SOCIAL DISTANCE

Rohit Kasabe [1], Priti Rajput [2] , Amit Bansode [3]

P.G. Student, Department of E&TC, DY Patil School of Engineering, Ambi, Pune, Maharashtra, India[1]

Guide – Asst. Professor, Department of E&TC, DY Patil School of Engineering, Ambi, Pune, Maharashtra, India[2]

Co-Author Department of E&TC, DY Patil School of Engineering, Ambi, Pune, Maharashtra, India[3]

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Abstract: Social isolation was shown to be a very efficient strategy of controlling the spread of COVID-19. Individuals are being encouraged to limit their connections with one another in order to avoid the virus from spreading via physical or close touch. Artificial intelligence/Deep Learning has already demonstrated potential in resolving a wide variety of common problems. We shall learn in detail how to utilise Python, Image Processing, and Deep Learning to detect social division in public spaces and workplaces in this suggested system. By analysing real-time video streams from the camera, the social distancing detection tool can evaluate whether people are maintaining a safe distance from one another in public settings and the workplace. Monitoring This software enables individuals in businesses, industries, and retail establishments to monitor whether or not people are maintaining a safe distance from one another via security camera systems.

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I. INTRODUCTION

Social distance is used to help prevent the transmission of infectious diseases like Covid-19. This is not a novel concept; for many centuries, the majority of communities have recognised the value of isolating sick individuals from others. The goal of transmission restriction is to alleviate pressure on the health service by postponing the pandemic peak, reducing the size of the pandemic peak, and spreading cases over even a longer period of time. It is a technique for minimising interpersonal contact. Maintaining a distance of approximately 2 metres between yourself and another person has been demonstrated to significantly reduce the spread of the majority of flu virus strains, including COVID19. In practise, this means that avoiding contact with people can aid in the prevention of the spread of potentially fatal diseases. Social distance is a nonpharmaceutical infection control strategy that can prevent or postpone the spread of a highly contagious disease. COVID-19 is a virus that is now spreading fast from person to person. An otherwise healthy person can become unwell if they come into contact with respiratory droplets from an infected person's coughing or sneezing. The World Health Organization states that "COVID-19 is transmitted by droplets and fomites during unprotected close contact between an infector and an infectee" (WHO). A fomite is a potentially infectious object or material, such as clothing, cutlery, or furniture. As a result, transmission of disease can be avoided by avoiding contact with other people and touching infected fomites. Social distancing aims to limit or eliminate COVID-19 transmission in a population by restricting interaction between possibly infected persons and healthy individuals, or between population groups with high transmission rates and population groups with no or low transmission rates[1].

-Closed Community Facilities

 - Closed Unnecessary Workplaces

- Closed Schools - Closed Colleges and Universities

- Self-Shielding

- Individuals avoid face-to-face interactions.

Individuals avoid public spaces and public transportation. Public health experts use the phrase "social distancing" to refer to some of the measures they take to avoid or limit the growth of a highly contagious disease. Legally, the Health Officer may use social distancing techniques. Due to the significant impact these policies will have on our community, any action to execute them will be coordinated with local agencies such as cities, police departments, and schools, as well as state and federal partners.

II LITERATURE SURVEY

Marco cristani, alessio del bue," The Visual Social Distancing Problem." [1] Maintaining so-called Social Distancing is one of the most significant and effective strategies for containing the most recent viral epidemic (SD). To comply with this limitation, governments are establishing legislation governing the minimum inter-personal distance between people. Given this condition, quantifying our adherence to such physical constraints in our daily lives is crucial in order to discover the causes of projected distance limitations breaking and whether this poses a hazard. The Visual Social Distancing (VSD) problem is defined as the automatic assessment of inter-personal distance from a picture, as well as the characterization of related person aggregations. VSD is crucial for assessing whether people adhere to the SD restriction in a non-invasive manner, as well as providing statistics on the level of safety in specific places when this constraint is broken. We begin by emphasising that measuring VSD is more than just a geometrical difficulty; it also demands a more in-depth understanding of the scene's social behaviour. The goal is to detect potentially dangerous scenarios while avoiding false alarms (for example, a family with children or relatives or an elderly individual with caregivers), all while adhering to current privacy policies. We next investigate how VSD relates to recent literature in Social Signal Processing and propose a future research direction into novel Computer Vision algorithms that may be able to handle such a problem. In the conclusion, prospective challenges related to the effectiveness of VSD systems, ethical considerations, and future application scenarios are examined.

cong t. nguyen1,5,6, yuris mulya saputra1,3, nguyen van huynh1 , ngoc-tan nguyen1,7, tran viet khoa1,4, bui minh tuan1,4, diep n. nguyen1 , dinh thai hoang1 , thang x. vu2 , eryk dutkiewicz1 , symeon chatzinotas2 , and björn ottersten," A Comprehensive Survey of Enabling and Emerging Technologies for Social Distancing Part II: Emerging Technologies and Open Issues" [2]. This two-part study will examine how developing technologies such as wireless and networking, as well as artificial intelligence (AI), can facilitate, encourage, and even impose social separation. Part I [1] establishes a firm foundation for social distancing and conducts an in-depth examination of the enabling wireless technology. Part II examines upcoming technologies, including machine learning, computer vision, infrared imaging, and ultrasound. These technologies enable a slew of novel strategies for overcoming social distance issues, including symptom prediction, quarantine detection and monitoring, and contact tracing. Finally, we explore remaining concerns and impediments to implementing social distance (e.g., privacy-preserving, scheduling, and incentive mechanisms). Rather than reacting impromptu to pandemics of the COVID-19 type in the future, smart infrastructures (e.g., next-generation wireless systems such as 6G, smart homes/buildings, smart cities, and intelligent transportation systems) could incorporate a pandemic mode into their standard architectures/designs.

Afiq Harith Ahamad, Norliza Zaini, Mohd Fuad Abdul Latip," Person Detection for Social Distancing and Safety Violation Alert based on Segmented ROI." [3]. When dealing with the global Covid-19 pandemic, flattening the curve for coronavirus cases will be difficult if inhabitants do not take steps to stop the virus from spreading. Maintaining a safe gap between people in public is one of the most important strategies in these outbreaks. This article presents the detection of people using social distance monitoring as a prophylactic strategy for limiting physical contact between people. In this work, the MobileNet Single Shot Multibox Detector (SSD) object tracking model and the OpenCV image processing package are utilised to detect humans in areas of interest. The distance between humans detected in video footage will be calculated and compared to a specified set of pixel values. The distance between the centre points and the overlapping boundary between people is measured in the segmented tracking area. When dangerous distances between people are detected, messages or warnings can be delivered to keep the distance safe. Aside from recognising the presence of humans in restricted areas, which can also be used to trigger alerts, another important component of the system is detecting the presence of people in restricted areas. Some research has been conducted to determine how beneficial the training is for both purposes. According to the data, the distance tracking system achieved 56.5 percent to 68 percent accuracy for outdoor and demanding input video testing, while interior testing in a controlled setting achieved 100 percent accuracy. The safety violation alert function based on segmented ROI, on the other hand, was shown to be more accurate, with accuracy ranging from 95.8 percent to 100 percent for all input movies examined. Savyasachi Gupta∗ , Rudraksh Kapil† , Goutham Kanahasabai‡ , Shreyas Srinivas Joshi§ , Aniruddha Srinivas Joshi," SD-Measure: A Social Distancing Detector"[4]. During the COVID-19 pandemic, social distance was widely adopted as a non-

pharmaceutical preventive technique to limit the transmission of contagious diseases. SD-Measure, a new framework for detecting social distancing in video footage, is introduced in this research. The suggested method employs the Mask R-CNN deep neural network to detect people in video frames. A centroid tracking technique is utilised to track the participants throughout the film in order to determine whether social distance is utilised during the interaction between persons. We employ legitimate algorithms to calculate the distance of people from the camera and between themselves to assess whether the social distancing rules are being followed. When evaluated on the Custom Video Footage Dataset (CVFD) and Custom Personal Images Dataset (CPID), the framework exhibited high accuracy with a low false alarm rate, proving its effectiveness in determining whether social distancing rules were fulfilled. Person detection, Mask RCNN, Centroid-based Object Tracking, and COVID-19 are all terminology for social distancing.

Yew Cheong Hou1 , Mohd Zafri Baharuddin2, Salman Yussof1, Sumayyah Dzulkifly1," Social Distancing Detection with Deep Learning Model"[5]. The article describes a method for detecting social distancing by the use of deep learning in order to measure the distance between people in order to limit the effect of the poliovirus pandemic. The detection technique was developed using video analysis to urge people to maintain a safe distance from one another. The open-source object detection pre-trained model based on the YOLOv3 technique has been used to recognise pedestrians using the video frame from the camera as input. The video frame was then converted to a top-down perspective in order to measure distances in the two-dimensional plane. A red border and a red line will be displayed around any pair of individuals in the display who are not compliant. A pre-recorded film of pedestrians strolling down main sidewalk was used to validate the proposed technique. The results demonstrate that the suggested method is capable of calculating the social distance between a small number of people in a video. The proposed technology has the potential to be used as a real-time detection tool in the past.

III PROBLEM DEFINITION

There is no such thing as social distancing nowadays, thus knowledge spreads swiftly, which is why we are creating this app.

IV METHODOLOGY

Proposed Methodology

1-Machine Learning: Machine learning is a subfield of artificial intelligence (AI) and computing science that focuses on how human beings learn and gradually improve its accuracy by using data and algorithms. IBM is a machine learning company with a lengthy history. One of his own Arthur Samuel is credited with using his own study (PDF, 481 KB) (link sits outside the IBM) to coincide with "machine learning" in the game of checkers. In 1962 Robert Nealey, the master self-proclaimed checkers played the game and lost it to the computer on an IBM 7094. In compared to what can be done currently this performance seems small, but is considered a main milestone in artificial intelligence. In the following decades, technology progress in storage and processing will enable certain creative goods which

we know and appreciate today, including the Netflix engine recommendation or self-driving vehicles.

Machine learning is a crucial part of the rapidly expanding discipline of data science. Algorithms are trained to generate classifications or predictions using statistical approaches, revealing crucial insights in data mining initiatives. Following that, these insights drive decision-making within applications and enterprises, with the goal of influencing important growth KPIs. As big data expands and grows, the demand for data scientists will rise, necessitating their assistance in identifying the most relevant business questions and, as a result, the data needed to answer them.

Machine learning is the process of computers figuring out how to do things without being specifically programmed to do so. It entails computers learning from data in order to do specific jobs. It is possible to write algorithms that inform the machine how to perform all steps required to solve the problem at hand for basic jobs entrusted to computers; no learning is required on the computer's behalf. It can be difficult for a human to manually build the algorithms required for increasingly complicated tasks. In practise, assisting the computer in developing its own algorithm rather than having human programmers explain each required step can prove to be more productive.

Machine learning is a subject that use a range of techniques to teach computers how to execute problems for which no perfect answer exists. When there are many viable responses, one technique is to classify some of the correct answers as valid. This can then be used as training data by the computer to improve the algorithm(s) it uses to determine correct answers. For example, the MNIST dataset of handwritten digits has been often used to train a system for the task of digital character recognition.

2- Image Processing: The process of executing operations on a picture in order to enhance it or extract relevant information from it is referred to as "image processing." It is a sort of signal processing in which an image serves as the input and either the image or its characteristics/features serve as the output. The process of applying various procedures to an image in order to enhance it or extract relevant information from it is referred to as "image processing." It is a sort of signal processing in which an image serves as the input and either the image or its characteristics/features serve as the output. Image processing is the process of converting an analogue image to a digital format and then processing it to improve the image or extract essential information from it. The process of executing operations on a picture in order to enhance it or extract relevant information from it is referred to as "image processing." It is a sort of signal processing in which an image serves as the input and either the image or its characteristics/features serve as the output. Image processing is one of the most quickly evolving technological domains in the modern era. It is also an important topic of research in engineering and computer science.

Image processing basically includes the following three steps:

- Importing the image via image acquisition tools;
- Analysing and manipulating the image;
- Output in which result can be altered image or report that is based on image analysis.

Analogue and digital image processing are the 2 kinds of image processing methods employed. Hard copies, such as prints and photographs, can benefit from analogue image processing. When employing these visual tools, image analysts employ a variety of interpretive fundamentals. Digital image processing techniques allow for computer-assisted alteration of digital images.

Pre-processing, augmentation, and presentation, and also information extraction, are the three general processes that all types of data must go through when using digital techniques. We'll go above some basic terminologies like image, digital image, and digital image processing in this lesson. Various types of digital picture sources will be examined, with examples for each type. This presentation will cover the entire spectrum of image processing to computer vision. Finally, we'll discuss picture acquisition and the various types of image sensors available.
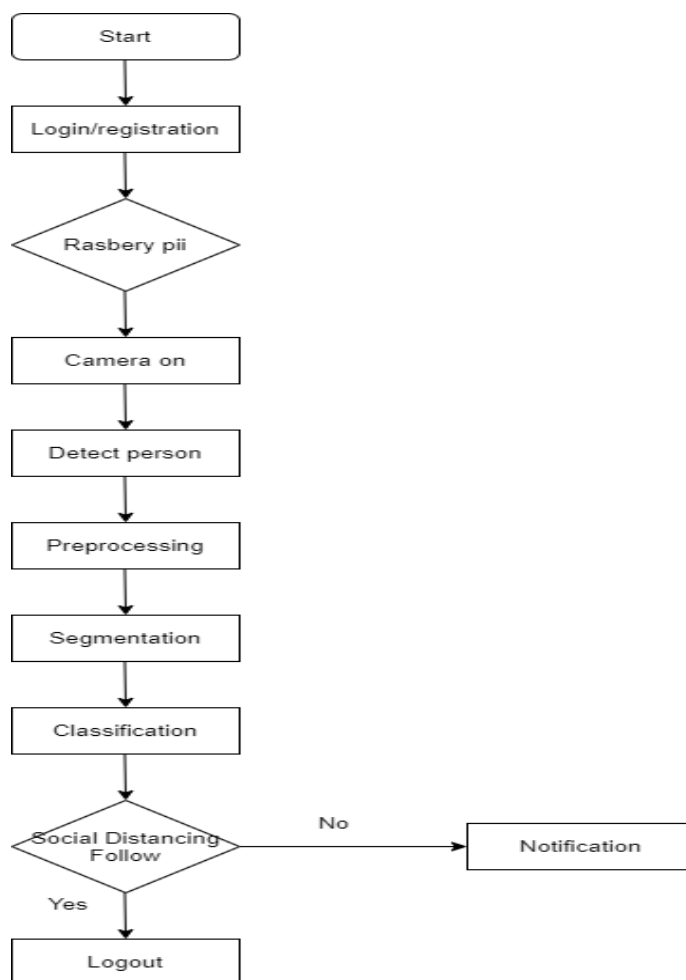
Explanation

Pre-processing : - Although geometric modifications of images (e.g. rotation, scale, translation) are classified as pre-processing methods, the goal of pre-processing is to improve the image data by suppressing unwanted distortions or enhancing particular image attributes useful for subsequent processing. - Possessing Image processing is the use of a digital computer to run an

algorithm to process digital images. Digital image processing, as a subsection or discipline of digital signal processing, has a number of advantages over analogue image processing.

1. Image to Read

2. Image Resized (220,220, 3)/Image Resized (220,220, 3)/Image Resized (220,220, 3)/Image Re (width, height, no. RGB channels)

3. Converting RGB to Grayscale

4. Noise removal with a Gaussian filter after segmentation

Segmentation : It entails segmenting a visual input to make image analysis easier. We can break the image up into segments in which we can undertake more processing if we want to extract or define something from the rest of the image, such as detecting an object from a backdrop. This is referred to as segmentation. Segments are made up of groupings of pixels, or "super-pixels," that depict things or sections of objects.

Feature Extraction:- Specific structures in the image, such as points, edges, or objects, might be used as features. Feature Extraction is a technique for reducing the amount of features in a dataset by generating new ones from existing ones (and then discarding the original features).

The original set of features should then be able to describe the majority of the data in the new reduced set of features. Feature extraction begins with a set of measured data and creates derived values (features) that are intended to be useful and non-redundant, easing the learning and generalisation phases and, in some situations, resulting in superior human interpretations. Dimensionality reduction is linked to feature extraction.

Classification : Because of its great accuracy, CNNs are employed for picture categorization and recognition. Each set of neurons in a classification convolutional neural network evaluates a single section or "feature" of the image in a three-dimensional structure. Each set of neurons in a CNN focuses on a different region of the image. The algorithm looks at tiny portions of the photos. The end result is a probabilistic vector that predicts how likely each feature in the image is to belong to a class or category.

V SYSTEM ARCHITECTURE

Preprocessing data is a crucial element of the process of data mining. The preparation and filtering of data may take a lengthy time. Cleanup, instance selection, standardisation, transformation, extraction and selection of features, etc. Functional extraction can help to retrieve vital information. Initially, it allows for scalable system solutions with data intensity. Finally it permits software, without "understanding" it, to process a broad range of complex facts. Market segmentation means the division into separate customers subsets (known as sections) of a wide consumer or commercial market based on similar characteristics. Over the years there have been numerous ways of market segmentation. Physical distance is a set of non pharmacological methods or techniques used to decrease dangerous disease spread by creating a physical barrier to human interplay and restricting intimate contact. The physical distance is also known as social distance.
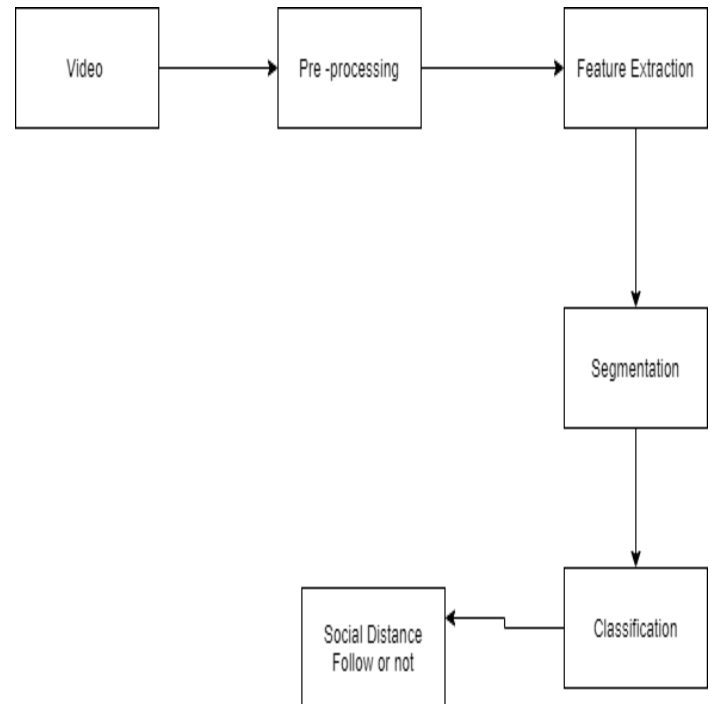
VI CONCLUSION

We'll develop a model that can detect whether someone is maintaining a social distance and send an alert if they are. We apply machine learning and image processing concepts to detect the object. This strategy is employed to halt the spread of covid. Distancing oneself from others is a highly effective strategy for reducing the virus's spread via air droplets. Coughing, sneezing, and screaming all result in the formation of droplets with a predetermined transmission distance. We can prevent the virus from spreading if we maintain this distance. On January 30, the World Health Organization declared the ongoing coronavirus outbreak a "public health emergency of global significance." The World Health Organization labelled the COVID-19 epidemic a pandemic on March 11, 2020, following the disease's spread outside of China. Public health measures, such as those in place in China and now throughout the world, are intended to contain the virus's spread while medications and a vaccine are produced.

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