Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 8, Issue 02, February -2021

Digital Solution for Enforcing Social Distancing

Face Mask Detection and Social Distancing

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Abstract — *Head pose classification is widely used before face recognition and problems using multiple images, since algorithms like face recognition need the image to be a front face. And due to the threat posed by the COVID-19 pandemic, many people wear face masks to protect themselves and their families safe. Under certain circumstances, several common algorithms should not be applied to head pose classification. To discover how to classify head poses, this study developed a method that uses color texture analysis of images and line portrait. In the proposed HGL method, the human face is combined with the HSV color space, and the CNN is trained to extract face features for classification. The accuracy results of the algorithm in MAFA dataset indicate the method is better than those based on facial landmark detection and convolutional neural network.*

Keywords-*Machine Learning, Image processing*

I. INTRODUCTION

The corona virus has caused a worldwide outbreak where over 2.7 million people have been infected and more than 180,000 have died. However, there are several similar large scale serious respiratory diseases, such as SARS, severe acute respiratory syndrome (SARS), and the Middle East respiratory syndrome (MERS). Being of high reproductive number, the increase rate of hemolytic, pancytopenia, thrombocytopenia, antibody titer down, relative sensitivity is 2.4 times, and the half-life of monocytes, neutrophils and thrombocytes of 1.8, 3.9 and 19.3 days, respectively. This report is indicated that in human, the COVID-19 infection frequency is slightly higher compared to the MERS. But researchers still haven't deployed the surgical face masks, and public health is sometimes considered as the top priority of governments. Fortunately, Leung et al. still found that the surgical face masks could control the spread of coronavirus. As of right now, WHO recommends that people should wear face masks if they have respiratory symptoms, or they are taking care of the people with symptoms Moreover, many public service providers prefer that customers wear masks, too Therefore, face mask detection will be critical to help the global society be protected from respiratory illnesses, but face mask detection has not had much research focus in the past.

II. OBJECTIVES

- Face mask detection and face recognition.
- Distance measurement between people for social distance.

III. MOTIVATION

- The motivation of our project is to detect Unmask person easy.
- Our system is also give notification to all user for sanitize
- Another motive of our project is to follow social Distancing.

IV. LITERATURE SURVEY

Paper Name: Multi-angle Head Pose Classification when Wearing the Mask for Face Recognition under the COVID19 Coronavirus Epidemic
Author: Shuang Li, Xin Ning, Lina Yu, Liping Zhang, Xiaoli Dong , Yuan Shi , Wei He
Abstract: Head pose classification is widely used for the preprocessing before face recognition and multi-angle problems, because algorithms such as face recognition often require the input image to be a front face. But affected by the COVID-19 pandemic, people wear face masks to protect themselves safe, which makes cover most areas of the face. This makes some common algorithms cannot be applied to head pose classification in the new situation. Therefore, this paper established a method HGL to deal with the head pose classification by adopting color texture anal- ysis of images and line portrait. The proposed HGL method combines the H channel of the HSV color space with the face portrait and gray scale image, and train the CNN to extract features for classification. The evaluation on MAFA dataset shows that

compared with the algorithms based on facial landmark detection and convolutional neural network, the proposed method has achieved a better performance (Front accuracy: 93.64%, Side accuracy: 87.17%).

Paper Name: Explainable AI and Mass Surveillance System-based Healthcare Framework to Combat COVID-19 like Pandemics
Author: M. Shamim Hossain, Ghulam Muhammad, and Nadra Guizani
Abstract: Tactile edge technology that focuses on 5G or beyond 5G reveals an exciting approach to control infectious diseases such as COVID-19 internationally. The control of epidemics such as COVID-19 can be managed effectively by exploiting edge computation through the 5G wireless connectivity network. The implementation of a hierarchical edge computing system provides many advantages, such as low latency, scalability, and the protection of application and training model data, enabling COVID-19 to be evaluated by a dependable local edge server. In addition, many deep learning (DL) algorithms suffer from two crucial disadvantages: first, training requires a large COVID-19 dataset consisting of various aspects, which will pose challenges for local councils; second, to acknowledge the outcome, the find- ings of deep learning require ethical acceptance and clarification by the health care sector, as well as other contributors. In this article, we propose a B5G framework that utilizes the 5G network's low-latency, high-bandwidth functionality to detect COVID-19 using chest X-ray or CT scan images, and to develop a mass surveillance system to monitor social distancing, mask wearing, and body temperature. Three DL models, ResNet50, Deep tree, and Inception v3, are investigated in the proposed framework. Furthermore, blockchain technology is also used to ensure the security of healthcare data.

Paper Name: Automated evaluation of COVID-19 risk factors coupled with real- time, indoor, personal localization data for potential disease identification, prevention and smart quarantining
Author: J. Barabas, R. Zalman and M. Kochlan
Description: Currently, there have been more than five million people infected with the COVID-19 virus, and the numbers are still rising. Early detection and thorough hygiene are of paramount concern, especially for events that people are in random or opportunistic contact with each other. To this end, automation systems with medical-grade temperature measurement and hygienic compliance evaluation are essential, not only for disease management and prevention, but also for economic stability. Herein, we present a system that provides all functionality mentioned above via readily available components (both hardware and software), and is further enhanced with preliminary RTLS data acquisition, enabling post-symptom detection of person-to-person interaction identification to assess potential infection vectors and mitigate further propagation thereof by means of smart quarantine.

Paper Name: A Novel AI-enabled Framework to Diagnose Coronavirus COVID- 19 using Smartphone Embedded Sensors: Design Study
Author: Halgurd S. Maghdid, Kayhan Zrar Ghafoor, Ali Safaa Sadiq, Kevin Curran, Danda B. Rawat, Khaled Rabie
Description: Coronavirus infections are a common, dangerous affliction of humans and animals. The new type of coronavirus discovered in Wuhan, China, was firstly described. However, the virus is prevalent throughout most of the world and is currently causing a pandemic according to the World Health Organization (WHO). Additionally, people in all parts of the world are working to control the COVID-19. There are many different ways to detect coronavirus including analysis of CT scans of the lungs and blood tests. In the case of the confirmed COVID-19 patient, fever, tiredness, and dry cough are displayed. Among other techniques, various means are used to detect the virus and its effects such as laboratory detection kits. However, these devices incur high cost, are slow to install, and have limited effectiveness. In this paper, a new framework for smartphone-based COVID- 19 detection is proposed. The proposal has a low baseline cost, since most radiologists already own smartphones for other daily activities. Not only do ordinary people benefit from using the framework but so do security personnel. Today's smartphones are equipped with powerful cores, memory space, and large number of sensors, including cameras, microphones, temperature sensors, inertial sensors, proximity, color sensors, humidity sensors, and wireless chipsets/sensors. The Artificial Intelligence (AI) enabled framework reads the smartphone sensors' measurements to predict the grade of severity of pneumonia as well as predicting the result of the disease.

Paper Name: Diagnosing COVID-19: The Disease and Tools for Detection
Author: Bana Handaga, Budi Murtiyasa, Jan Wantoro.
Abstract: COVID-19 has spread globally since its discovery in Hubei province, China in December 2019. A combination of computed tomography imaging, whole genome sequencing, and electron microscopy were initially used to screen and identify SARS- CoV-2, the viral etiology of COVID-19. The aim of this review article is to inform the audience of diagnostic and surveillance technologies for SARS-CoV-2 and their performance characteristics. We describe point-of-care diagnostics that are on the horizon and encourage academics to advance their technologies beyond conception. Developing plug-and-play diagnostics to manage the SARS-CoV-2 outbreak would be useful in preventing future epidemics.

V. PROPOSED SYSTEM

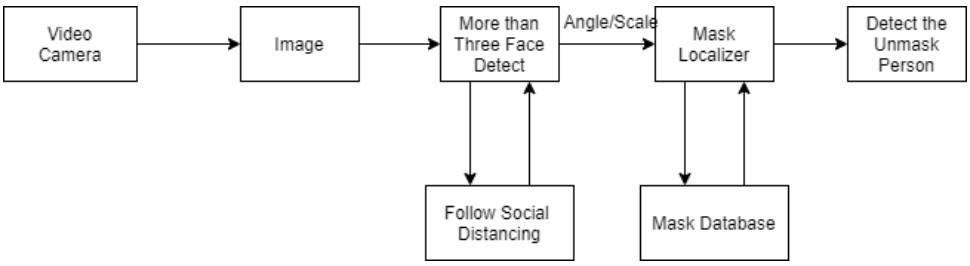

Figure 1. System Architecture

5.1 Modules:

Video camera: Once users show their face, all the activity surrounding your video capture time will be captured by the camera.

Image: We have test data or training data images, such as individual wearing masks and wearing no masks.

Mask Locator: Mask Locator detects whether a person is wearing a mask or not, and then sends the user messages if the person is not wearing a mask.

Follow social distancing: In that module, more than three faces detects if they are break social distancing rules immediately generate warning to user.

VI. CONCLUSION

We will build and apply a model that will detect if a person is wearing a mask or not. If a person is maintaining social distance we will also determine if it is increasing or decreasing. If a person is found to be positive for Covid, contact tracing will be provided for such patients. Actions will be taken against those who do not follow and adhere to the rules.

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