



# Meeting - 11/17/2022

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- Findings for this week:
  - YOLOv7 as a region based convolutional neural network would suit the use case of this project the best
  - Google Colab is free and allows for quick training of YOLOv7 R-CNN's for testing purposes
  - Follow up with Professor regarding any possibility for the usage of the PC in the Maker space or any VM possibility from Carleton contact
- Labelled Testing Datasets Created
  - Potholes (Frank) ~ 600 images
  - Cones (Josh) ~ xxx images
  - Signs (Gilles) ~650 images
  - Barricades (Kareem) ~ xxx images
    - Using bounded box labelling in Roboflow
- YOLO Version Decision Factor (Gilles)
  - YOLOv7 is 1.8% more precise
  - YOLOv7 has a 0.11% better Mean Average Precision (maP) with 50% obstacle overlap
  - YOLOv7 has a 50% longer time to train compared to YOLOv5

- all figures are taken with a image dataset of 500
- If a KPI for testing and final deployment of the neural network is model training speed then YOLOv5 suits this better
- If a KPI for testing and final deployment is precision then YOLOv7 suits this better
- More Info:
  - <https://www.learnwitharobot.com/p/yolov5-vs-yolov6-vs-yolov7>
  - <https://colab.research.google.com/drive/1X9A8odmK4k6l26NDviiT6dd6TgR-piOa>
- YOLOv7 Trial with Potholes Training Dataset (Frank)
  - The training model has high object detection rates (meaning it can detect potholes well) however it does this with lower than expected accuracy (meaning it is not confident in its decisions)
  - The factors we can change that could increase this accuracy is increasing the batch size (images in the dataset) and changing the value for epochs.
    - batch size is dependent on image size, and memory available
  - More Info:
    - <https://colab.research.google.com/drive/1LQnOzd6pM2OtMW3H5IJQfp7QlhatnyT9?usp=sharing#scrollTo=bp7rVA0nbn-O>
- Plans for Next Week:
  - Implement the training datasets on YOLOv7 TensorFlow and producing meaningful charts, graphs, and figures to analyze the precision, mAP, and accuracy of the supplied datasets
  - DONE - Place order for the Raspberry Pi Camera and Raspberry Pi Computer under the 500\$ allotted funding
    - find and read email about 500\$ funding to lab manager
    - Reference number is PURCH4907-21
  - DONE - Check in with other groups as to how the purchase of the headless PC is coming along
  - DONE - Email lab manager for Maker space PC usage
  - Explore possible solution for distance estimation
    - Binocular Vision
    - SIFT Algorithm

- Disparity Estimation for Distance
  - Disparity Map (layers objects)
- Elevated LIDAR mount
- Home brew AI distance measure algorithm