

2208-CSE-6363-004

Machine Learning  
Project - Review 1

**Social Distancing and Facemask  
Monitoring System**

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## Project Topic

Social Distancing and Facemask Monitoring System.

## Based on:

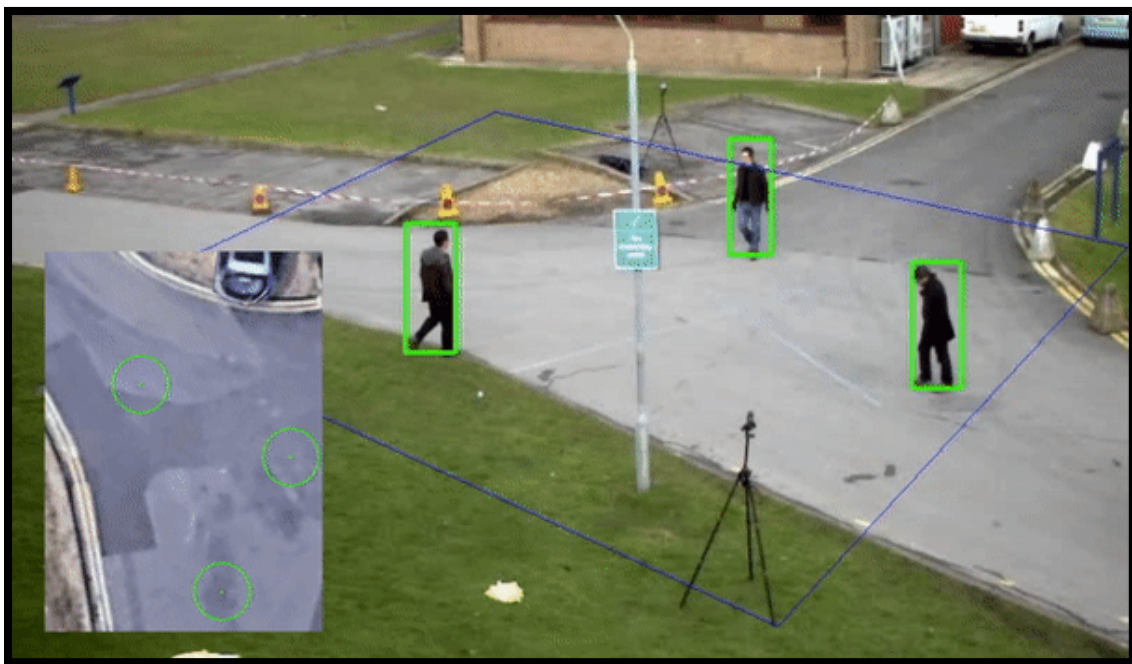
Deep Learning (Object detection on images or real time object detection on videos)

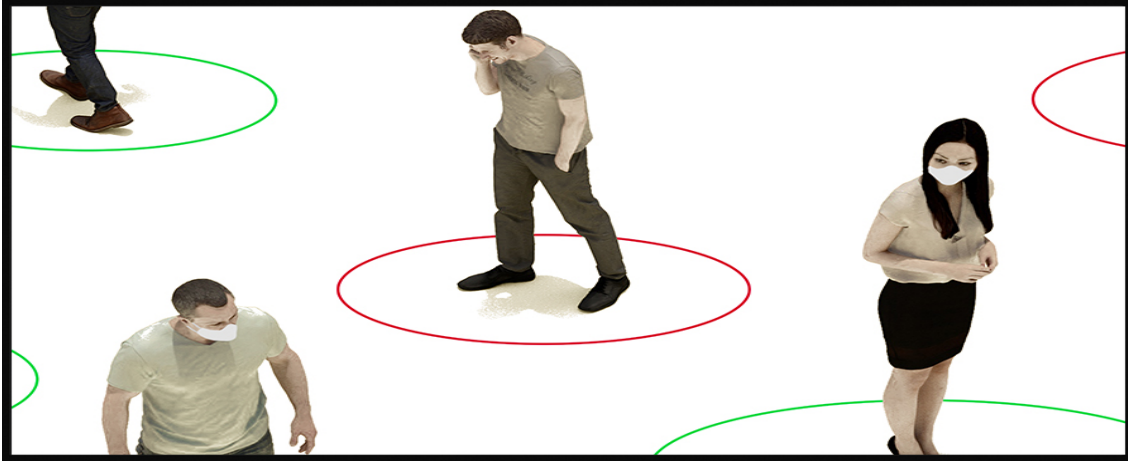
## Project Description

The Coronavirus disease (COVID-19) has brought global crisis with its deadly spread. Social distancing and using facemasks have been proven as effective measures against the spread of the infectious Coronavirus disease.

The word social distancing aims at reducing the physical contact between possibly infected individuals and healthy people.

However, the public is not used to keep an imaginary safety bubble around themselves and therefore we propose a solution to overcome this problem.





The project focuses on building an application that detects whether an individual is wearing a face mask and maintaining social distance or not.

Object detection in the image domain is a fundamental deep learning problem. The goal is to detect instances of semantic objects that belong to certain classes, e.g., humans, cars, buildings. An active surveillance system capable of detecting facemasks and distances between individuals can slow down the spread of the deadly disease by warning them.

We aim to merge two different concepts of the given research paper references so that we can build a single monitoring system which can detect social distancing as well as the fact that whether face masks are being used by individuals in a social gathering or not.

## Datasets-

- **COCO dataset (Common Objects in Context)**

It is a large-scale object detection, segmentation, and captioning dataset.

- **Multi-Human-Parsing (MHP) dataset**

It is a dataset used to train models to learn partitioning a crowd scene image into semantically consistent regions belonging to the

body parts while differentiating different identities, such that each pixel in the image is assigned a semantic part label, as well as the identity it belongs to.

## **Algorithms-**

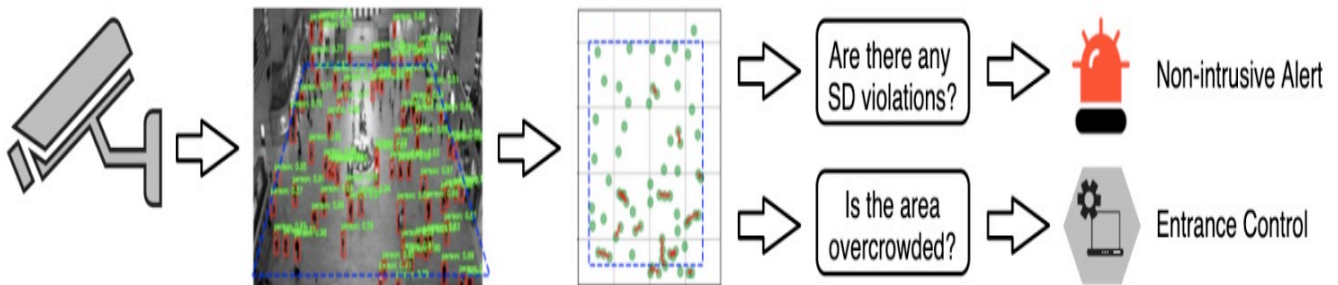
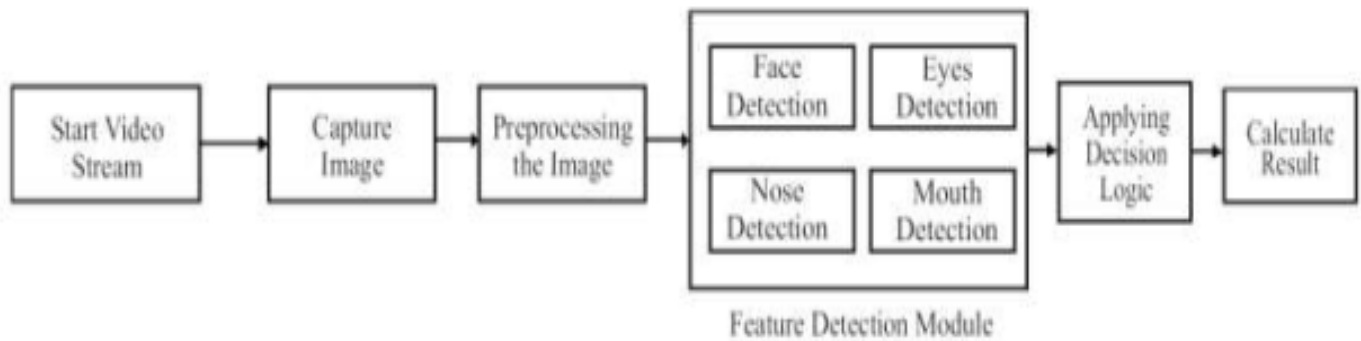
- **YOLO (You Only Look Once) real-time object detection algorithm**

It is a convolutional neural network (CNN) that applies a single neural network to the full image, and then divides the image into regions and predicts bounding boxes and probabilities for each region. These bounding boxes are weighted by the predicted probabilities.

- **Faster R-CNN**

It is a Region based convolutional neural network that takes the source image and inputs it to a CNN called a Region Prediction Network (RPN). It considers many possible regions and uses an efficient deep learning method to predict which regions are most likely to be objects of interest.

# Overview of the Proposed system



## Research Paper References

**1. Monitoring COVID-19 social distancing with person detection and tracking via fine-tuned YOLO v3 and Deepsort techniques.**

**Narinder Singh Pun, Sanjay Kumar Sonbhadra and Sonali Agarwal**

**2. An Application for the Detection of COVID-19 Face Mask Using OpenCV.**

**T. Venkat Narayana Rao, Gadige Vishal Sai, Manideep Chenna, M. Sahas Reddy**

**3. A Vision-based Social Distancing and Critical Density Detection System for COVID-19.**

**Dongfang Yang, Umit Ozguner, Ekim Yurtsever**

# **Timeline-**

## **September Week 2**

- Project Topic and description.
- Research paper references.

## **October Week 2**

- Data cleaning and preprocessing.

## **November Week 2**

- Project Implementation
- Testing algorithms
- Evaluation

## **November Week 4**

- Paper submission