

SYNOPSIS

1 Group Id:

18

2 Project Title:

Digital Solution For Enforcing Social Distancing

3 Project Option:

Internal Project

4 Internal Guide:

Prof. Bhagyashri Vyas.

5 Sponsorship or External Guide:

NA

6 Technical Keywords:

- Artificial Intelligence (AI)
- Object detection
- Neural Network
- visual surveillance
- OpenCV
- Social distancing
- Machine Learning
- Deep Learning
- CNN
- COVID-19

7 Problem Statement:

Developing a system that detect Unmask personeasy and give notification to all user forsan-
itize and also to follow social Distancing.

8 Abstract:

Head pose classification is widely used for the preprocessing before face recognition and mul-
tiangle problems,because algorithms such as face recognition often require the inputimage to
be a front face. But affected by the COVID-19pandemic,people wear face masks toprotect
themselves safe, which makes cover most areas of the face. This makes some commonalgo-
rithms cannot be applied to headpose classification in the new situation. Therefore, thispaper
established a method HGL to deal with the head pose classification by adoptingcolor tex-
ture analysis of images and line portrait.Thepro- posed HGL method combines theHchannel
of the HSV color space with the face portrait and grayscale image, and train theCNN to
extract features for classification. The evaluation on MAFA dataset shows thatcompared
with the algorithms based on facial landmark detection and convolutional neuralnetwork,
the proposed method has achieved a better performance.

9 Goals and Objectives:

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

10 Relevant mathematics associated with the Project:

Distance Calculation: We have bounding box for each person in the frame. We need to estimate person location in frame. i.e we can take bottom center point of bounding box as person location in frame. Then we estimate (x,y) location in bird's eye view by applying transformation to the bottom center point of each person's bounding box, resulting in their position in the bird's eye view. Last step is to compute the bird's eye view distance between every pair of people and scale the distances by the scaling factor in horizontal and vertical direction estimated from calibration.

11 Names Of Conference/Journals where papers can be Published:

1 Paper Name :Multi-angle Head Pose Classification when Wearing the Mask for Face Recognition under the COVID19 Corona virus Epidemic

Author:Shuang Li, Xin Ning, Lina Yu, Liping Zhang, Xiaoli Dong , Yuan Shi , Wei He

Description : 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 analysis 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 percent Side accuracy: 87.17 percent).

2 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

Description :Tactile edge technology that focuses on 5Gg or beyond 5G reveals a next-generation 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 findings 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 Inceptionv3, are investigated in the proposed framework. Furthermore, blockchain technology is also used to ensure the security of health care data.

3 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 :Since the beginning of the current COVID-19 pandemic, more than five million people have been infected and the numbers are still on the rise. Early symptom detection and proper hygienic standards are thus of utmost importance, especially in venues where people are in random or opportunistic contact with each other. To this end, automated systems with medical-grade body temperature measurement, hygienic compliance evaluation and individualized, person-to-person tracking, are essential, not only for disease spread intervention and prevention, but also to assure economic stability. Herein, we present a system that encapsulates all of the mentioned functionality via readily-available components (both hardware and software) and is further enhanced with preliminary RTLS data acquisition, enabling post-symptom detected, person-to-person interaction identification to assess potential infection vectors and mitigate further propagation thereof by means of smart quarantine.

4 Paper Name :A Novel AI-enabled Framework to Diagnose Corona virus COVID19 using Smartphone Embedded Sensors: Design St

Author:Halgurd S. Maghdid, Kayhan Zrar Ghafoor, Ali Safaa Sadiq, Kevin Curran, Danda B. Rawat, Khaled Rabie

Description :Coronaviruses are a famous family of viruses that cause illness in both humans and animals. The new type of coronavirus COVID-19 was firstly discovered in Wuhan, China. However, recently, the virus has widely spread in most of the world and causing a pandemic according to the World Health Organization (WHO). Further,

nowadays, all the world countries are striving to control the COVID-19. There are many mechanisms to detect coronavirus including clinical analysis of chest CT scan images and blood test results. The confirmed COVID19 patient manifests as fever, tiredness, and dry cough. Particularly, several techniques can be used to detect the initial results of the virus such as medical detection Kits. However, such devices are incurring huge cost, taking time to install them and use. Therefore, in this paper, a new framework is proposed to detect COVID19 using built-in smartphone sensors. The proposal provides a low-cost solution, since most of radio logists have already held smart phones for different daily purposes. Not only that but also ordinary people can use the framework on their smartphones for the virus detection purposes. Today's smartphones are powerful with existing computation rich processors, memory space, and large number of sensors including cameras, microphone, temperature sensor, inertial sensors, proximity, colour sensor, humidity-sensor, and wireless chipsets/sensors. The designed Artificial Intelligence (AI) enabled framework reads the smartphone sensors' signal measurements to predict the grade of severity of the pneumonia as well as predicting the result of the disease.

5 Paper Name : Diagnosing COVID-19: The Disease and Tools for Detection

Author: Bana Handaga, Budi Murdiyasa, Jan Wantoro.

Description : 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.

12 Plan of Project Execution:

13 Members Of Group:

- Shreyas Kumbhar
- Rohan Zinjurke
- Tanishq Kulthe
- Ashutosh Dhabekar

Tasks performed	From Date	To Date	Duration
Topic Selection	23/01/2020	29/01/2020	6
Literature Survey	23/01/2020	29/01/2020	6
Defining Problem Statement	30/01/2020	1/02/2020	1
Synopsis Formation	10/02/2020	17/2/2020	7
High Level Designing	17/07/2020	24/07/2020	7
Paper publication and presentation	07/08/2020	28/08/2020	21
Implementing Module 1	11/09/2020	18/09/2020	7
Stage 1 Report	02/10/2020	16/10/2020	14
Implementing Module 2	30/10/2020	30/11/2020	30
Implementing Module 3	15/12/2020	15/01/2021	30
Paper Publication and Presentation	29/01/2021	26/03/2021	57
Testing Documentation and Report Writing	09/04/2021	30/04/2021	21
Final Report	14/05/2021	11/06/2021	28