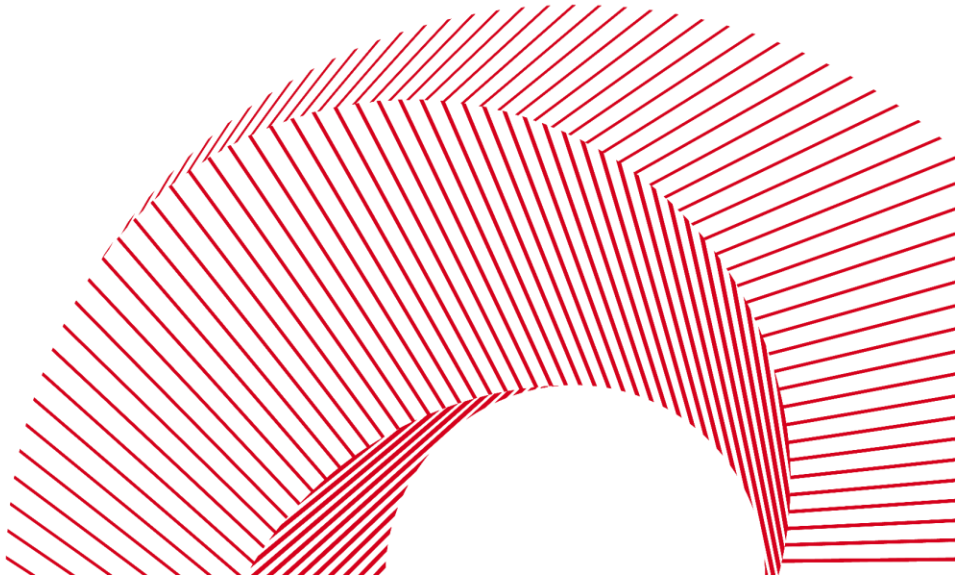
Overview-ML Ops & Active Learning

Dominik	Devcontainer Upgrade, Quantization analsis, Lane w/ Xunbo, Server GPU Driver upgrade, Code Reviews
Michał	Create MCM client, add Confluence page for MCM, fix issues with Kubernetes certificates, add new Workflow templates
Xunbo	Lane Detection dataset preparation, visualization, BFS-SSEG based model, investigate knowledge distillation
Maurice	TA recordings (MTCE & MTCA), EVM setup, coupler height estimation
Robin	Oracle Project Management kickoff, Vacation
Xianghe	One week vacation. Annotate Space Correction, refactor 3d viewer code.
Yichen Xie	Finish SAM update, annotation feature (local storage) improving
Jialei Li	Comparison between Colmap based on undistorted and fisheye images Adjustment of pipeline, test on fisheye
Majd	KP2D quat debugging, Experiments on KP2D loss

HYUNDAI MOBIS

Dominik

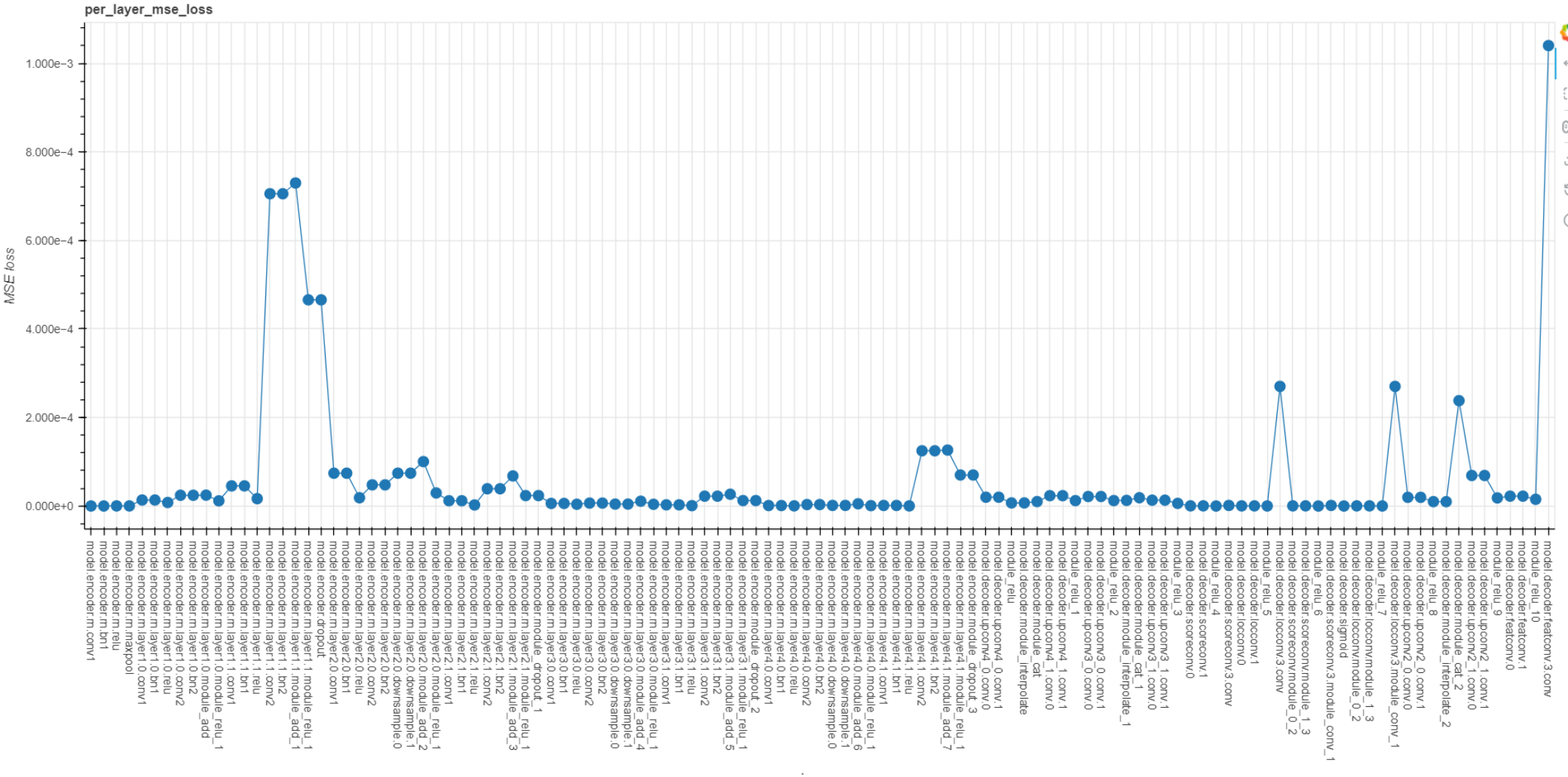


- Newer Pytorch base image, align pytorch version
- Dropping support for Conda (new python venv for olymp)
- Downgrade to python 3.11 (lacking compatibility for 3.12 with some packages)
- Support for the Qualcomm AI Model Efficiency Toolkit (AIMET)

Quantization Analysis

Qualcomm AI Model Efficiency Toolkit (AIMET) - quantization analysis tools for e.g.

- Layerwise activation, weight statistics
- Evaluation loss per layer quantization enabled / disabled
- MSE output error per layer quantization enabled / disabled



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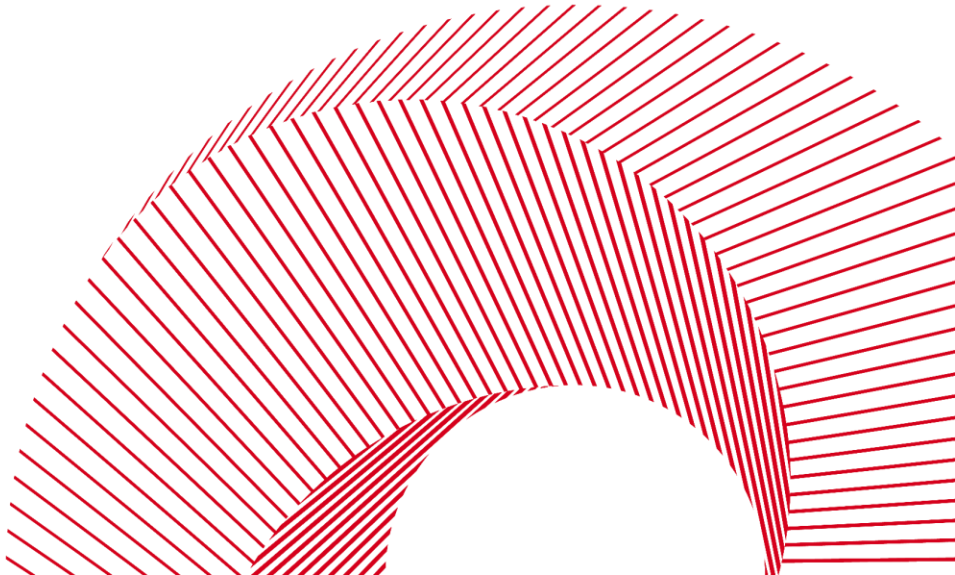
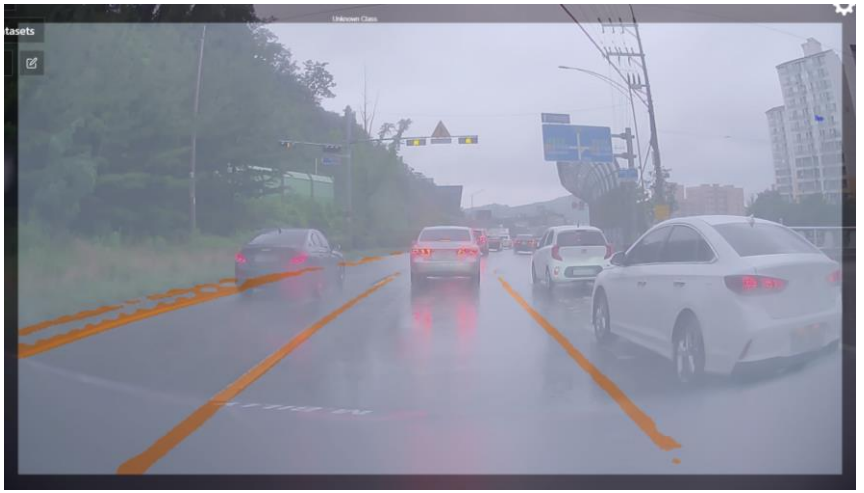
Xunbo



- Lane Detection
  - Infiniq dataset(from mtck) clean up, fix the issue
  - Visualization in Oracle v2
  - Draft the pipeline for training BFS sseg based model
  - Investigate state of the art LD method, with knowledge distillation



Annotation
Inference

- Others
  - Olymp code review
  - Support Jialei

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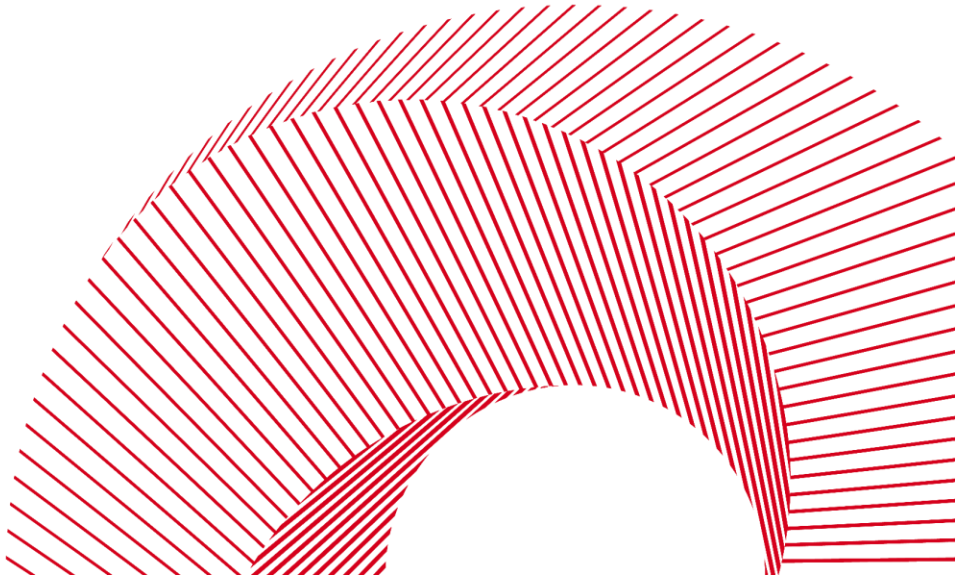
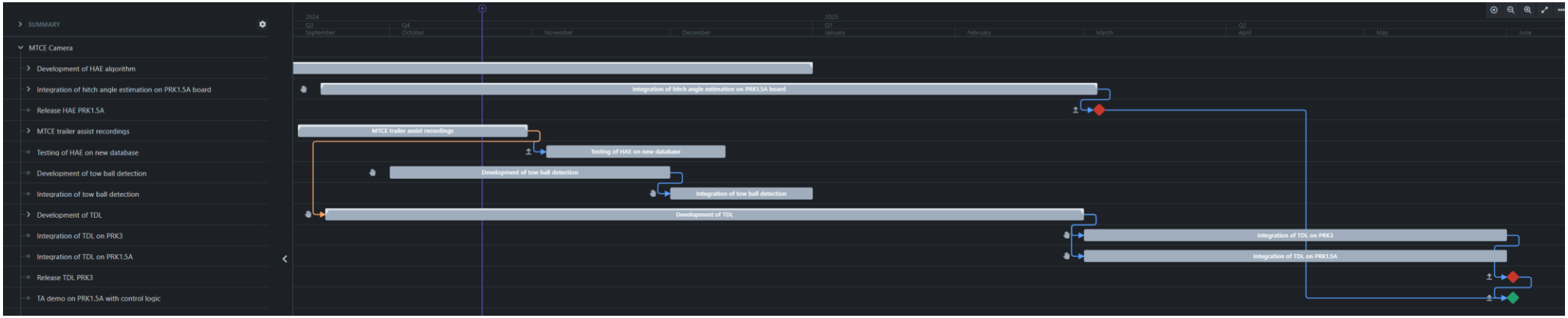
Maurice Georgi

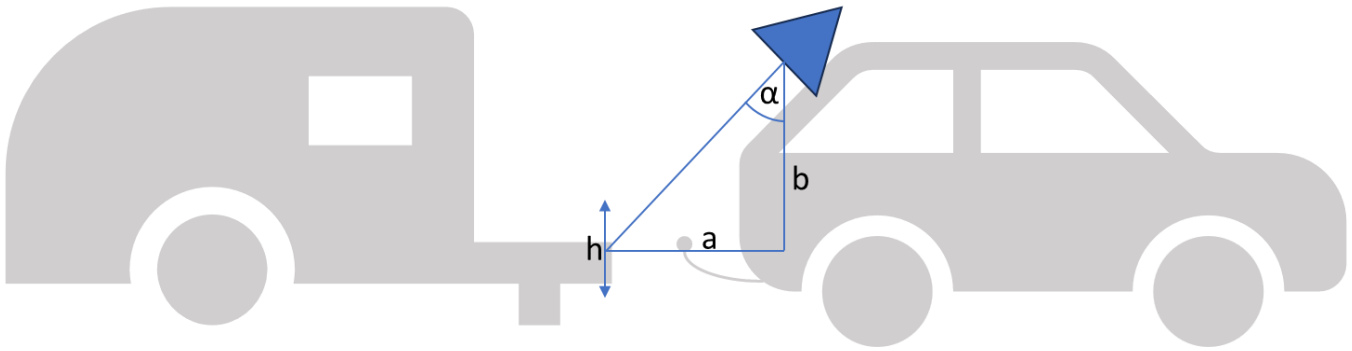
Trailer Assist



Overview

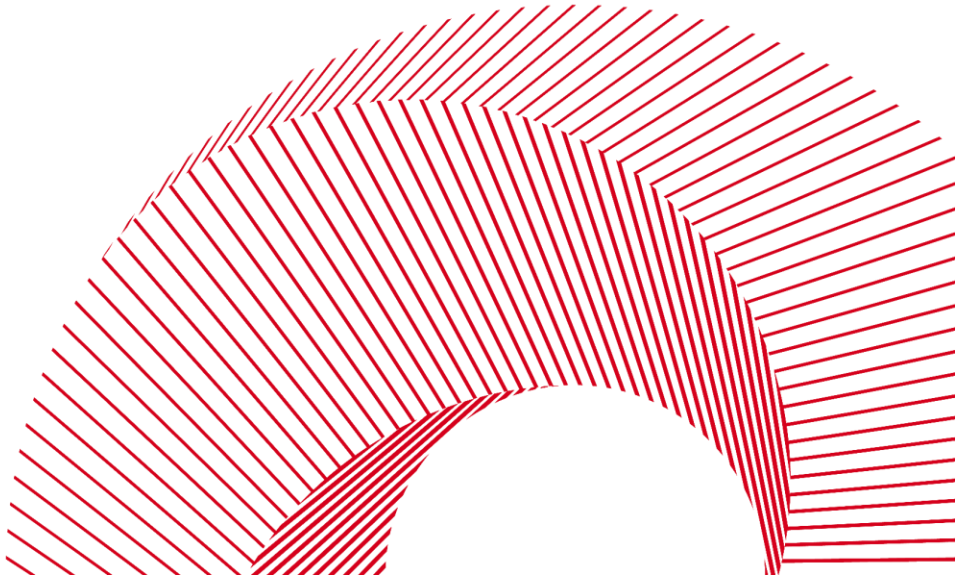

SUMMARY
MTCE Camera
Development of HAE algorithm
Integration of hitch angle estimation on PRK1.5A board
Release HAE PRK1.5A
MTCE trailer assist recordings
Testing of HAE on new database
Development of tow ball detection
Integration of tow ball detection
Development of TDL
Integration of TDL on PRK3
Integration of TDL on PRK1.5A
Release TDL PRK3
TA demo on PRK1.5A with control logic
2024
Q3
September
Q4
October
November
December
2025
Q1
January
February
March
Q2
April
May
June
Integration of hitch angle estimation on PRK1.5A board
MTCE trailer assist recordings
Testing of HAE on new database
Development of tow ball detection
Integration of tow ball detection
Development of TDL
Integration of TDL on PRK3
Integration of TDL on PRK1.5A

- Handover of MBilly2 to outsourcing company for recording trip
- Supporting MTCA with recording setup [WIP]
- Preliminary analysis of coupler height estimation and effect on position estimation
- Setup of TDAVE EVM
  - Flashed and connected to personal workstation ✓
  - Setting up camera repo with PSDK 9.1 for J721S2 [WIP]



HYUNDAI MOBIS

Majd Wardeh



1. Fix KP2D building branch and merge it to develop.

2. Tried to build a newer docker image to compile AIMET out of the box.
   - Dominik took over.

3. KP2D quantization debugging: Compared the output ranges (mean, std, min, max) of different layers in the network for multiple trainings and checkpoints.

4. Did multiple experiments with changes to the losses:
   - Experiments on Score loss: make the gradients approach zero when the network is trained.
   - Experiments on Loc Loss: favor in-cell estimations and remove gradients for out-of-reach points.
   - Experiments on Adding feature normalization loss to enforce unit length for the feature head.

5. Did experiments on the original KP2D repo: Train for longer epochs with/without weight decay.

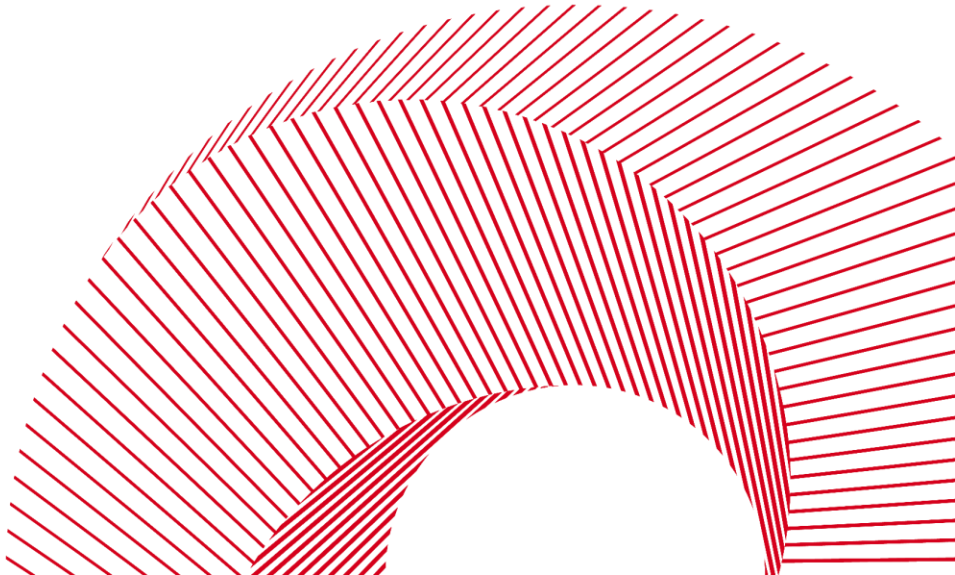
6. Checked the joint network branch done by Tobi.

7. Self-study: read R2D2, UnSuperPoint, DISK.

Others:
2 days out-of-office.

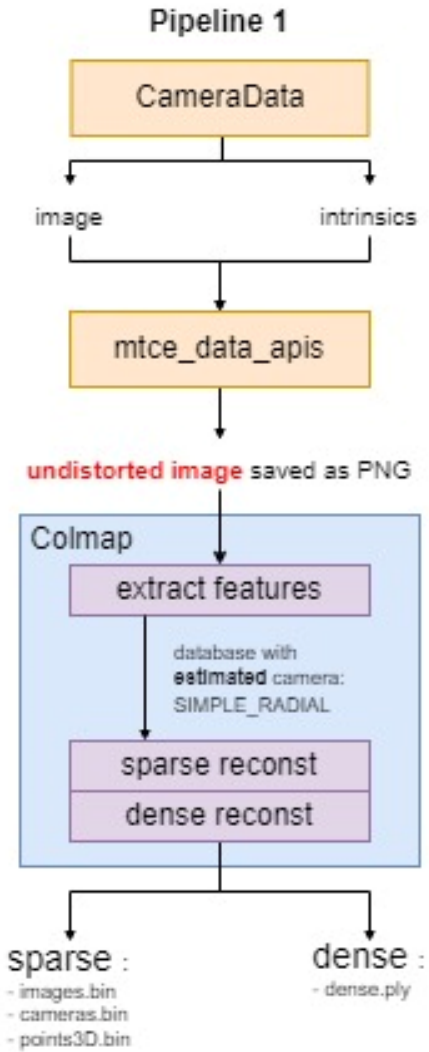
HYUNDAI MOBIS

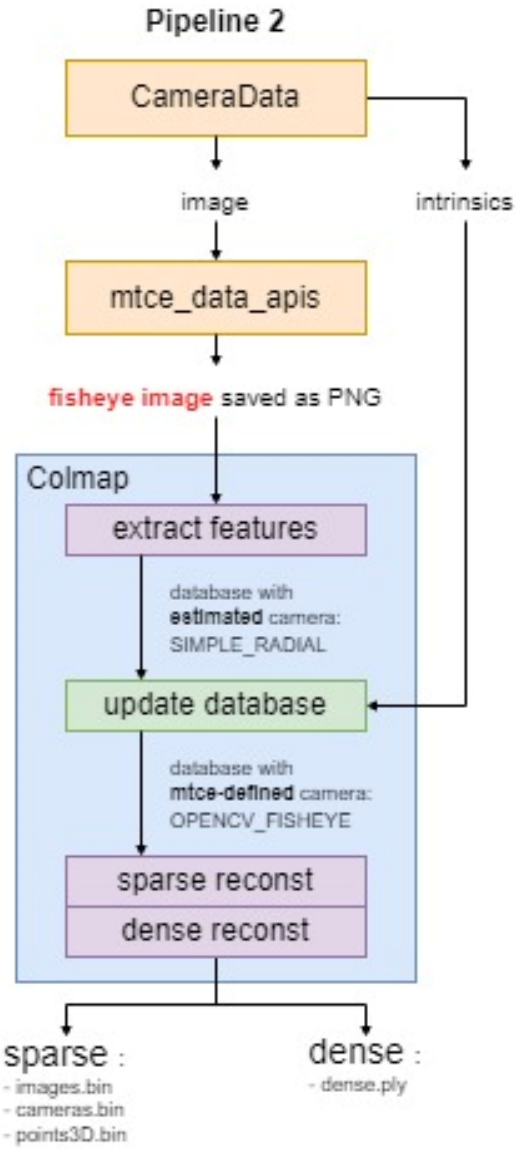
Jialei Li



Colmap: previous 2 pipelines for 3D reconstruction

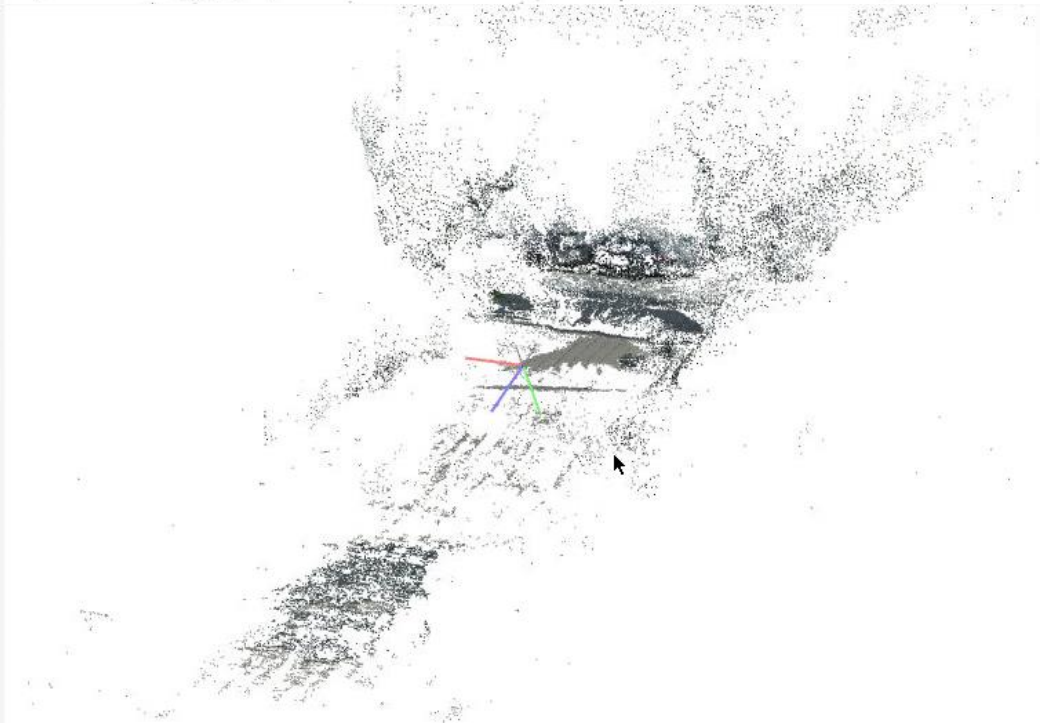
- Both pipelines get given i mages and camera intrinsi cs
- Pipeline 1 undistorts fishe ye images firstly, then Col map works on undistorted images with estimated ca mera model
- Pipeline 2 lets Colmap wo rk on original fisheye imag es, then update intrinsics and camera model into "fi sheye camera"





Colmap: dense result comparison

- Upper result:
  Pipeline1, working on undistorted input images, multi-view cameras
- Lower result:
  Pipeline2, working on fisheye input images, multi-view cameras



Adjustment of pipeline

- Previous pipelines have issues in database management
- Adjustments:
  - Pre-build database.db before extracting features, including load fisheye camera intrinsic paramters
  - Only create 1 camera model for all images from one single view instead of 1 camera model for each input image
  - For feature matching: try **sequential matching** instead of **exhaustive matching**

Adjustment of pipeline

- Both results:
  - after adjustment
  - fisheye camera
  - sequential matching
  - based 100 images in a row
  - rear view camera
- Upper result:
  - sparse reconstruction
  - red things: camera pose
- Lower result:
  - dense reconstruction
  - issues: only "the ground" reconstructed
  - next step: check stereo fusion choices