DEEP LEARNING BASED REAL-TIME COVID NORMS VIOLATION DETECTION SYSTEM

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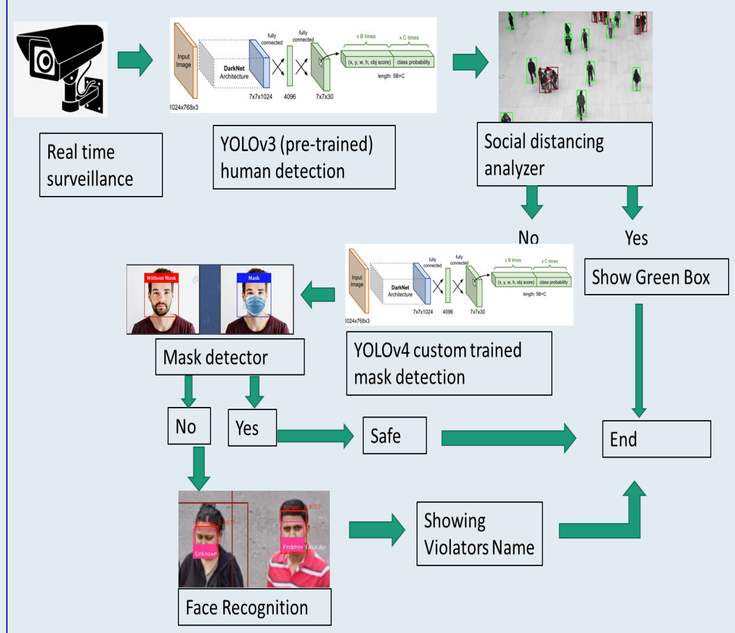
ABSTRACT

The coronavirus became a pandemic solely via person to person transmission for not following basic hygiene, social distance and proper protective equipment like masks. We propose a model based to detect mask on closely situated crowd along with recognizing their faces. We acquired significant results on 3D camera calibration and Height Width method technique to measure distance among people. Mask detection and recognizing violators face using both YOLO v3 and v4 gave Mean Average Precision of 0.9395 and 0.9018 respectively. An interactive User Interface is also designed to view real time data and alert violators details to the administrator.

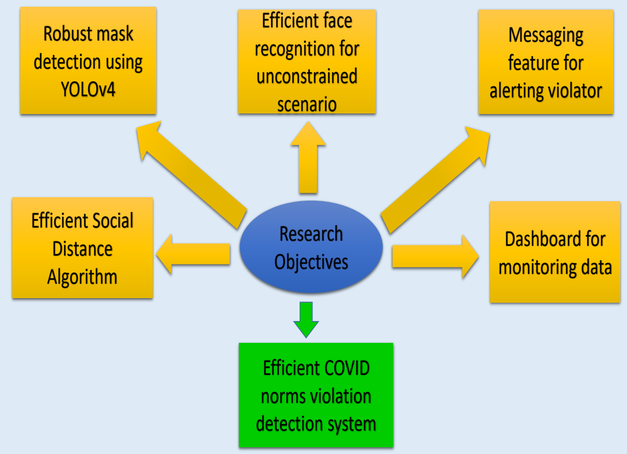
OBJECTIVE & SCOPE

The objective of this project is to study different methods to measure distance among people, superimpose models for detecting masks and recognize violators face. The real time data is fetched to an UI and alerts are sent to the violators. The data is also visible to the administrator on which further analytics can be performed.

PROPOSED FRAMEWORK

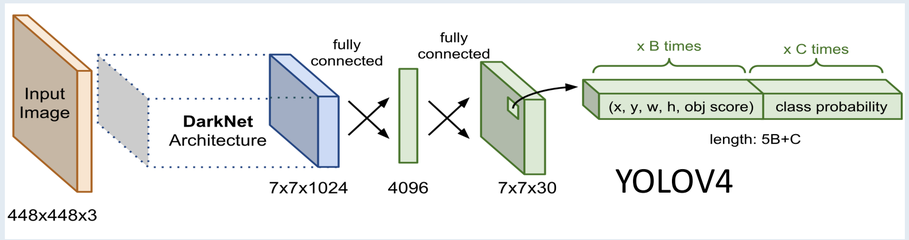


METHODOLOGY



ALGORITHM AND ARCHITECTURE

- ⇒ YOLOv4 is a real-time object detection model that can recognize multiple objects.
- ⇒ Social distancing algorithms uses 3D depth camera calibration and height-width comparison method.
- ⇒ 3D depth camera calibration is based on perspective effect and height-width is based on ratio comparison of height and width.
- ⇒ Face recognition is done by face_recognition API which uses CNN.
- ⇒ Dashboard uses R and R shiny for making interactive graphs, live plots and showing violators name in real time.



CONCLUSION

An efficient framework for covid norms violation system is proposed. Given a constrained and crowded video, The proposed framework detects the person not following predefined social distance and inspects the person for wearing mask using YOLO model. Once the yolo model detects the violator, the face recognition module identifies the person and send the information to law enforcement dept. In addition to that, Our proposed framework aids the user to get information about the distribution of violators in particular place. Our framework outperforms recent solutions like Prateek Khandelwal [1] with map of 0.9395 on YOLOv4 and 0.9018 on YOLOv3.

REFERENCES

[1] Prateek Khandelwal, Anuj Khandelwal, Snigdha Agarwal, Deep Thomas, Naveen Xavier and Arun Raghuraman, ”Using Computer Vision to enhance Safety of Workforce in Manufacturing in a Post COVID World”, 2020, arxiv:2005.05287.

[2] Alexey Bochkovskiy, Chien-Yao Wang, and Hong-Yuan Mark Liao, ”Yolov4: Optimal speed and accuracy of object