

A woman with long dark hair is looking down at a tablet computer she is holding. The image is heavily overlaid with a blue tint and a bokeh effect, giving it a futuristic or technological feel. The background is blurred, suggesting an indoor setting with windows or lights.

DATA ANALYTIC – DISCOVERY SCIENCE

COUNTING CROWD WITH THE HELP OF CAMERA USING COMPUTER VISION
TECHNIQUES

Vaibhav Meena (B19BB049)
Bioscience and Bioengineering Dept.

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.

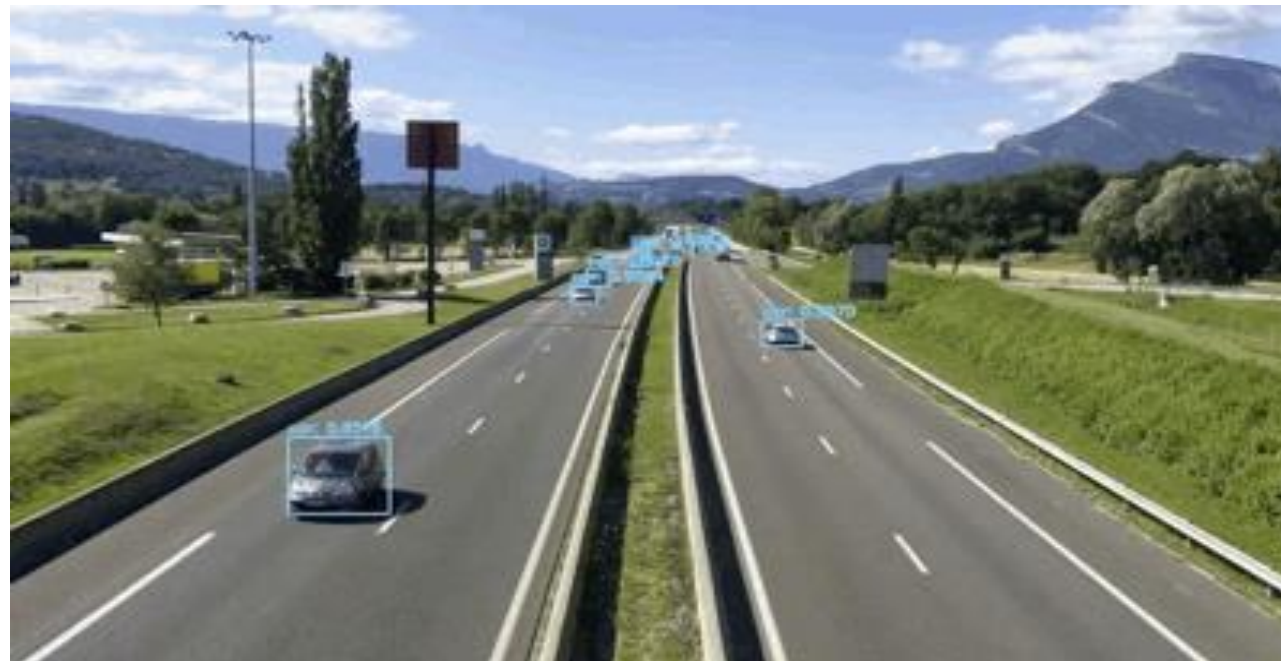
YOLO (YOU LOOK ONLY ONCE) AND R-CNN (FOR OBJECT DETECTION AND COUNTING)

- 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

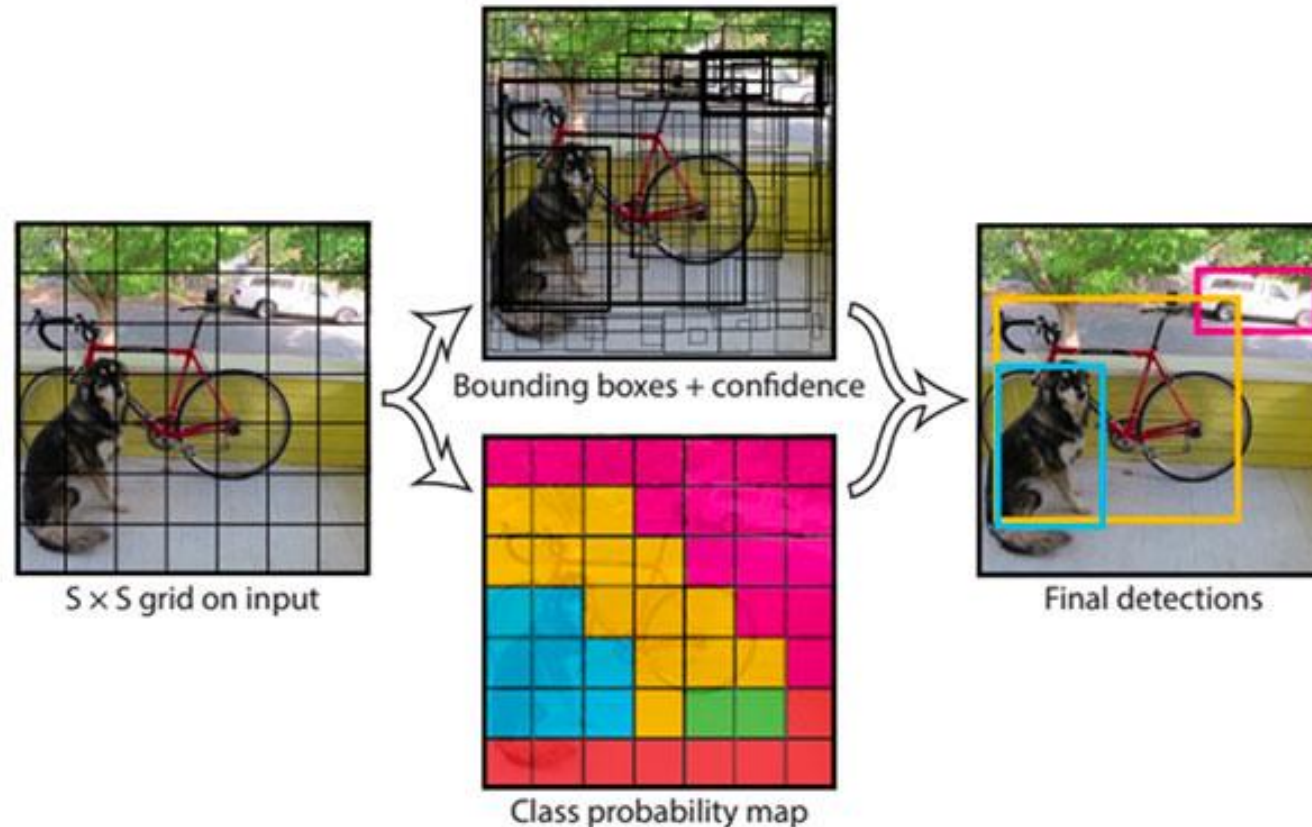
Moving cars detected
by YOLO →

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

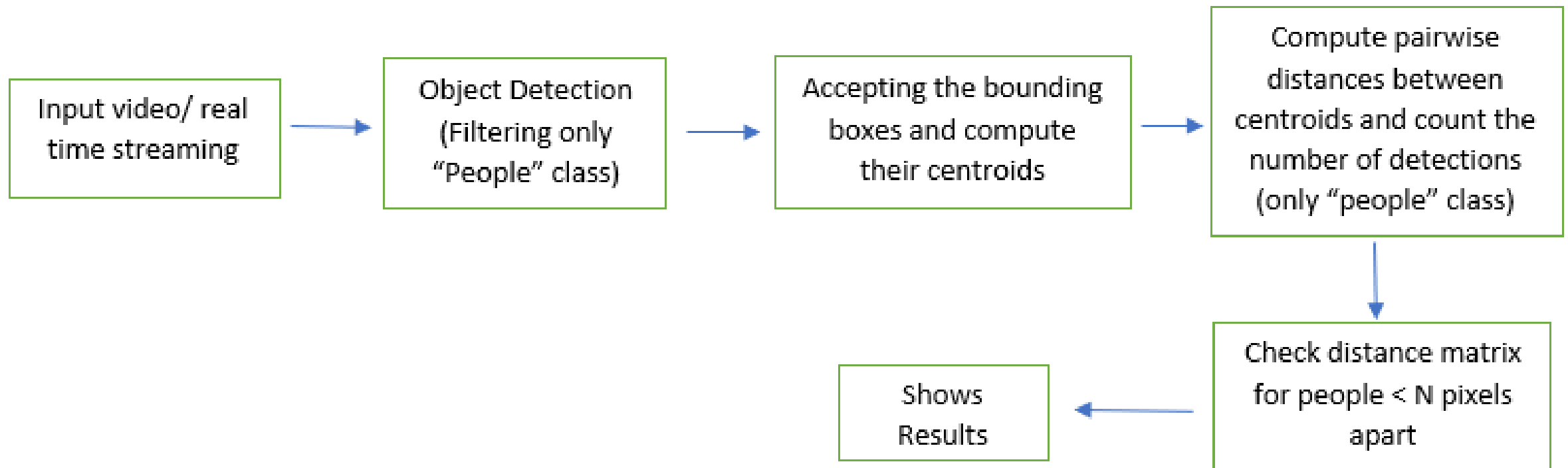


SOCIAL DISTANCING DETECTOR

- 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.



PIPELINE OF THE PROJECT



WORKING OF THE PROGRAM

Note: Video is fast forwarded

The screenshot displays the Visual Studio Code interface with a video recording overlay. The overlay is titled "Video Source" and includes a "Preview" button. It features a "Full Screen" dropdown, a "Video Encoder" section with "FFmpeg" selected, and a "Video Encoder" dropdown set to "Mp4 (x264 | AAC)". The "FPS" is set to 16 with a "Limit" checkbox checked, and the "Quality" is set to 70%. The "Audio" section is set to "Webcam" with "No Webcam" selected and a "Record Webcam to separate file" checkbox. The "ScreenShot" section includes an "Imgur" button. The "Output Folder" is set to "C:\Users\hp\Videos".

The background shows a Python script in the "Driver_main.py" file, which includes a loop for processing video frames. The script is as follows:

```
116 if len(violate)!=0:
117     print("[WARNING] Social Distancing Not Found")
118
119     print(currentDT.strftime("Date : %Y-%m-%d Time: %H:%M:%S"))
120
121     # check to see if the output frame should be displayed to our
122     # screen
```

The status bar at the bottom indicates "Python 3.6.0 64-bit" and "Ln 106, Col 56". The taskbar at the bottom shows various application icons and the system clock.

The background of the slide is a dark blue overlay on a photograph. The photograph shows several people's hands and forearms gathered around a table, pointing at a large map or document. The scene suggests a collaborative meeting or a presentation. The text 'THANK YOU' is written in a large, white, serif font, centered horizontally in the lower half of the image.

THANK YOU

Google Drive link for the Program Code :

<https://drive.google.com/file/d/1MoY2PmMvMzslF7pp4LRkhSEL6haHvzeV/view?usp=sharing>