Social distancing and mask detection

Team 8

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Problem statement

- The world today is shaken by the deadly virus that has brought the fast moving lives of today's modern society to an absolute stand still.
- Two science-backed methods to limit the spread of the raging infection are:
  - Maintaining social distance
  - Wearing Masks
- These measures bring down the pressure on healthcare resources and persona, while delaying the pandemic peak and also saving patients from exorbitant virus loads.
- We bring a solution that automates the constant policing needed for ensuring that people follow the above precautionary measures.
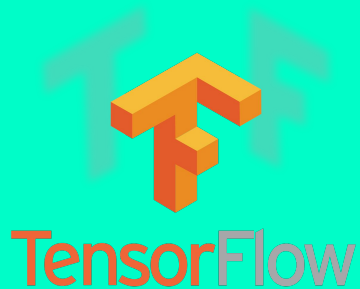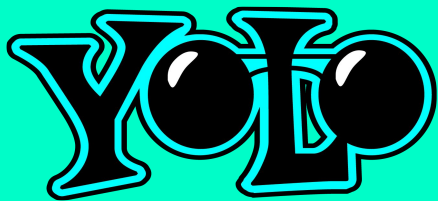
PROPOSED SOLUTION

AI v Covid-19

J Schmidhuber 2020

- With advances in deep learning, a subset of machine learning, computer vision methods have shown enormous scope in multiple application areas and industries, especially in healthcare and medical research.
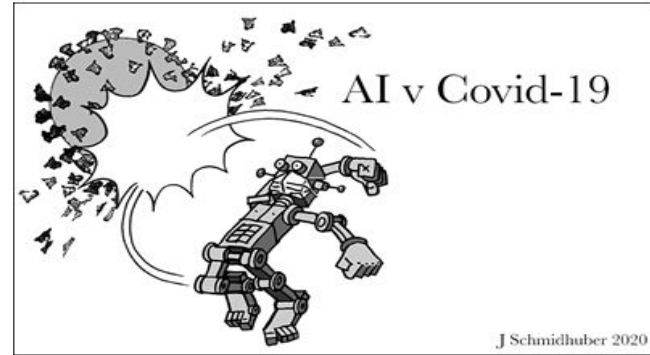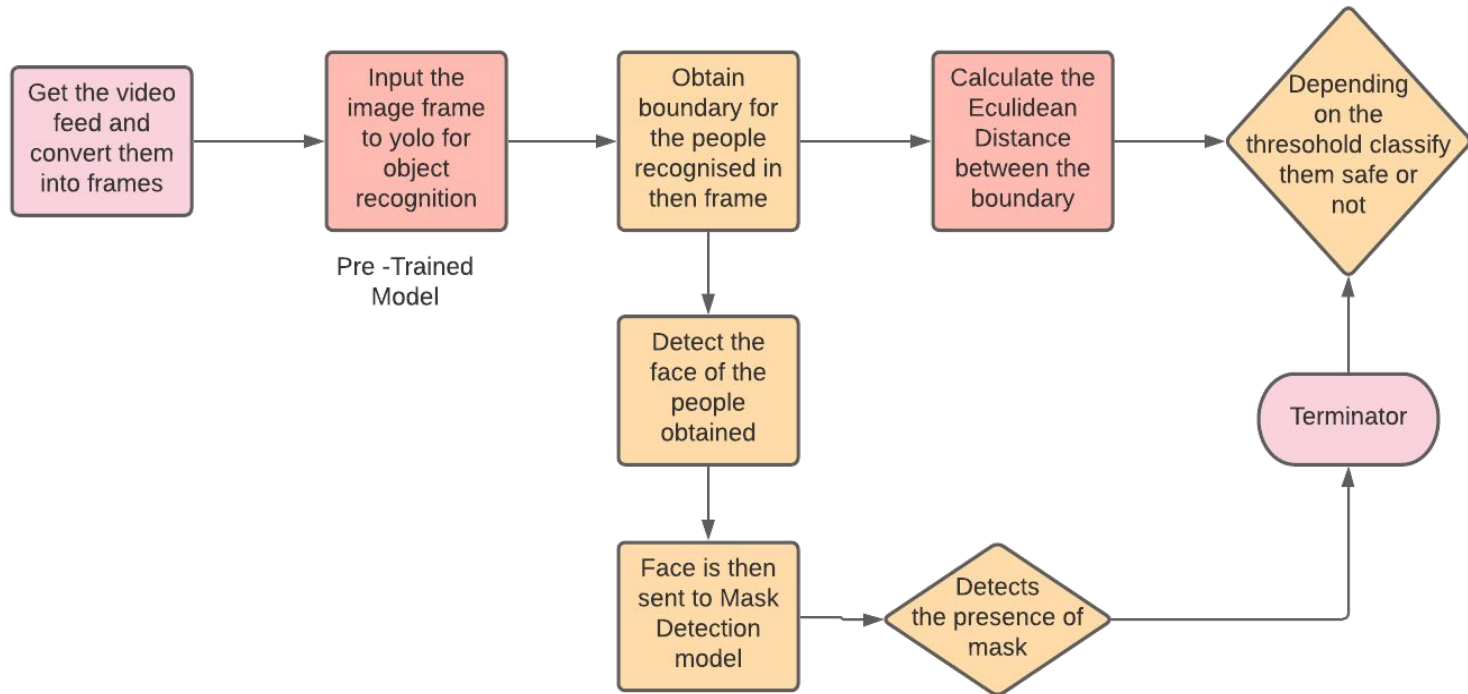
- We created a program that utilizes Artificial Network to check if the social distancing norms are being followed, and other precautionary measures like the use of face masks that could possibly help in avoiding the need for future lockdown.
- This can automate the human task of monitoring public spaces if social distancing rules are being followed.
- The program uses Pretrained models like YOLO and Face-net to achieve the same through computer vision.

Technology Stack

Working of the Project

Get the video feed and convert them into frames → Input the image frame to yolo for object recognition → Obtain boundary for the people recognised in then frame → Calculate the Eculidean Distance between the boundary → Depending on the thresohold classify them safe or not

Pre -Trained Model

Obtain boundary for the people recognised in then frame → Detect the face of the people obtained → Face is then sent to Mask Detection model → Detects the presence of mask → Terminator → Depending on the thresohold classify them safe or not

Further Improvements

- A more accurate approach of mapping the camera frame to a bird's eye view. The projection of the camera is not taken into account here since the impact of the camera's projection on the estimated distance is minimum. However, the universal approach is to convert a video into a top view or bird's eye view and then compute the distance between two objects in an image. This task is known as Camera Calibration. A top-down transformation of the viewing angle can be considered.
- OpenCV's YOLO implementation is quite slow because of the additional post-processing required by the model.Hence we can consider utilizing a Single Shot Detector running on the GPU,that will help improve the frame throughput rate considerably.
- We can implement this real-time by integrating with IOT wherein the CCTV cameras in public places would do this analysis.