Weekly Progress Report

Nov 01 - 04th, 2021

Presented by Yannis (Yiming) He 84189287

Noah's Ark | Autonomous Driving Lab
LiDAR Domain Adaptation

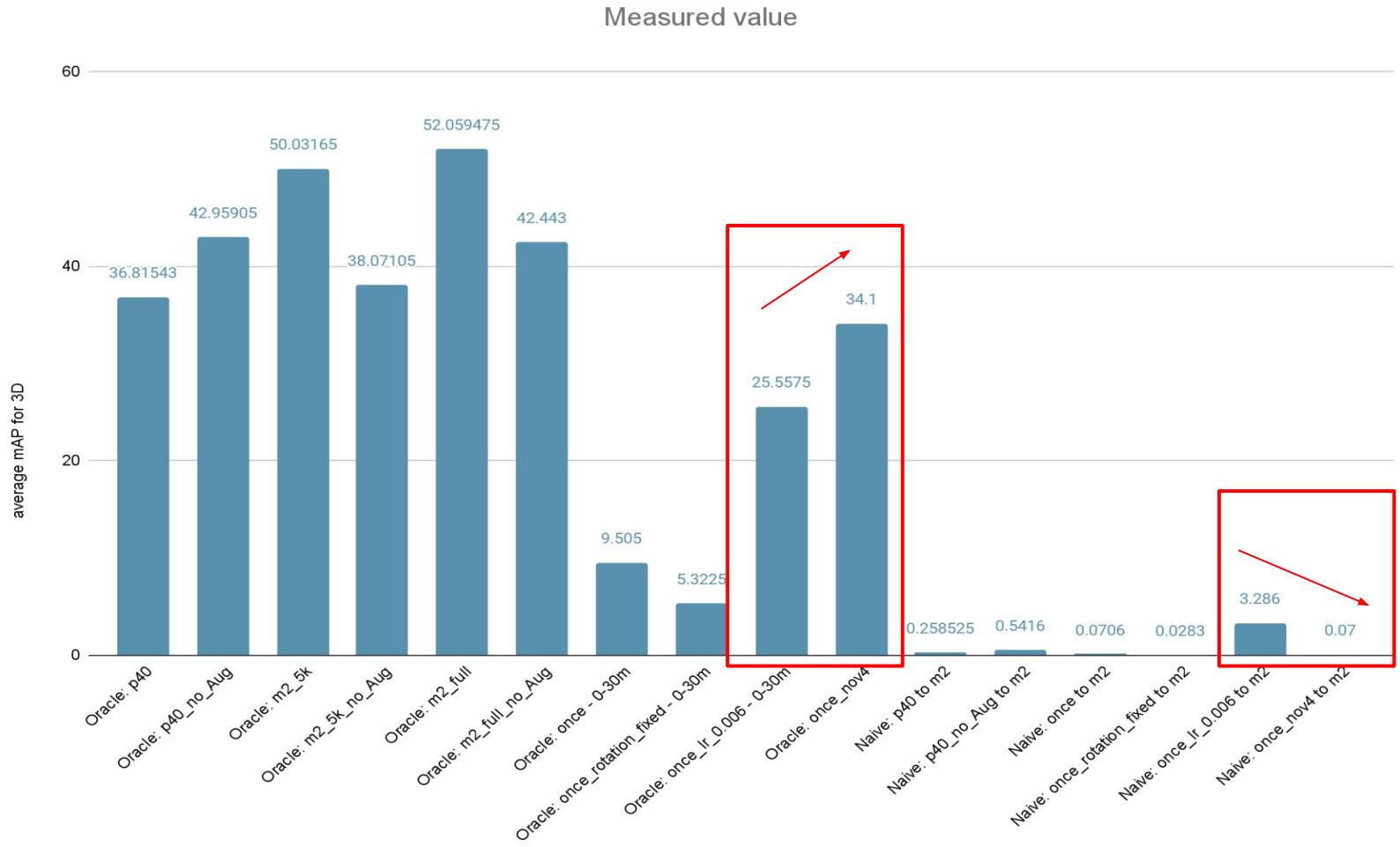
Manager: Bingbing Liu 00435285
Supervisor: Eduardo Corral Soto 00407762

HUAWEI

Weekly Summary

- **Done:**
  - Experiment on effect after ONCE_rotation_fixed (Oracle & naive DA on m2)
    - Drop in performance.
    - Investigation on configuration: learning rate is making a great difference
    - With lr: 0.072 → 0.006
      - Oracle improved ~5 times (5.32 → 25.6)
      - Naive DA on m2 improved (0.03 → 3.3)
  - Experiment on Xingxin's code base (Oracle & naive DA on m2)
    - Current best performance on ONCE oracle, BUT got ~0 for naive DA to m2
    - Investigation on configuration: learning rate is making a great difference
      - Oracle: 25.6 → 34.1
      - Naive DA on m2: 3.3 → 0.07
- **In Progress:**
  - Investigate why the inverse performance (oracle vs naive) occurred
    - Code, configuration, etc.
  - Region of Interest (ROI):
    - Evaluate P40 with ROI_x_flip_prob = 0.5 on M2 dataset
  - Visualization every frame BEV
    - to understand the false positive/negative
- **Recent Goals:**
  - Development: Plot mAP for all checkpoint for each class
- **TODO**:
  - Understanding: once_metric vs kitti metric
    - Prepare a decision diagram & flowchart for testing pipeline
  - Visualize frames having good and bad performances
    - Investigate correlation between performance & bbox (in progress)
    - Run entire pipeline with each frame individually (TODO)
    - Rank frames by AP (TODO)
    - Visualize frame with high & low AP (TODO)

Work Logs


Measured value
average mAP for 3D
60
40
20
0
36.81543
42.95905
50.03165
38.07105
52.059475
42.443
9.505
5.3225
25.5575
34.1
0.258525
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Oracle: p40
Oracle: p40_no_Aug
Oracle: m2_5k
Oracle: m2_5k_no_Aug
Oracle: m2_full
Oracle: m2_full_no_Aug
Oracle: once - 0-30m
Oracle: once_rotation_fixed - 0-30m
Oracle: once_lr_0.006 - 0-30m
Oracle: once_nov4
Naive: p40 to m2
Naive: p40_no_Aug to m2
Naive: once to m2
Naive: once_rotation_fixed to m2
Naive: once_lr_0.006 to m2
Naive: once_nov4 to m2

Work Logs

- Nov 01 (Monday)
  - Investigation on training:
    - P40 new vs old code base:
      - Unstable training
      - Bug:
        - “Cannot perform reduction function max on tensor with no elements because the operation does not have an identity at …”
      - Worse performance
    - ONCE before vs after rotation fixed:
      - Worse performance, not on the same scale with what Xingxin got
    - ROI:
      - dimension unmatch
  - Development: Plot mAP for all checkpoint for each class

Work Logs

- Nov 02 (Tuesday)
  - Investigation on training:
    - P40 new vs old code base:
      - Unstable training
      - Bug:
        - “Cannot perform reduction function max on tensor with no elements because the operation does not have an identity at …”
      - Worse performance
  - Experiment on effect after ONCE_rotation_fixed (Oracle & naive DA on m2)
    - Got worse performance.
    - Investigation on configuration: learning rate is making a great difference
    - With lr: 0.072 → 0.006
      - Oracle improved ~5 times (5.32 → 25.6)
      - Naive DA on m2 improved (0.03 → 3.3)
    - ROI:
      - dimension unmatch
  - Development: Plot mAP for all checkpoint for each class

Work Logs

- Nov 02 (Wednesday)
  - Investigation on training:
    - P40 new vs old code base:
      - Unstable training
      - Bug:
        - “Cannot perform reduction function max on tensor with no elements because the operation does not have an identity at …”
      - Worse performance
  - Experiment on effect after ONCE_rotation_fixed (Oracle & naive DA on m2)
    - Got worse performance.
    - Investigation on configuration: learning rate is making a great difference
    - With lr: 0.072 → 0.006
      - Oracle improved ~5 times (5.32 → 25.6)
      - Naive DA on m2 improved (0.03 → 3.3)
    - ROI:
      - dimension unmatch
  - Development: Plot mAP for all checkpoint for each class

End of November 04th, Weekly Report

Presented by Yannis (Yiming) He 84189287

Weekly Progress Report

Nov 08 - 12th, 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

Weekly Summary

- **Done:**
  - Investigate why the inverse performance (oracle vs naive) occurred
    - Xingxin's codebase hasn't invert the rotation angle from 90 to -90 degree
  - Synced Xingxin's changes for p40
  - Investigated the inverse behavior for rotation → +90 degree is the correct one
- **In Progress:**
  - Train ONCE with ~~corrected~~ rotation angle (-90) and perform oracle and naive DA on m2
  - Train ONCE with corrected rotation angle (+90) and offset = 0
  - Run p40 with resampling
  - Region of Interest (ROI):
    - Evaluate P40 with ROI_x_flip_prob = 0.5 on M2 dataset
  - Visualization every frame BEV
    - to understand the false positive/negative
- **Recent Goals:**
  - Development: Plot mAP for all checkpoint for each class
- **TODO**:
  - Understanding: once_metric vs kitti metric
    - Prepare a decision diagram & flowchart for testing pipeline
  - Visualize frames having good and bad performances
    - Investigate correlation between performance & bbox (in progress)
    - Run entire pipeline with each frame individually (TODO)
    - Rank frames by AP (TODO)
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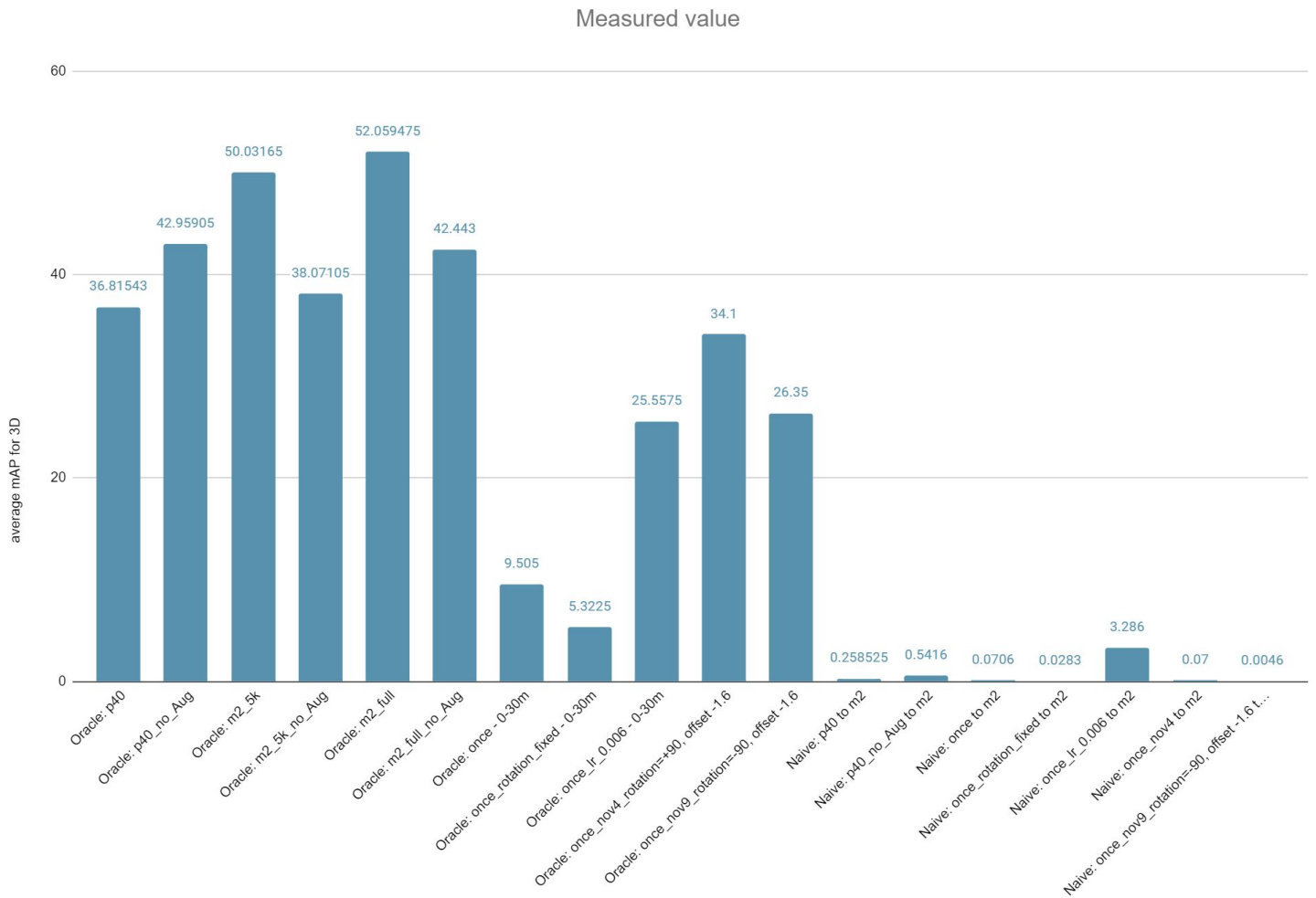
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Oracle: m2_full
Oracle: m2_full_no_Aug
Oracle: once - 0-30m
Oracle: once_rotation_fixed - 0-30m
Oracle: once_lr_0.006 - 0-30m
Oracle: once_nov4_rotation=+90, offset -1.6
Oracle: once_nov9_rotation=-90, offset -1.6
Naive: p40 to m2
Naive: p40_no_Aug to m2
Naive: once to m2
Naive: once_rotation_fixed to m2
Naive: once_lr_0.006 to m2
Naive: once_nov4 to m2
Naive: once_nov9_rotation=-90, offset -1.6 t...

Work Logs

- Nov 08 (Monday)
  - Investigate why the inverse performance (oracle vs naive) occurred: code, configuration, etc.
    - Trained function (no difference)
    - Configuration
      - Data processor
        - Xingxin:
          - Offset: [0, 0, -1.6]
          - Rotation: 1.5708
        - Yannis:
          - Offset: [0, 0, 0]
          - Rotation: -1.5708
- Nov 09 (Tuesday)
  - Trained once with “Offset: [0, 0, -1.6] & Rotation: -1.5708” (GPU 4,5,6)
    - Result: worse performance in oracle when having -90 degree
      - Discussing with group, +90 should be the correct one
  - Experiment on the effect of offset
  - Run p40 with resampling embedded

Work Logs

- Nov 10 (Wednesday)
  - Get project comparison software
  - Run ONCE with offset = 0, rotation = 90+

End of November 12th, Weekly Report

Presented by Yannis (Yiming) He 84189287