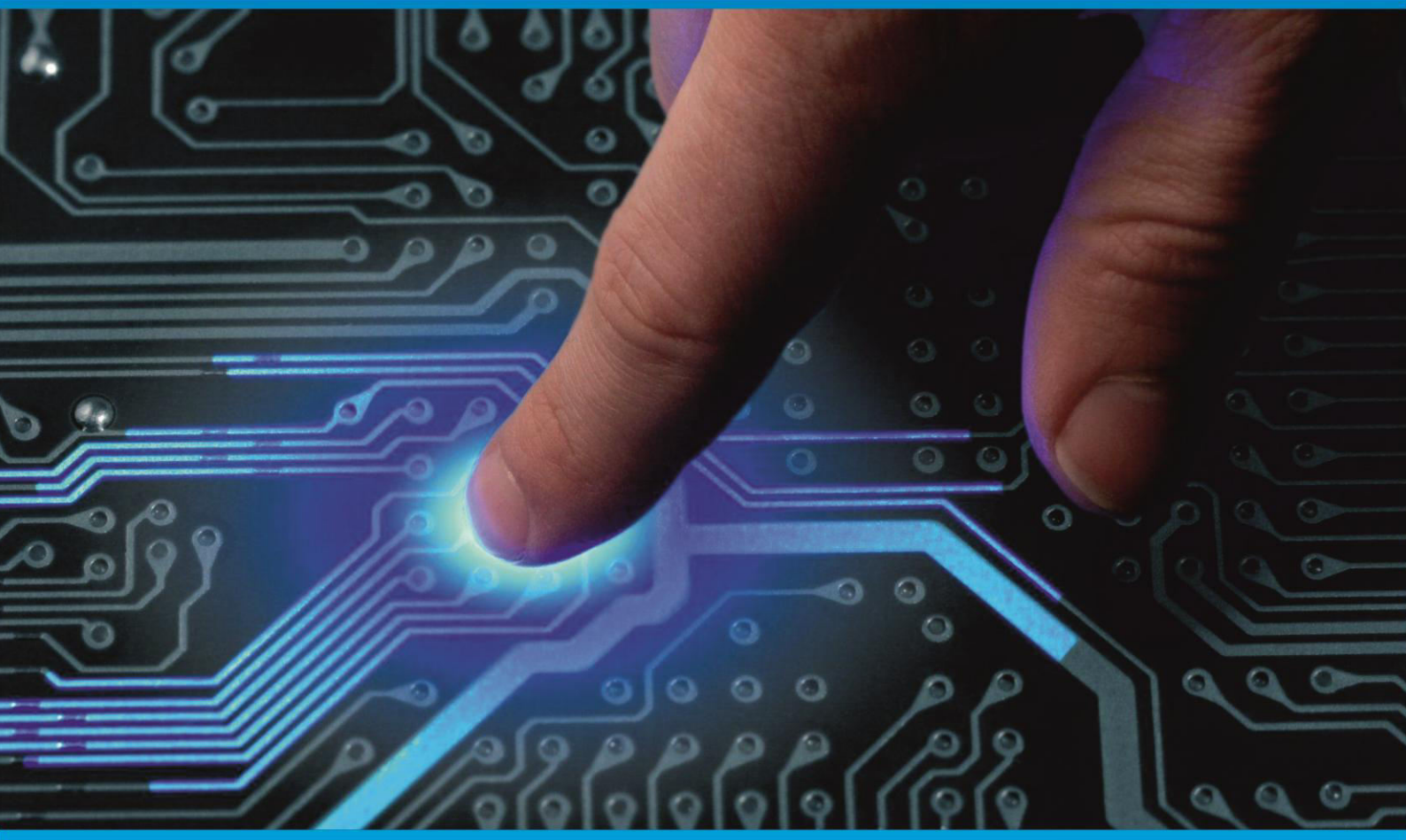
IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 9, Issue 5, May 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 5, May 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0905149|

Survey on Covid-19 Safety Measure System

Rumana Anjum[1], Abhishek Patel MC[2], Bharath J[2], Prajna M P[2], Ramya K L[2]

Assistant Professor, Dept. of CSE, Vidya Vikas Institute of Engineering and Technology, Mysuru, India[1]

UG Students, Dept. of CSE, Vidya Vikas Institute of Engineering and Technology, Mysuru, India[2]

ABSTRACT: Coronavirus disease 2019 has affected the worldseriously. One major protection method for people is to wear masks in public areas. Furthermore, many public service providers require customers to use the service only if they wear masks correctly. However, there are only a few research studies about face mask detection based on image analysis. In this paper, we propose Face Mask Detector, which is a high-accuracy and efficient face mask detector. The proposed Face Mask Detector is a one-stage detector, which consists of a feature pyramid network to fuse high-level semantic information with multiple feature maps, and a novel context attention module to focus on detecting face masks.

I. INTRODUCTION

In 1986, the Chernobyl disaster used a scouting device to measure the radius of impact since then machines are pushed to take human beings out of risk. In the same way, we came up with this idea so that the human being's life could not be pushed at risk. While entering into any hospitals, schools, colleges, Shopping centers, etc. we need to go under safety measures before entering inside. There will be at least two members performing this task. They will be in contact with numerous numbers of people by putting their and other people's life at risk. We are providing a solution for this by making the system completely automated. There will be three security measures; firstly, this product consists of a camera module that detects whether a person is wearing a mask or not. If the person is not properly wearing the mask, then the machine will give an alert and the person will not be allowed to enter. Next, the system consists of an automatic temperature detector, which allows the person only if he or she is having a normal body temperature. Finally, before the person enters, he or she should sanitize their hands and enter with an automatic sanitizer dispenser. With these three security layers, we can save ourselves and also protect the person who was doing this job.

II. BACKGROUND

To date, 34 states and the District of Columbia have mask mandates for public spaces, both outdoors and indoors. But compliance can vary depending on a range of factors, from personal politics to an individual's financial ability to purchase masks. For the most part, people who flout the mandates even if they can afford to follow them get away with that noncompliance. In, the paper mainly says about thehospital grasped infections, which is about 2 Million Patients per year, and also says that it is the 8th leading cause for deaths annually in the USA. It also says that hand washing is important and also effective with proper handwashing steps, but washing with soap and water is time-consuming for peak hours in hospitals. This paper also showed the effectiveness of alcohol-based hand sanitizers, which reduced infection rates by a whopping 30%. They used hand sanitizers with 60 to 70 percent ethanol or isopropanol for reducing a significant number of pathogens. The patients were also given about 4.25-ounce containers of hand sanitizer alongside their beds. The temperature was displayed within a range of 32–42 °C. Below and above these limits, temperatures at the thermometer were reported as "low" and "high". Values below 32 °C were frequently observed in our sample, values above 42 °C were not observed (Table 1). To carry out the statistical analysis, we fixed these body temperatures at 32 °C. To check the sensitivity of our results, we used alternative values of 31 °C and 30 °C, but it turned out that in qualitative terms our findings were robust against this change.

III. PROPOSED OBJECTIVES

• The main goal is to achieve contactless security measures.

• Spreading awareness about automated systems.

• Automated machines can replace human beings.

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• Relieving people from risking their lives.

IV. METHODS

- **Dataset:**

The dataset which we have used consists of 3835 total images out of which 1916 are of masked faces and 1919 are of unmasked faces. All the images are actual images extracted from Bing Search-API, Kaggle datasets, and the RMFD dataset. From all three sources, the proportion of the images is equal. The images cover diverse races i.e., Asian, Caucasian, etc. The proportion of masked to unmasked faces determines that the data set is balanced.

- **Architecture:**

The working of the Single Shot Detector algorithm relies on an input image with a specified bounding box against the objects. The methodology of predicting an object in an image depends upon a very renowned convolution fashion. For each pixel of a given image, a set of default boarding-houses (usually 4) with different sizes and aspect ratios are evaluated. Moreover, for all the pixels, the confidence score for all possible objects is calculated with an additional label of 'No Object'. This calculation is repeated for many different feature maps.

- **Training:**

At the training time, for each pixel, we compare the default bounding boxes having different sizes and aspect ratios with ground truth boxes and finally use the Intersection over Union (IoU) method to select the best matching box. IoU evaluates how much part of our predicted box matches with the ground reality. The values range from 0 to 1 and increasing values of IoU determine the accuracies in the prediction; the best value being the highest value of IoU.

- **Hyperparameters:**

A hyperparameter is a parameter or a variable we need to set before applying an algorithm to datasets. These parameters express the "High Level" properties of the model such as its complexity or how fast it should learn. Hyperparameters are fixed before the actual training process begins. They can be divided into two categories: optimizer hyperparameters and model hyperparameters.

- **Temperature Detection:**

You no longer need to touch an object with a probe to measure its temperature. Non-contact infrared temperature sensors are capable of measuring surface temperature with a much faster response time than thermocouples, and with similar or better accuracy.

Sometimes a non-contact sensor is preferred instead of a contact thermocouple. Situations include:

The target is moving. Rolling or rubbing thermocouples wear out, but infrared pyrometers do not. You need a fast response time. Contact probes take time to heat up, but infrared temperature sensors provide a reading within a fraction of a second. The target has a high voltage. Non-contact sensors can be positioned a safe distance away from conductors to avoid electrical arcing. The target is vibrating. The pyrometer can be mounted elsewhere, where there is no vibration. The target cannot be touched for sanitary reasons. There is no need to clean an infrared temperature sensor after every measurement, making them ideal for the food and pharmaceutical industries.

- **Sanitization:**

Here, An Arduino Uno microcontroller is used since it is easy to program, has an inbuilt ADC, DAC. The input to the Arduino is given using an ultrasonic sensor, which is used to sense the distance, it emits ultrasonic frequency from one side and notes the time taken by the sound wave to get reflected. When the sensor senses the hand, at a distance less than 7cm from the sensor, the Arduino gives a 100ms pulse from its digital output pin. The pump cannot be used

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directly, hence a relay is used as a switch. The relay accepts the pulse from Arduino and makes the pump run. The pump is 3 to 12V submersible type, which pumps out a few drops of hand sanitizer onto the hands, after pumping, the distance is sensed for every 1000ms(1s) for scanning purposes.

- The performance of Face Mask is compared with a public baseline result published by the creator of the dataset. Due to the limited methods proposed for this dataset, we also used ResNet and MobileNet as different backbones for comparison. Around 10% in precision and recall respectively. In addition, Face Mask with ResNet-backbone achieves the state-of-the-art result compared to the baseline model. Particularly, Face Mask is 2.3% and 1.5% higher than the baseline result in the face and mask detection precision respectively, and 11.0% and 5.9% higher than baseline for recall. where the red and green boxes refer to the face and mask predictions, respectively. Figure 4 indicates that Face Mask can recognize the confusing face without a mask.

- In the above paper, Arduino is used as a microcontroller for calculating the distance between the sensor and the hand placed below it. If it is less than 7cm, then the pump runs for 100ms through a relay and pumps out a few mL of liquid alcohol-based hand sanitizer, and also senses the distance for every 1000ms. Components like pump, relay, Arduino microcontroller were tested. The Hand Sanitizer was used as the liquid type with Isopropanol and Chlorohexidine Gluconate (0.3%). This can also be used for gel-type hand sanitizer.

- The specified accuracy for most Calex infrared temperature sensors is within +/- 1°C or 1%. In industry, repeatability is usually more important than accuracy to ensure consistent quality in the product being our sensors. Although some contact probes may claim better accuracy than this, it is often more difficult to achieve a good reading because of poor thermal
contact and heat loss to the air, and the system accuracy is often much worse as a result. Because infrared temperature sensors detect the IR energy emitted directly by the surface, neither of these things affects the measurement.

V. CONCLUSION

As technology is booming it's an intelligent move to replace humans with the machine. By the development of this system, we can detect if the person is wearing a face mask, sanitized his hands, and the contactless exact value of the person's body temperature which helps for the well-being of the society. Nevertheless, the value of life is more than that of a machine.

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7.488

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