



# Meeting - 12/01/2022

👤 Participants	Ⓒ Gilles Myny 🍰 Kareem Assad Ⓐ Joshua Ⓕ Frank
👤 Created By	Ⓒ Gilles Myny
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## Items Completed This Week

- Frank
  - Trained 4 variations of models on pothole dataset. The more epochs found the more accurate the results. Also have reached max usage on Google Colab, will need to start training models on maker PC.
  - YOLO has various graphs that can be useful for the progress report.
  - Roboflow has the ability to upload videos to the dataset, either for training or testing purposes, next steps are to test models on video.
- Gilles
  - Reached max usage on Google Colab training model for road signs with 300 epochs and a batch size of 16
    - initial tests resulted in very high accuracy (80-90) on true positive detections however had quite a few false positives on surrounding unrelated objects mistaking for detectable objects

- refined dataset for stop signs to have polygon bounded boxes to better train the model on the shape of stop signs rather than the colour and text, will be evaluating these changes on the Maker space PC this weekend
- Gathered a couple of dash cam videos located in cities that include potholes, traffic / construction cones and barricades, as well as road signs. Will be using these videos as test objects in respective datasets on the Maker space PC (for unlimited usage compared to limited on Colab)
- Josh
  - Trained several YOLO V7 models with varying parameters
    - Batch Size: 1-8 (16 is too large)
    - Epochs: 50-300
  - Overall poor results (most likely due to poor training set)
- Kareem
  - Trained variable models on the barricades datasets. Reached the same conclusion as Frank, the more epochs the more accurate the results. However, The variability of the results is not significantly high to justify training with a high batch size.
    - Tested w/ Batch Sizes of 32, 16, 8, 4 (Found anything 16+)
    - Below average results, really struggles to differentiate barricades and other platforms such as short floating benches. Also struggles with rust and visual signs placed on barriers.
  - CNN on it's own picks up important information through filters. For barriers with simple geometric characteristics, we can pick horizontal lines with a 3x3 filters
 
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 of  $\begin{matrix} 1 & 1 & 1 \\ 0 & 0 & 0 \\ -1 & -1 & -1 \end{matrix}$ . Therefore, we can assume that resizing the image would not make a significant difference.
  - Practically, we would need the images to be small to decrease training time.
    - Testing various sizes to see what a good middle ground is. Currently resized all images to 150x150.

- Next Steps: Going to vary the dataset to contain Cable barriers, Box Beams, Concrete barriers, and some hybrids.
- Used max usage on google collab, created an issue to setup remote-ssh + WSL on the new machine
- Updated the repo to contain folders of where everyone's work should go. We should move away from google collab and google drive as it's hard to transfer + reuse each others works.
- Considering training a simple CNN model for the identified types of barriers and then transferring the learning.
- These images were among some used for testing, they were classified in 4 categories, box beam, cable barriers, hybrid, and concrete barriers. These were manually labeled but as you can see, a human would even struggle to identify these.



# Item(s) for Next Week

- Progress Report
  - include a lot of research from references (online) about CNN's and YOLOv7, labelling tools used like Roboflow, etc
  - include section about plans with acquired Pi equipment and Maker Space PC
  - create diagrams or sections regarding testing pipelines we're using on our current YOLOv7 models
  - revision of aspects of the proposal that have changed by research (path has changed since the proposal)
  - updating the plan and tasks (milestones, timelines, and work distribution)
  - how progress will continue until the end of the project
  - revisiting potential additions to the project given the timeline remaining
  - do not include code in the report (not relevant)
  - discussing design and approach
    - repo design/ architecture?
- create pipeline on Git to force push the 4 folders on the Maker space at midnight (daily?)