Weekly Progress Report

Sept 6th - 10th, 2021

Presented by Yannis (Yiming) He 84189287

Noah's Ark | Autonomous Driving Lab
LiDAR Domain Adaptation

Manager: Bingbing Liu 00435285
Supervisor: Eduardo Corral Soto 00407762

HUAWEI

- Sept 6th (Monday)
  - Labour Day → No work
- Sept 7 (Tuesday):
  - Discussion with Alonso for the docker build for CenterPoint
    - He is not sure what is causing the issue either.
      - What should be the next step? Who else should I reach out to.
    - To Eduardo: Could you try build the docker and see how it goes on your side
  - HYLDA Paper proofread
- Sept 8 (Wed)
  - Finish the paper proofread and comments
  - Modify the testing pipeline for TSIT
    - Changing input, dataloaders, etc
      - Use the validation set of the dataloader instead of testing set
  - Continue training that got interrupted (24/200 epoch)
  - Building the testing pipeline (done)

- Sept 9th (Thurs)
  - Try testing on current checkpoint:
    - 20th epoch
    - → no meaningful result
  - TODO:
    - Add Resize back to 64 x 2048 into the pipeline for a better references
    - Test the result after 200 epoch finished (estimated finishing on Friday night)
    - Deliver the paper proofread to Eduardo
- Sept 10th (Friday)
  - Docker development for CenterPoint
  - Meeting with Alonso

End of September 10th, Weekly Report

Presented by Yannis (Yiming) He 84189287

Weekly Progress Report

Sept 13th - 17th, 2021

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HUAWEI

- Sept 13th (Monday)
  - TSIT training finished (200 epoch)
  - Merging the validation dataset for source domain (SKITTI) into the testing pipeline
  - CenterPoint Docker:
    - 1st issue:
      - Background:
        - We (Huawei) have limitation to pull docker image from the DockerHub
          - 100 pull per 6 hours from 1 ID (whoever use the SPES and connect to VPN)
          - I.e. we can only use docker image saved on our gitlab
            - registry.kyber.team/kyber/kyber-tools
      - Issue: We don't have "pytorch 1.6.0 (version used by Xingxin's docker)" image in our gitlab
        - Alonso suggest: use pytorch 1.7.1 instead, assuming there is no big difference
        - I.e.
          - Replacing:

```
FROM pytorch/pytorch: 1.6.0-cuda10.1-cudnn7-devel
```

          - With

```
FROM registry.kyber.team/kyber/kyber-tools/pytorch: 1.7.1-cuda11.0-cudnn8-devel
```

  - Result: It passed by the pull from dockerhub
  - Questions to Xingxin: Does the version matter?

- Sept 13th (Monday) (CONT')
  - CenterPoint Docker (cont'):
    - 2nd issue:
      - Background:
        - Xingxin, Mrigank, Aich are able to build the dockers on their server without issues
        - Both Eduardo and I cannot
      - Issue:
        - Alonso: "it probably has to do with how they configured the servers"
      - Potential solution (to be tried today)
        - Configure the docker clients on our server
          - Alonso said this approach is troublesome
          - It would be great if Xingxin can push his docker image to our gitlab so I can pull from there
  - TODO:
    - Proofread the updated ICRA paper
      - To be received

- Sept 13th (Monday) (CONT')
  - HYLDA Paper:
    - Making the videos for ICRA presentation (deadline Sept 19th):
      - Requirements: https://www.icra2022.org/contribute/call-for-papers#:~:text=The%20ICRA%202022%20conference%20will,program%20in%20the%20following%20ways.
        - Format: MP4
        - File Size: < 20 Mb
        - Video Size: height > 480p
        - FPS: > 20
    - Finished, waiting for feedback from Eduardo
  - CenterPoint
    - Discussion with Xingxin for Docker
    - Received docker image as a zip file (to be tried once finishing ICRA video)
- Sept 14th (Tuesday)
  - HYLDA Paper (completed)
    - Received feedback from Eduardo for video
      - Edited accordingly and re-delivered
    - Proof read the newest HYLDA paper
      - Suggestions to modification (delivered)

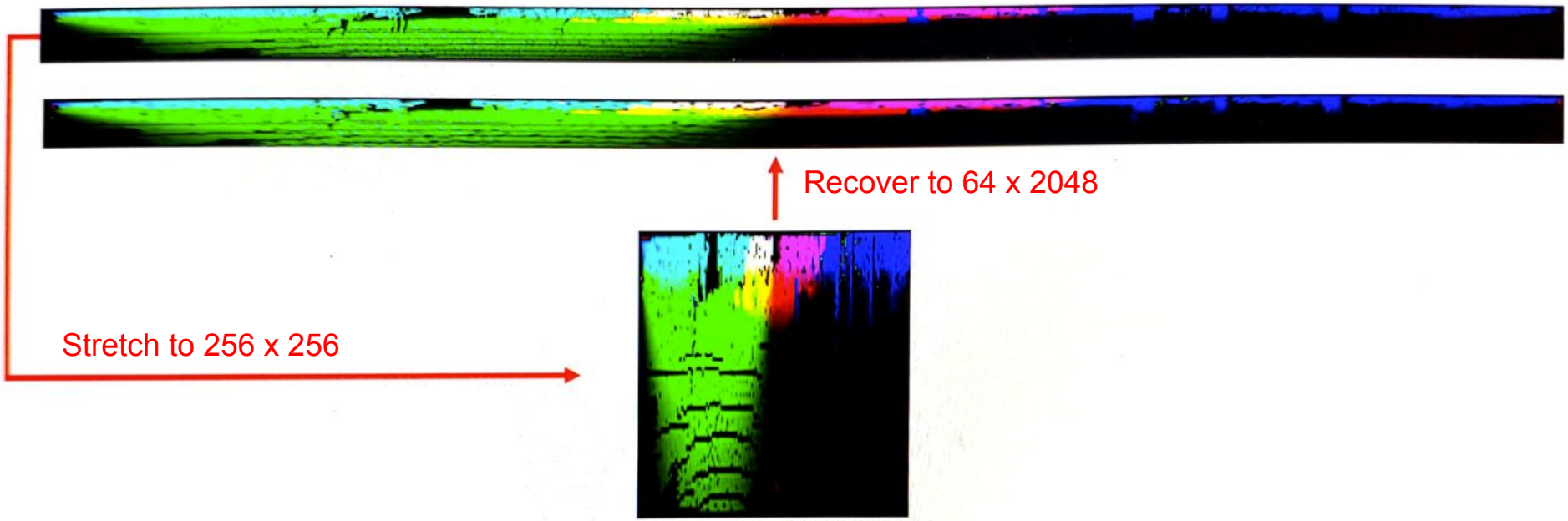
- Sept 14th (Tuesday) (CONT')
  - CenterPoint
    - Copy the docker image zip file to gx9 (in progress)
    - TODO:
      - Try pull the docker directly from the registry.kyber.team
      - Look into CenterPoint 3D Object detection baseline
  - TSIT:
    - Test the model output with validation set
    - Issue:
      - Data Split file not detected (resolved)
    - TODO: Run the testing
- Sept 15 (Wednesday):
  - CenterPoint
    - Tried to pull docker uploaded by Xingxin from registry.kyber.team

```
docker pull registry.kyber.team/kyber/kyber-perception/semida-det:once-0.0.1
```

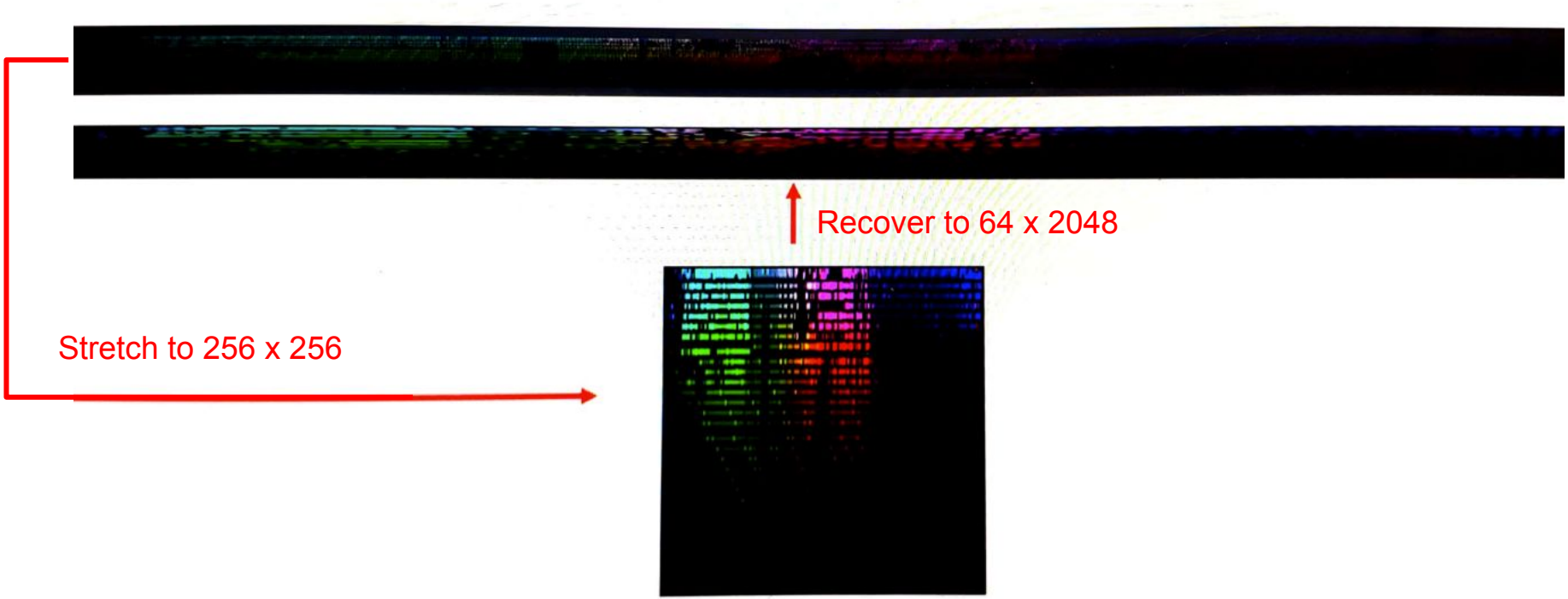
      - Having issue access the repo
        - Error: unauthorized account (but Alonso gave me access)
        - seeing a white screen when going to https://registry.kyber.team
          - Server might be down?

- Sept 15 (Wednesday) (CONT'):
  - TSIT:
    - Conduct comparison for stretching effect
      - OK for SKITTI, a bit distorted for nuScene
      - Potential solution: Hole filling
    - Finished the validation for style transfer from SKITTI to nuScene
      - Doesn't looks really good

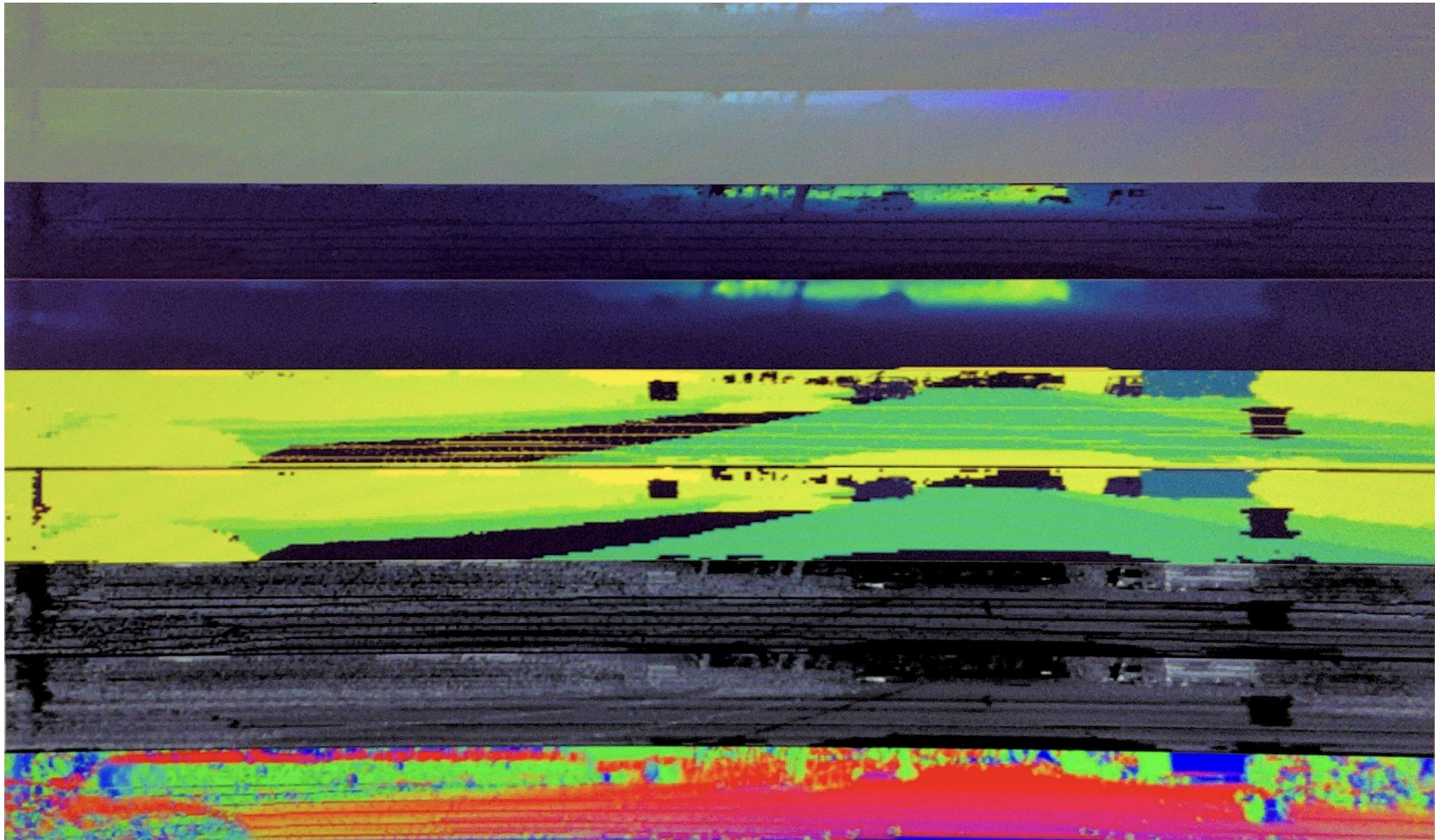
Validation Set - SKITTI



Validation Set - nuScenes



Holes Filling (Top: before vs Bottom: after)



- Sept 16 (Thursday):
  - Follow up with Alonso/Arash for “pulling docker from registry.kyber.team”
  - without waiting for docker for now
    - Retrain CenterPoint object detection baseline
    - Run domain adaptation baseline
      - From which to which datasets are we using for the baseline?
- Sept 14 (Friday):
  - Pull docker from Xingxin
  - Recogiture the docker that would work with CenterPoint
  - Connecting with Eduardo for next step
    - Synchronize the code base (including docker)
  - Prepare nuScenes dataset for CenterPoint
  - Start training the baseline

End of September 17th, Weekly Report

Presented by Yannis (Yiming) He 84189287

Weekly Progress Report

Sept 20th - 24th, 2021

Presented by Yannis (Yiming) He 84189287

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Manager: Bingbing Liu 00435285
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HUAWEI

Weekly Summary

- Reproduced CenterPoint Paper results on nuScenes (Training + validation for 20 epoch)
  - Plot the performance (mAP) over #epoch
- Compare functionalities of two repos (SemiDADet vs Original)
  - Original doesn't have tensorboard built-in (easy fix)
  - Original missing dataloaders for p40, ONCE, m2
    - should be able to integrate with SemiDADet's dataloaders (to be validated)
  - SemiDADet doesn't have detection visualization
- Studying the code for CenterPoint
- Shortened HYLDA demo video for ICRA submission
- **Recent Goals:**
  - For Huawei Datasets (finished copying to gx9)
    - Oracle with source & target
    - Naive with source → target

Work Logs

- Sept 20 (Monday):
  - Reproduce the CenterPoint 3D object detection benchmark on nuScenes.
    - Prepare nuScenes dataset for CenterPoint
    - start training (finished on Sunday 2pm)
  - Look into tensorboard support for CenterPoint → no native tensorboard available
  - Discuss the short-term goal with Eduardo
    - Get Huawei dataset
      - Oracle with source & target
      - Naive with source → target
  - Get dataset to gx9 (in progress)
    - P40, once, m2
  - TODO:
    - Check model performance and compare with their benchmark to make sure my code base is working fine.
    - Evaluate for checkpoint 14-20
      - Record in Excel
    - Run training with ONCE on nuScenes and compare with original

Work Logs

- Sept 21 (Tuesday):
  - Evaluate for checkpoint 1-14 (done, i.e. complete for 1-20)
    - Record in text
      - ~/repo/CenterPoint_ya_study/src/second/yA_TRAINING_OUTPUTS/nus_baseline_val_outputs
  - Look into visual.py and 3D boxes visualization on github issue
    - Generate bounding box for each epoch in validation (done)
      - ~/repo/CenterPoint_ya_study/src/second/work_dirs/nus_baseline_epoch_xx/example
  - Finished dataset copying
    - P40
    - M2
    - ONCE
  - Edit HYLDA demo video (shorten by half)
- Sept 22 (Wed)
  - Develop an automated script that format the validation output
  - Organized the output in Excel
  - Plot mAP progression for each class for each epoch
  - Go through the pipeline and get familiar with the code

Work Logs

- Sept 23 (Thursday)
  - Compare our reproduced result with the results on CenterPoint paper for nuScenes (matched)
  - Record the output of each epoch in Excel
  - Continue study CenterPoint Code base.
- Sept 24 (Friday)
  - Obtain semidadet pipeline
  - Build docker for semida → encounter issue, discuss with Eduardo
  - Modify testing pipeline to evaluate all checkpoints

End of September 24th, Weekly Report

Presented by Yannis (Yiming) He 84189287

Weekly Progress Report

Sept 27th - Oct 1st, 2021

Presented by Yannis (Yiming) He 84189287

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HUAWEI

Weekly Summary

- **Done:**
  - Resolving docker issue
  - Resolving tcp port conflict for multi-process training (Thanks to Aich)
  - Training centerpoint (semedadet) on p40, ONCE (80 epochs)
- **In Progress:**
  - Evaluate models performance on p40, once (oracle)
- **Recent Goals:**
  - Analysis (visualize) performance
  - Naive domain adaptation (source: p40, once | target: m2)
  - Oracle: M2 train → M2 Val (when Xingxin gives us the correct data)
  -

Work Logs

- Sept 27 (Monday)
  - Tried run Semidadet using HYLDA docker:
    - Encountered issue with package import: `iou3d_nms_cuda`
      - Resolved by successfully run "`python3 setup.py develop`"
    - Encountered issue with package import: `deform_conv_cuda`"
      - Tried many solutions on internet, but haven't found a working solutions
  - Adjusted the testing & training configuration: 80 epochs & test all checkpoints
  - Met with Eduardo:
    - Docker issue:
      - `docker: failed to register layer: Error processing tar file(exit status 1): write /var/log/lastlog: no space left on device`
        - However, I do have many space shown by "`df -H`"
    - Discussed the next step:
      - Run training on p40, m2, once
      - Evaluate oracle performance → pick best checkpoints
      - Run naive domain adaptation (source: p40, once | target: m2)

Work Logs

- Sept 28 (Tuesday)
  - Setting goal with Eduardo:
    - Oracle: p40 train → p40 val, ONCE train → ONCE val, M2 train → M2 val
    - Native: p40 train → M2 val, Once train → M2 val
      - Need to run the evaluator on a single GPU with batch size=1.
      - Need to modify the test code so that dataloader returns the frame file ID.
        - To visualize it together with the AP and save to text file
      - Text file to be opened in Excel to sort by mAP and select good and bad examples
      - Visualize those bad example
    - Identify val frames with good & bad mAP
      - Visualize representative good and bad examples to understand the performance drop
      - Compute statistics and histograms (TBD)
  - Debug for running 2 training at the same time
    - “Runtime Error: Address already in use”
      - Tcp port conflict
    - Resolved by manually setup TCP port
  - Run training for ONCE
  - Run evaluator for both p40 & ONCE

Work Logs

- Sept 29 (Wednesday)
  - Encounter bug for ONCE evaluation
  - Run naive domain adaptation (ask for M2)
  -

End of October 1st, Weekly Report

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