stated emergency conditions for the novel coronavirus (COVID-19). Practically, the whole population of the world is under lockdown and people are maintaining social distances as suggested by the World Health Organization (WHO). This deadly virus has infected tens of lakhs individuals and continues to spread globally. According to recent reports, the next few months are life-threatening in the current efforts to hold COVID-19 spread among communities. Across India, persons are losing jobs, working from home, being hospitalized, and even vanishing life as a result of COVID-19 infections. The epidemic placed great stress on medico professionals. Hospitals are experiencing higher than normal patient loads and treating all patients quickly and effectively now becomes a very challenging task. Due to fear, country-wise lockdown, and suspended OPDs in Hospitals regular patients are also not able to approach doctors.

II. PROPOSED METHOD

It consists of a cascade classifier and a pre-trained CNN which contains two 2D convolution layers connected to layers of dense neurons the algorithm for face mask detection is as follows. Data preprocessing involves conversion of data from a given format to much more user friendly, desired and meaningful format. It can be in any form like tables, images, videos, graphs, etc. These organized information fit in with an information model or composition and captures relationship between different entities. The proposed method deals with image and video data using Numpy and Open CV.

Block Diagram

We are going to build a Raspberry Pi-based face mask detector which detects whether the person is wearing a mask or not .The following diagram describes major components of our project.
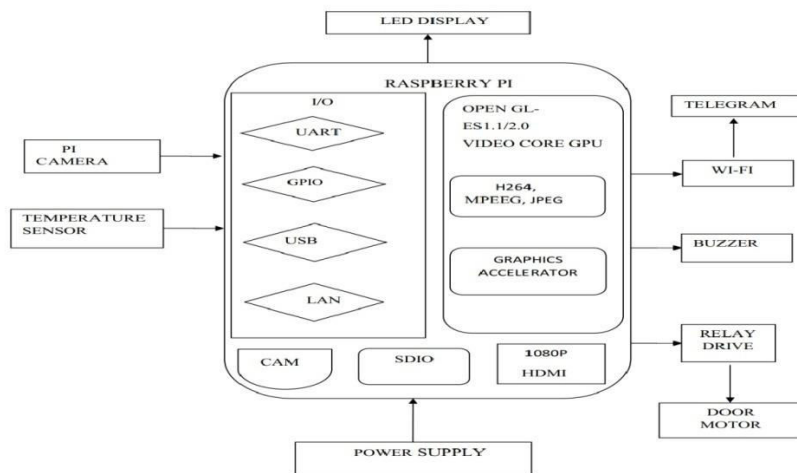
Figure 1: Block Diagram

Description of Prototype model

The Raspberry Pi 4 Model B (Pi4B) is the first of a new generation of Raspberry Pi computers supporting more RAM and with siginficantly enhanced CPU, GPU and I/O performance; all within a similar form factor, power envelope and cost as the previous generation Raspberry Pi 3B+. The Pi4B is avaiable with either 1, 2 and 4 Gigabytes of LPDDR4 SDRAM.
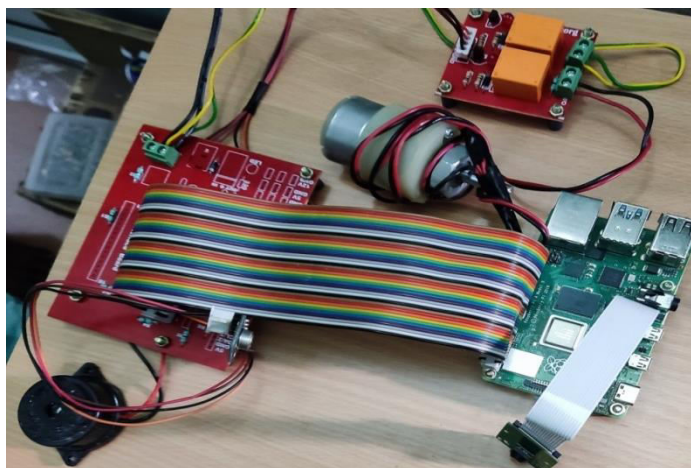

Figure 2: Prototype Model Of Face Mask And Temperature Detect

2. Pi Camera

The Raspberry Pi Camera Module is a 5MP CMOS camera with a fixed focus lens that is capable of capturing still images as well as high definition video. Stills are captured at a resolution of 2592 x 1944, while video is supported at 1080p at 30 FPS, 720p at 60 FPS and 640x480 at 60 or 90 FPS.The camera is supported in the latest version of Raspbian, Raspberry Pi's preferred operating system. The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs. It's easy to use for beginners, but has plenty to offer advanced users if you're looking to expand your knowledge. There are lots of examples online of people using it for time-lapse, slow-motion and other video cleverness. You can also use the libraries we bundle with the camera to create effects. If you're interested in the nitty-gritty, you'll want to know that the module has a five megapixel fixed-focus camera that supports 1080p30, 720p60 and VGA90 video modes, as well as stills capture. It attaches via a 15cm ribbon cable to the CSI port on the Raspberry Pi.
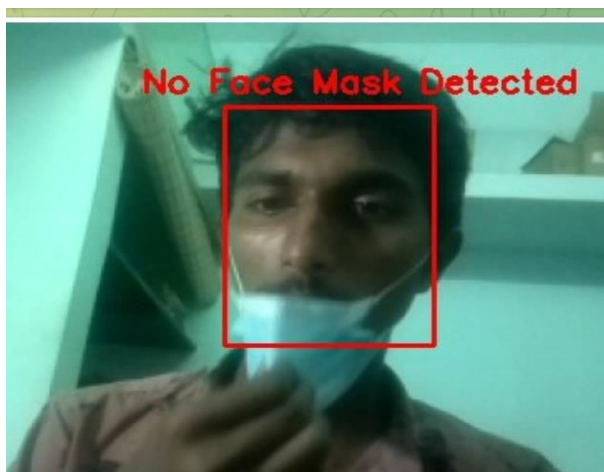
Figure 3 : Testing 1with Face Mask

Figure 4 : Testing 1without Face Mask

III.CONCLUSIONS

Thus, this proposed system will operate in an efficient manner in the current situation when the lockdown is implemented and helps to track public places easily in an automated manner. We have addressed in depth the tracking of social distancing and the identification of masks that helps to ensure human health. The implementation of this solution was successfully tested in real-time by deploying model in raspberry Pi4. It's performance is really well in images and our detection results were also quite good. This detection can also be used for video stream or camera fed inputs. To get improved performance and speed, Raspberry Pi of higher variant such as 4GB or 8GB RAM can be used to implement the detection algorithm. The Future development of the project is planned to involve the identification of a person and sent the intimation message to the persons mobile who were not wearing face masks using buzzer sounds. The solution has the potential to significantly reduce violations by real-time interventions, so the proposed system would improve public safety through saving time and helps to reduce the spread of coronavirus.

REFERENCES

1. Vikram Kulkarni &ViswaprakashBabu, embedded smart car security system on face detection, special issue of IJCCT, ISSN(Online):22310371,ISSN(Print):0975-7449,volume-3,issue-1
2. N. M. Z. Hashim, M. H. A. Halim, H. Bakri, S. H. Husin& M. M. Said, Vehicle Security System Using Zigbee , International Journal of Scientific and Research Publications, Volume 3, Issue 9, September 2013,ISSN 2250-3153

3. JaypalBaviskar ,AfshanMulla , Manish Upadhye , Jeet Desai and AniketBhovad , "Performance analysis of ZigBee based real time Home Automation system", International Conference on Communication, Information & Computing Technology (ICCICT), Mumbai, India, Jan. 16-17, 2015

4. Lien-Wu Chen, Kun-ZeSyue& Yu-Chee Tseng, A Vehicular Surveillance and Sensing System for Car Security and Tracking Applications, special 978-1-4244-5113-5/09/25.00c2009IEEE.

5. Pengfei Zhou; Yuanqing Zheng; Mo Li, "How Long to Wait? Predicting Bus Arrival Time with Mobile Phone Based Participatory Sensing," Mobile Computing, IEEE Transactions on, vol.13, no.6, pp.1228, 1241, June 2014.

6. Liu; Anqi Zhang; Shaojun Li, "Vehicle anti-theft tracking system based on Internet of things," Vehicular Electronics and Safety (ICVES), 2013 IEEE International Conference on, vol., no., pp.48, 52, 28-30 July 2013.

7. A. Rosebrock, "COVID-19: Face Mask Detector with OpenCV,Keras/Tensor Flow and Deep learning",May4,2020.

8. B. Qin and D. Li ,"Identifying facemask-wearing condition using image super-resolution with classification network to prevent COVID-19,"Sensors, vol.20.no.18,p.5236,2020.

9. Ariyanto, Mochammad & Haryanto, Ismoyo & Setiawan, Joga & Muna, Munadi & Radityo, M.. (2019). Real-Time Image Processing Method Using Raspberry Pi for a Car Model. 46-51.

10. P.Ranjitha, V.Dhinesh, M.Muruganandam, S.Saravanan, "Implementation of Soft Switching with Cascaded Transformers to drive the PMDC Motor", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1411-1418, May 2015.

11. C.Sowmiya, N.Mohanandhini, S.Saravanan and M.Ranjitha,"Inverter Power Control Based On DC-Link Voltage Regulation for IPMSM Drives using ANN" International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 11, pp.1442-1448, 2018.

12. N.Yuvaraj, B.Deepan, M.Muruganandam, S.Saravanan, "STATCOM Based of Adaptive Control Technique to Enhance Voltage Stability on Power Grid", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1454-1461, May 2015.

13. P.Manikandan, S.Karthick, S.Saravanan and T.Divya," Role of Solar Powered Automatic Traffic Light Controller for Energy Conservation" International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 12, pp.989-992, 2018.

14. R.Satheesh Kumar, D. Kanimozhi, S. Saravanan, "An Efficient Control Scheme for Wind Farm Using Back to Back Converter," International Journal of Engineering Research & Technology (IJERT), Vol. 2, No.9, pp.3282-3289, 2013.

15. K.Prakashraj, G.Vijayakumar, S.Saravanan and S.Saranraj, "IoT Based Energy Monitoring and Management System for Smart Home Using Renewable Energy Resources," International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1790-1797, 2020

16. S.Umamaheswari, M.Thilagavathi, S.Sivaranjani, N.Mohananthini, M.Selvakumari, S.Saravanan," A Study Of Renewable Energy In Smart Grid Technology", International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.

17. D.Ajithkumar, J.S.Akilan, K.Dileep, R.Lokesh, E.Viswanathan S.Tamilselvan S.Saravanan," Design and Development of Electric Two Wheeler With Fast Charging", International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.

18. V.Annamalai P.S.Isaiyalagan T.Manikandan T.Premkumar N.Sathya R.Prakash S.Saravanan," Design and Implementation of Automatic Rope Robot for Supplying Poultry Feeds", International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.

19. S.Arvinthraj, M.Arun, S.Inbhakumar, R.Sagayaraj, S.Saravanan," Multipurpose Hybrid Electric Vehicle for Agricultural Applications", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7366-7371, 2021.

20. G.Boopathi raja, K.Dhinesh, S.Gobi, G.Nandakumar, G.Nagarajan, G.Vijayakumar, S.Saravanan," Cotton Harvesting Machine", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7372-7377, 2021

21. S.Anbarasu, K.Hariharan, S.Hariharan, R.Vinoth, T.Divya, N.Mohananthini, S.Saravanan," Battery Monitoring for E-Scooter Using Internet of Things", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7384-7389, 2021

22. S.Mangalraj, L.Manimaran, C.Kumaresan, R.Manikandan, G.Srinivasan, A.Gokulraj, S.Saravanan," IoT Based Smart Energy Meter", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7390-7395, 2021

23. M.Dhanarasan, T.Jothimurali, S.U.Manishkumar,, G.Dineshkumar,P.Sakthilakkia, A.Senthilkumar, S.Saravanan," Gas Booking Using IoT", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7396-7400, 2021

24. D.Manoj kumar, C.Kavinkumar, S.Kesavan, S.Saranraj, M.Selvakumari, P.Dhivyabharathi, S.Saravanan," Intelligent Water Level Management for Domestic Application Using GSM", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7401-7404, 2021

25. Jaladi Kishan Kanna, S.Muniyappan, A.Ajay, M.Swathisriranjani, N.Balaji , K.Prakasam , S.Saravanan ," IOT Based Multi Functional Robot", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7405-7413, 2021

26. G.Naveen, S.Guna, P.Praveen Kumar, P.Manikandan, S.Sandhiya, M.Dineshkumar, S.Saravanan ," Smart Agriculture Using IoT", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7414-7419, 2021

27. K.Karan, M.Nirmal Kumar, S. Pugalenthi, R.Suresh V.Deepika, Dr.S.Saravanan ," Design and Development of E-Vehicle Based on Roller", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7420-7426, 2021

28. S.Priyadharshini, D.Sivaranjani, S.Sowbaranika, S.Saravanan, N.Mohananthini," Automatic Solar Panel Tracker Using Artificial Intelligence and Data Science", International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13729-13735, 2021

INTERNATIONAL JOURNAL OF

MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY