

YOLO Based Social Distancing Violation Detection

OBJECTIVE

- Covid 19 can be prevented if few norms are followed properly
- Social Distancing is one of the important norms to stop spreading COVID-19.
- Advance Computer Vision technique can be implemented to identify if few persons are maintaining social distance or not.
- This can be used to spread awareness.

PROBLEM STATEMENT

- MAIN GOAL: To identify whether the people are in adequate distance or not.
- RED: High Risk; GREEN: Safe
- DISTANCE METRIC: Euclidean Distance.
- Used deep learning technique.

METHODS

- The backbone of our pre-trained model is YOLO v3
- Here we use supporting weights for the architecture trained with the COCO data set.
- Measured the distance between two persons using “Euclidean/L2 Norms”

$$d(x, y) = \sqrt{\sum_{i=1}^n (x_i - y_i)^2}$$

DATASET

- As the objective of the project is to work with CCTV footages, we considered a real-world video as our dataset.
- The test dataset is a recorded video of 8408 number of frames (720P - 30 FPS).



INITIAL RESULT

- At the initial stage the model is detecting almost all the object present in the video as well as in the coco data set.
- We need to filter out only human beings.



FINAL RESULT

The model is detecting only the human beings and calculating the distance between the nearest bounding box. This is how it is taking a decision between high risk and safe distances.



CONCLUSION

- The Final model is taking the decision based upon the pixel distance which can be modified based upon the recommendations by the experts.
- As the model is robust it can be used for any type of videos recorded from various devices (e.g.: Mobile Phones, CCTV footages, Cameras, Drones etc.)

FUTURE DIRECTION

- Face mask detection can be embedded.
- A bird eye view can be executed to help the local authority.
- A real time smart phone application can be developed (by using Tensorflow Lite).

BIBLIOGRAPHY

- <https://github.com/pjreddie/darknet/blob/master/data/coco.names>
- <https://github.com/pjreddie/darknet/blob/master/cfg/yolov3.cfg>