

# Data for Yolo on Raspberry PI

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# Original images



# Using yolo v8 to identify tanks in images.







# Execution time Yolov8

```
cat@raspberrypi: ~/Desktop/ece4300project
File Edit Tabs Help
ld the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
image 1/1 /home/cat/Desktop/ece4300project/tankPhotos/tank4.jpg: 448x640 1 tank,
1505.6ms
Speed: 10.6ms pre-process, 1505.6ms inference, 3.3ms postprocess per image at sh
ape (1, 3, 640, 640)
Results saved to runs/detect/train6
Command took 15.09 seconds to execute for image 0
Command took 9.64 seconds to execute for image 1
Command took 9.11 seconds to execute for image 2
Command took 8.67 seconds to execute for image 3
Command took 7.87 seconds to execute for image 4
Command took 8.23 seconds to execute for image 5
Average time for all images: 9.77
```

# Increasing Brightness on images and then running Yolov8

Brightness 1.2:

```
cat@raspberrypi: ~/Desktop/ece4300project
File Edit Tabs Help
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with USE_OPENMP=1 option.
image 1/1 /home/cat/Desktop/ece4300project/bright12/tank4.jpg: 448x640 1 tank, 1169.5ms
Speed: 8.3ms pre-process, 1169.5ms inference, 20.5ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/train6
Command took 9.58 seconds to execute for image 0
Command took 10.32 seconds to execute for image 1
Command took 8.63 seconds to execute for image 2
Command took 8.44 seconds to execute for image 3
Command took 8.07 seconds to execute for image 4
Command took 7.97 seconds to execute for image 5
Average time for all images: 8.83
```

tank 0.92



tank 0.86



tank 0.90



tank 0.93



tank 0.89

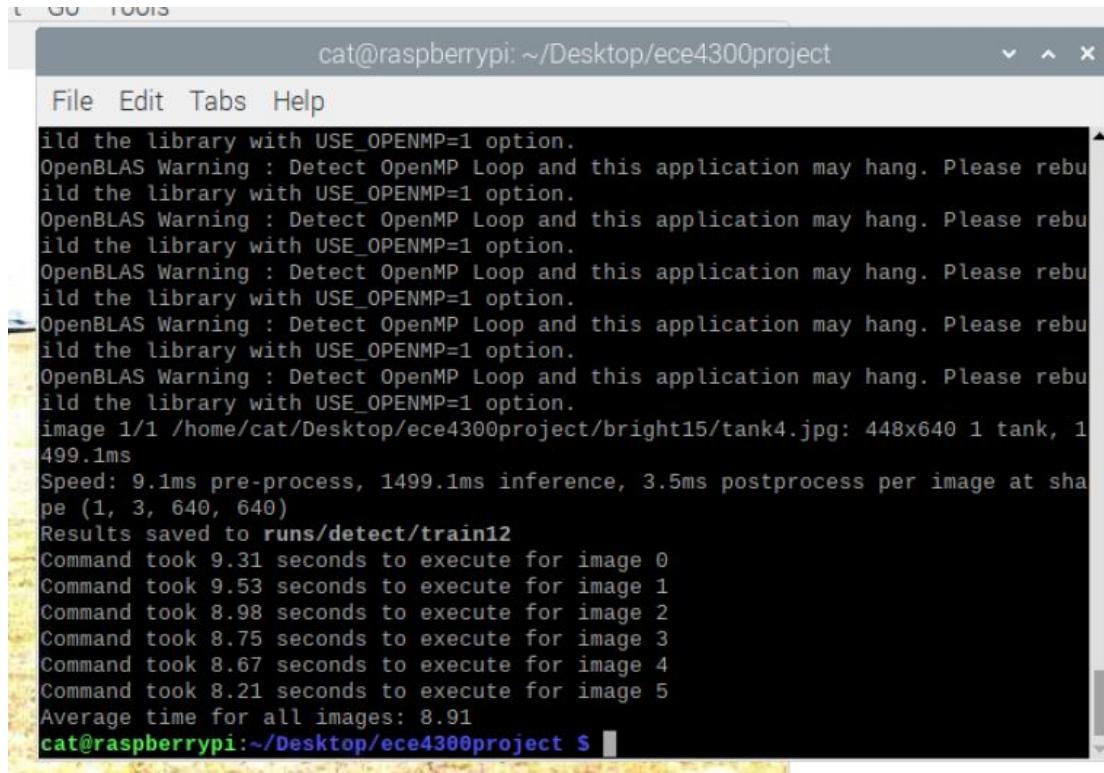


tank 0.88



# Increasing Brightness on images and then running Yolov8

Brightness 1.5:



```
cat@raspberrypi: ~/Desktop/ece4300project
File Edit Tabs Help
ld the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
image 1/1 /home/cat/Desktop/ece4300project/bright15/tank4.jpg: 448x640 1 tank, 1
499.1ms
Speed: 9.1ms pre-process, 1499.1ms inference, 3.5ms postprocess per image at sha
pe (1, 3, 640, 640)
Results saved to runs/detect/train12
Command took 9.31 seconds to execute for image 0
Command took 9.53 seconds to execute for image 1
Command took 8.98 seconds to execute for image 2
Command took 8.75 seconds to execute for image 3
Command took 8.67 seconds to execute for image 4
Command took 8.21 seconds to execute for image 5
Average time for all images: 8.91
cat@raspberrypi:~/Desktop/ece4300project $
```

tank 0.91

tank 0.93

tank 0.87

tank 0.85

tank 0.87

tank 0.85



# Increasing Contrast on Yolov8

Contrast: 1.2

```
cat@raspberrypi:~/Desktop/ece4300project
File Edit Tabs Help
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
image 1/1 /home/cat/Desktop/ece4300project/contrast1/tank4.jpg: 448x640 1 tank,
1351.6ms
Speed: 8.8ms pre-process, 1351.6ms inference, 3.3ms postprocess per image at sha
pe (1, 3, 640, 640)
Results saved to runs/detect/train18
Command took 9.83 seconds to execute for image 0
Command took 9.05 seconds to execute for image 1
Command took 9.05 seconds to execute for image 2
Command took 8.96 seconds to execute for image 3
Command took 8.05 seconds to execute for image 4
Command took 8.04 seconds to execute for image 5
Average time for all images: 8.83
cat@raspberrypi:~/Desktop/ece4300project $ ls
best.pt           contrast_adjust_input.py  tank4.jpg
bright12          predict.log                tankPhotos
bright15          README.md                 test_input.py
bright_adjust_input.py requirements.txt      test.py
photos
```

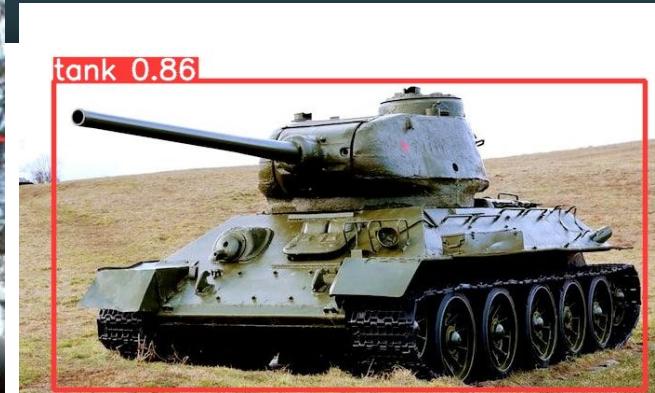
tank 0.91



tank 0.89



tank 0.86



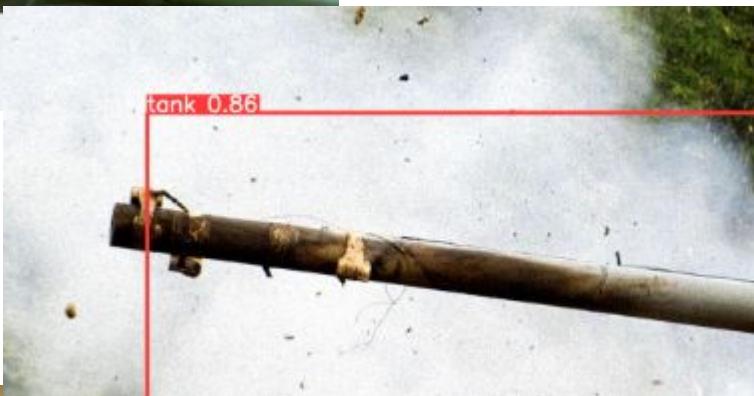
tank 0.92



tank 0.89

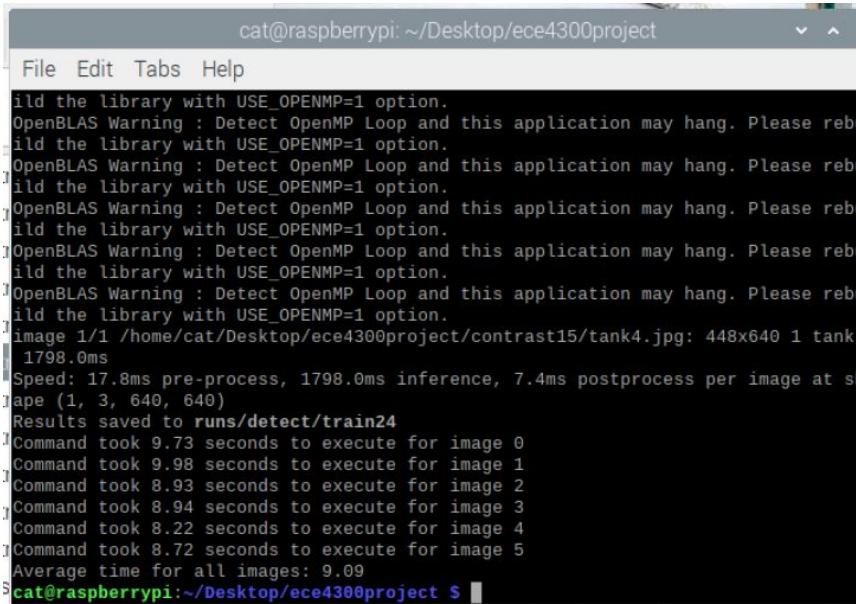


tank 0.86



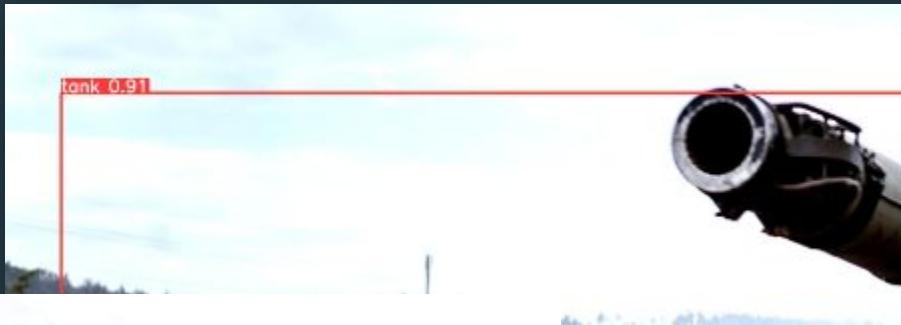
# Increasing Contrast Yolov8

Contrast: 1.5



A terminal window titled "cat@raspberrypi: ~/Desktop/ece4300project" displaying the output of a Yolov8 detection command. The output shows multiple "OpenBLAS Warning" messages about OpenMP loops, followed by the detection results for five images. The results include the image path, dimensions, object count, and execution times. The average time for all images is 9.09 seconds.

```
cat@raspberrypi:~/Desktop/ece4300project
File Edit Tabs Help
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
image 1/1 /home/cat/Desktop/ece4300project/contrast15/tank4.jpg: 448x640 1 tank,
1798.0ms
Speed: 17.8ms pre-process, 1798.0ms inference, 7.4ms postprocess per image at sh
ape (1, 3, 640, 640)
Results saved to runs/detect/train24
Command took 9.73 seconds to execute for image 0
Command took 9.98 seconds to execute for image 1
Command took 8.93 seconds to execute for image 2
Command took 8.94 seconds to execute for image 3
Command took 8.22 seconds to execute for image 4
Command took 8.72 seconds to execute for image 5
Average time for all images: 9.09
cat@raspberrypi:~/Desktop/ece4300project $
```



# Running Yolov5

Original Images

```
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5
File Edit Tabs Help
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebu
ild the library with USE_OPENMP=1 option.
image 6/6 /home/cat/Desktop/ece4300projectYolo5/tankPhotos/tank6.jpg: 288x416 1
tank, 656.6ms
Speed: 4.5ms pre-process, 942.8ms inference, 3.0ms NMS per image at shape (1, 3,
416, 416)
Results saved to runs/detect/exp13
Command took 31.22 seconds to execute for image 0
Command took 24.00 seconds to execute for image 1
Command took 22.38 seconds to execute for image 2
Command took 23.62 seconds to execute for image 3
Command took 22.67 seconds to execute for image 4
Command took 22.01 seconds to execute for image 5
Average time for all images: 24.32
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5 $ exp3
```



tank 0.96

tank 0.91







# Changing brightness for Yolov5

Brightness 1.5:

```
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5
File Edit Tabs Help
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
image 6/6 /home/cat/Desktop/ece4300projectYolo5/bright15/tank6.jpg: 288x416 1 tank, 1065.3ms
Speed: 4.7ms pre-process, 1335.5ms inference, 2.0ms NMS per image at shape (1, 3, 416, 416)
Results saved to runs/detect/exp18
Command took 23.10 seconds to execute for image 0
Command took 22.50 seconds to execute for image 1
Command took 22.75 seconds to execute for image 2
Command took 22.76 seconds to execute for image 3
Command took 22.90 seconds to execute for image 4
Command took 22.74 seconds to execute for image 5
Average time for all images: 22.79
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5 $
```

tank 0.95



tank 0.95



tank 0.77



tank 0.81



tank 0.93



tank 0.95



# Changing brightness for yolov5

Brightness: 1.2

```
Var cat@raspberrypi: ~/Desktop/ece4300projectYolo5/yolov5
File Edit Tabs Help
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with E_OPENMP=1 option.
image 6/6 /home/cat/Desktop/ece4300projectYolo5/bright12/tank6.jpg: 288x416 1 tank, 1632.1ms
Speed: 3.9ms pre-process, 1181.7ms inference, 2.7ms NMS per image at shape (1, 3, 416, 416)
Results saved to runs/detect/exp12
at Command took 23.13 seconds to execute for image 0
Command took 23.62 seconds to execute for image 1
Command took 22.37 seconds to execute for image 2
Command took 21.34 seconds to execute for image 3
Command took 23.50 seconds to execute for image 4
Command took 21.66 seconds to execute for image 5
Average time for all images: 22.60
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5 $
```

tank 0.93



tank 0.77



tank 0.74



tank 0.95



tank 0.96



tank 0.91



# Changing contrast for Yolov5

Contrast 1.2:

```
cat@raspberrypi: ~/Desktop/ece4300projectYolo5/yolov5
File Edit Tabs Help
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
image 6/6 /home/cat/Desktop/ece4300projectYolo5/contrast12/tank6.jpg: 288x416 1 tank, 1165.0ms
Speed: 4.0ms pre-process, 1410.7ms inference, 2.1ms NMS per image at shape (1, 3, 416, 416)
Results saved to runs/detect/exp24
Command took 22.53 seconds to execute for image 0
Command took 22.64 seconds to execute for image 1
Command took 23.34 seconds to execute for image 2
Command took 22.26 seconds to execute for image 3
Command took 22.46 seconds to execute for image 4
Command took 22.96 seconds to execute for image 5
Average time for all images: 22.70
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5 $
```

tank 0.95



tank 0.95



tank 0.92.



tank 0.95



tank 0.72



# Changing contrast for Yolov5

Contrast 1.5:

```
cat@raspberrypi: ~/Desktop/ece4300projectYolo5/yolov5
File Edit Tabs Help
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
OpenBLAS Warning : Detect OpenMP Loop and this application may hang. Please rebuild the library with US
E_OPENMP=1 option.
image 6/6 /home/cat/Desktop/ece4300projectYolo5/contrast15/tank6.jpg: 288x416 1 tank, 1244.7ms
Speed: 4.2ms pre-process, 1247.0ms inference, 3.3ms NMS per image at shape (1, 3, 416, 416)
Results saved to runs/detect/exp30
Command took 21.94 seconds to execute for image 0
Command took 23.06 seconds to execute for image 1
Command took 23.35 seconds to execute for image 2
Command took 21.61 seconds to execute for image 3
Command took 22.38 seconds to execute for image 4
Command took 22.07 seconds to execute for image 5
Average time for all images: 22.40
cat@raspberrypi:~/Desktop/ece4300projectYolo5/yolov5 $
```



tank 0.92



tank 0.87



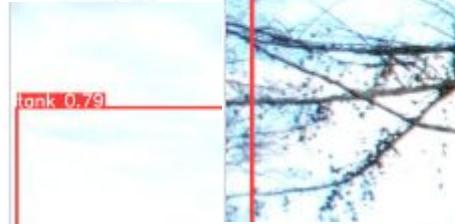
tank 0.95



tank 0.95



tank 0.79



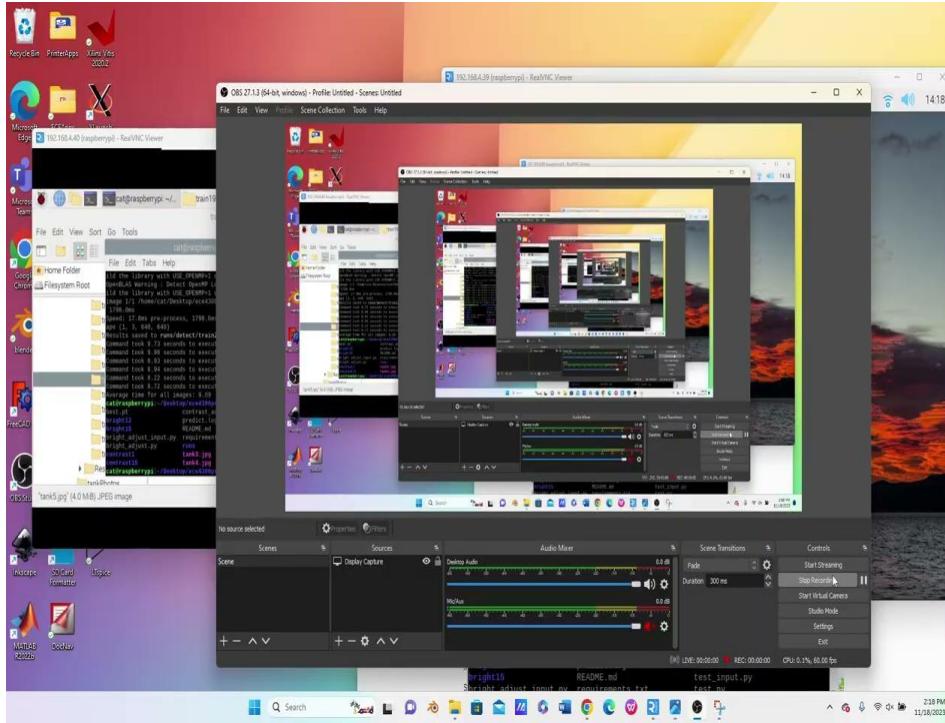
tank 0.65



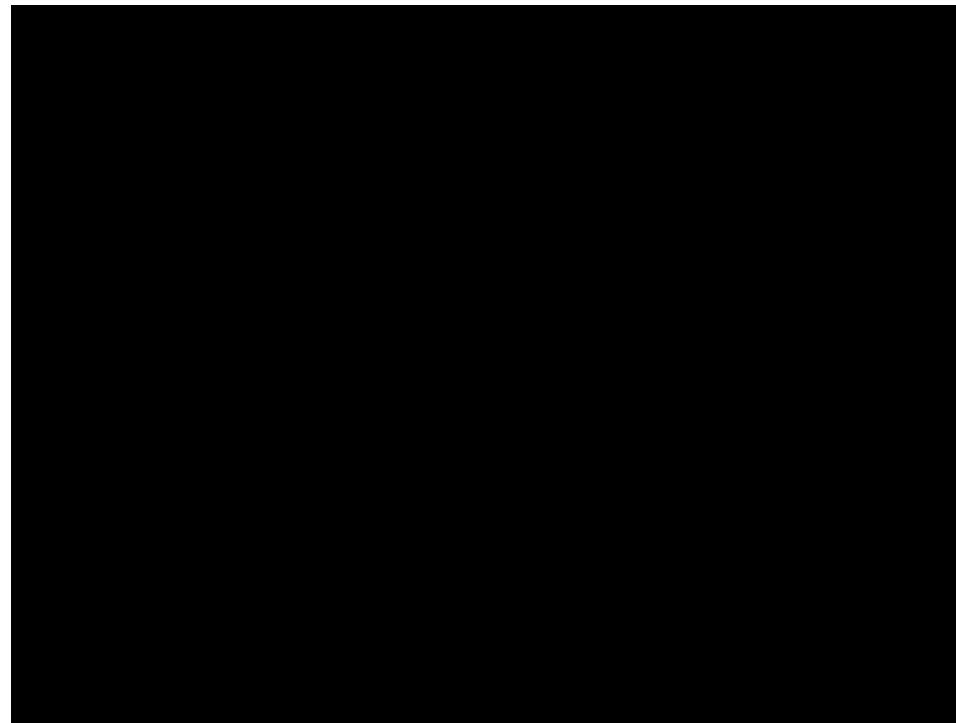
# Link to powerpoint:

<https://docs.google.com/presentation/d/1JjL62PPhDaUbsumT2pJYSsnBwfdhTSS1dVw2RBw563M/edit?usp=sharing>

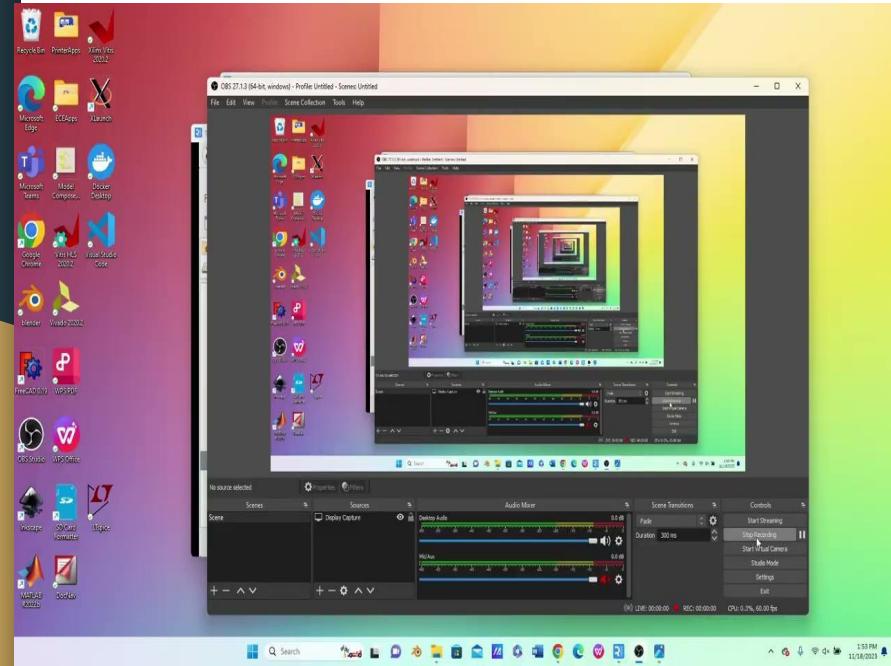
# Videos: Running Yolov8 and Yolov5



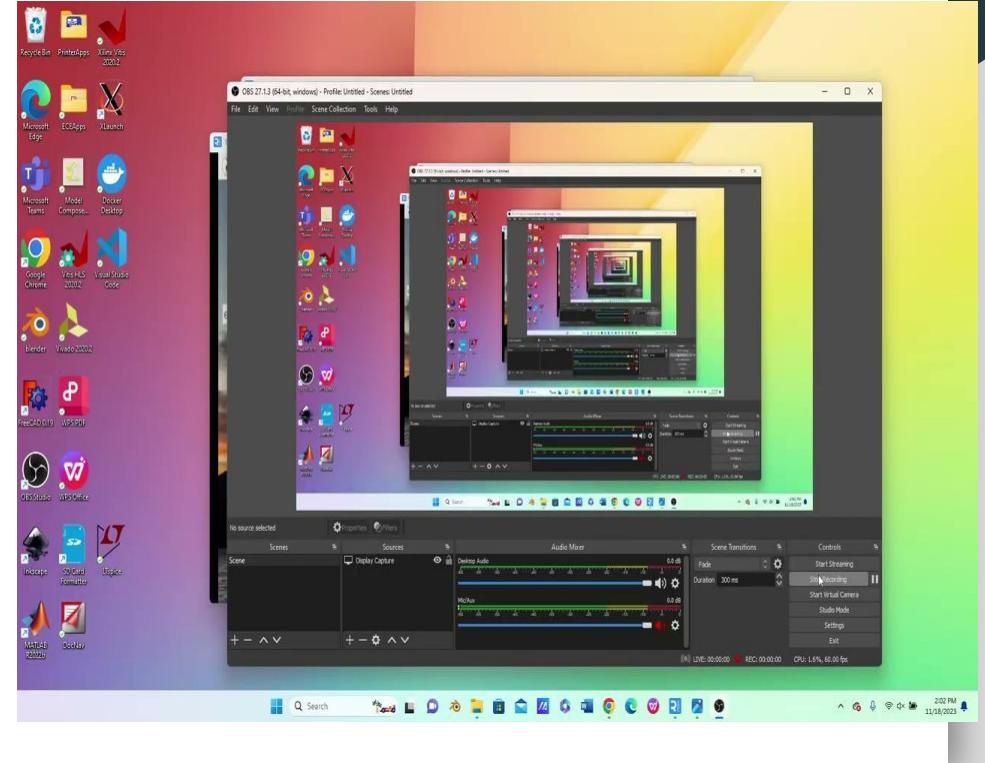
# Video: Running YoloV8



# Running Brightness Yolov8



# Running contrast Yolov8



# Video: Running YoloV5

# Running bright/contrast

