DATA ANALYTIC – DISCOVERY SCIENCE

COUNTING CROWD WITH THE HELP OF CAMERA USING COMPUTER VISION TECHNIQUES

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OVERVIEW

- Problem Statement: Counting the crowd size with the help of a camera using computer vision techniques.

- Crowd counting via cameras is important in this current situation of COVID 19 pandemic when surveillance is not an easy task. In this project, based on smartphone cameras or drone cameras, counting how many people are in the given video is an important task. Using computer vision techniques, in this project, for a given video, the requirement is to count the people present.

- Using the computer vision and deep learning approach this project can count the number of people in the crowd and can also detect the violation of social distancing.

TECHNOLOGY USED IN THIS PROJECT

- This project includes the use of OpenCV, Python and deep learning to apply YOLO to the video stream.

- Python: It's an interpreted, high-level, general purpose programming language.

- OpenCV (Open Source Computer Vision Library): It is an open source computer vision and machine learning software library. OpenCV provide common infrastructure for computer vision application. It works on various programming languages python, java, C++.

- YOLO (You Only Look Once): It is a network that uses Deep Learning algorithms for object detection.

- Counting the number of people is done by counting the detected bounding boxes of people.

YOLO (YOU LOOK ONLY ONCE) AND R-CNN (FOR OBJECT DETECTION AND COUNTING)

- YOLO (You Only Look Once): It is a network that uses Deep Learning algorithms for object detection.

- YOLO performs detection by classifying certain objects within the image/video determining where they are located.

- R-CNN is an object detector that removes the Selective Search Requirement and instead rely on Region Proposal Network (RPN).

- R-CNN uses two stage detector strategy whereas SSD and YOLO uses one stage detector strategy

- Algorithm for YOLO treat an object detection as a regression problem, taking a given input image and simultaneously learning bounding box coordinated and corresponding class label probabilities.
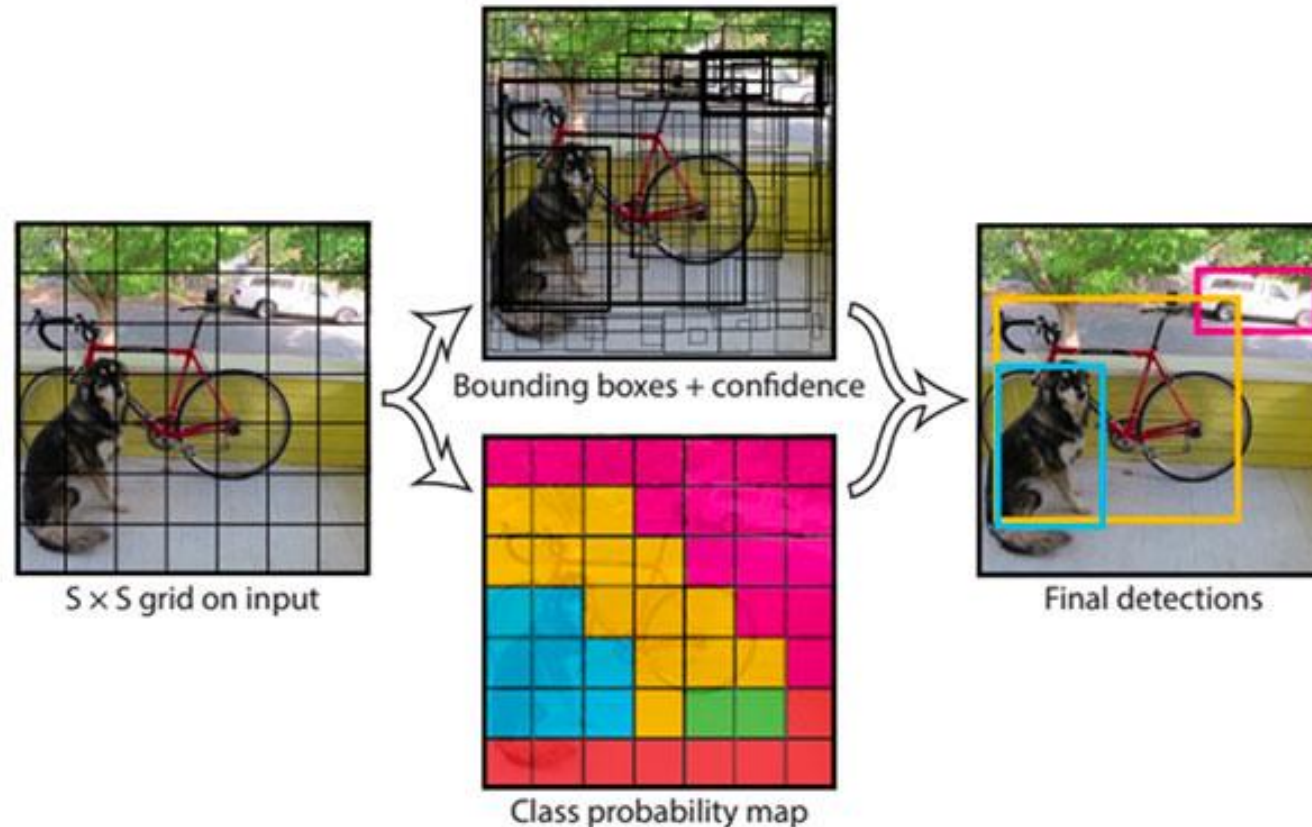
YOLO OBJECT DETECTOR

Moving cars detected by YOLO →

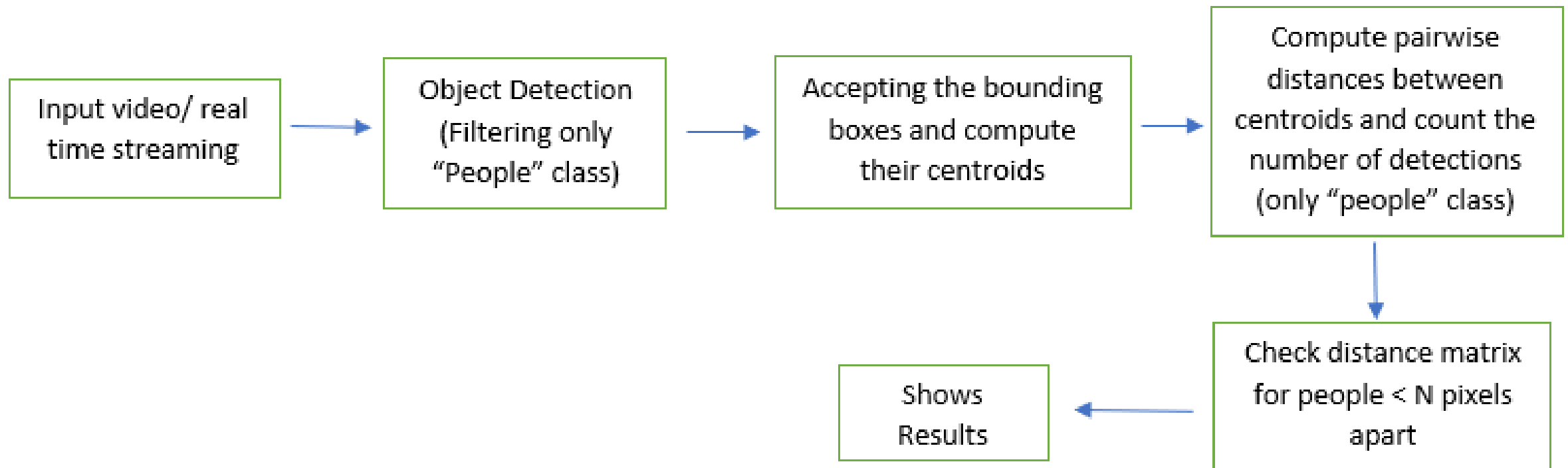Different classes "people", "suitcase", etc. detected by YOLO ↓
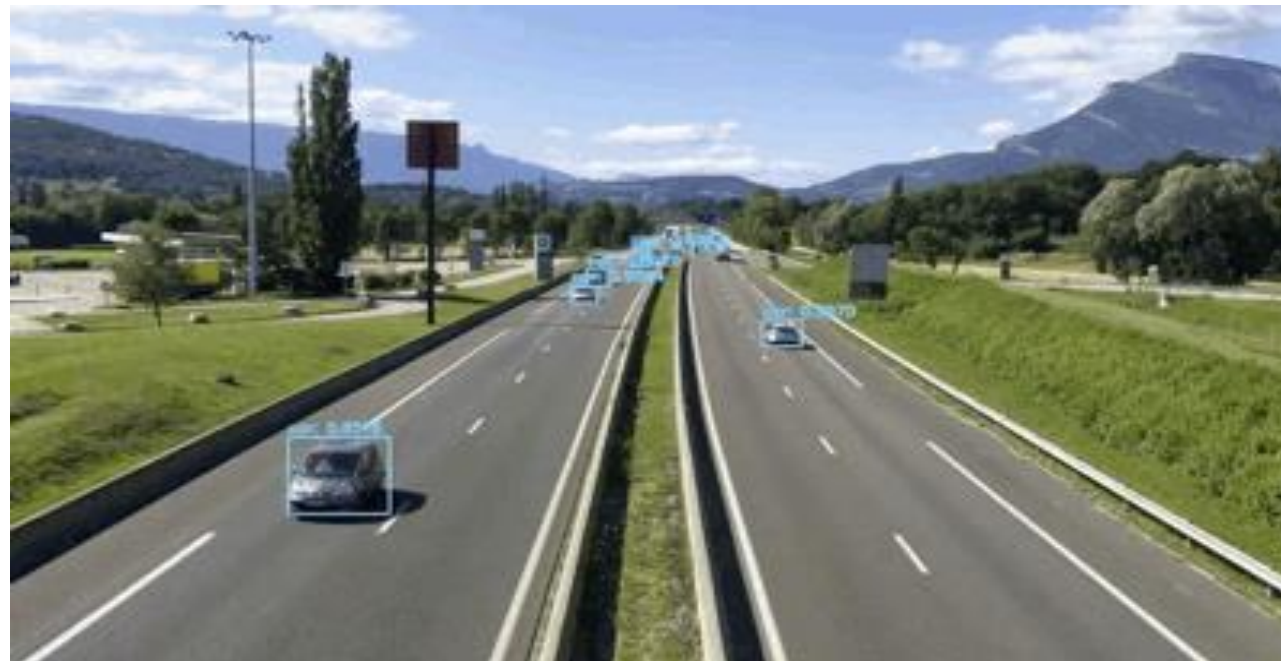
SOCIAL DISTANCING DETECTOR

- Working of social distancing detector:
    1. Apply object detection to detect all people (and only people) in a video stream.
    2. Compute the pairwise distances between all detected people using the pixel distances.
    3. Based on these distances, check to see if any two people are less than N pixels apart.

S × S grid on input

Bounding boxes + confidence

Class probability map

Final detections

PIPELINE OF THE PROJECT

WORKING OF THE PROGRAM

THANK YOU

Google Drive link for the Program Code :
https://drive.google.com/file/d/1MoY2PmMvMzslF7pp4LRkhSEL6haHvzeV/view?usp=sharing