Report on

Monitoring Social Distancing in Public Places through Images and Video Footages

Submitted in partial fulfillment of the requirements for ***Sem IV***

IMAGE PROCESSING AND DATA VISUALIZATION USING MATLAB

Bachelor of Technology
in
Computer Science & Engineering

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Problem Statement

Due to COVID-19 pandemic, society need to embrace and adopt new norm that includes practising social distance to break the transmission. This tracking system can help people to be constantly monitored and reminded to adhere to this practice. Direct impact that can be seen from this application will be lower or minimum number of COVID-19 cases due to high level of social distance compliance.
This system can be used to analyse the CCTV footages from shopping malls, railway stations, parks and various other public places to enforce social distancing in order to prevent the spread of the virus.

Module Description

Description of functions/modules used in the project:

1. peopleDetectorACF( ): peopleDetectorACF returns a pretrained upright people detector using aggregate channel features (ACF). The detector is an acfObjectDetector object, and is trained using the INRIA person data set.

2. insertObjectAnnotation( ): Annotate detected people with bounding boxes and display the person's risk of Covid transmissibility

3. vision.VideoFileReader( ): returns a video file reader System object, videoFReader, that sequentially reads video frames or audio samples from an input file

4. vision.VideoPlayer( ): returns a video player object, videoPlayer, for displaying video frames

High Level Design/Architecture

The Social Distancing monitoring system works by calculating the distance between the bounded boxes around the detected people in the given frame. Both the vertical distance and the horizontal distance between the bounded boxes is calculated. If the distance exceeds a certain number of pixels in the frame, the bounded boxes of the people in close distance are annotated with a red box that indicates high risk of infection. The bounded box of people in a larger distance are annotated with a lower risk of infection.

Breakup of tasks to be performed individually

Member contributions:

1. Abhishek V: Person detection, distance calculation & GUI
2. Ashish P: Object detection from video
3. Anush P: Annotating objects and writing final file
4. Abhishek Shrikant: Graphical User Interface