

Weekly Progress Report

July 5-9th, 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



- July 5 (Monday)
 - Paper reading: *Depth Completion from Sparse LiDAR Data with Depth-Normal Constraints* (done)
 - Paper reading: *TSIT: A Simple and Versatile Framework for Image-to-Image Translation* (TODO)
 - Discuss depth completion normal vector with Thomas, Try add 3D vectors as input into lcpss
 - Thomas's comment, the im_range's visualization has a wave shape, which doesn't seems right
 - Visualize proj_mask & raw_normal (TODO)
 - Meeting with Eduardo for cv2.inpaint delivery
 - Adding inpaint as an option for depth completion method
 - Visualize im_xyz, with inpaint on nusscenes
 - Visualize im_gt with inpaint
 - Compare the performance with current 3x3 method
 - For inpaint:
 - flag=TELEA
 - Radius = 3-5 (to be determined based on nusscenes's completion visualization)
 - Train model with completed depth on gx9 with gpu 0,1

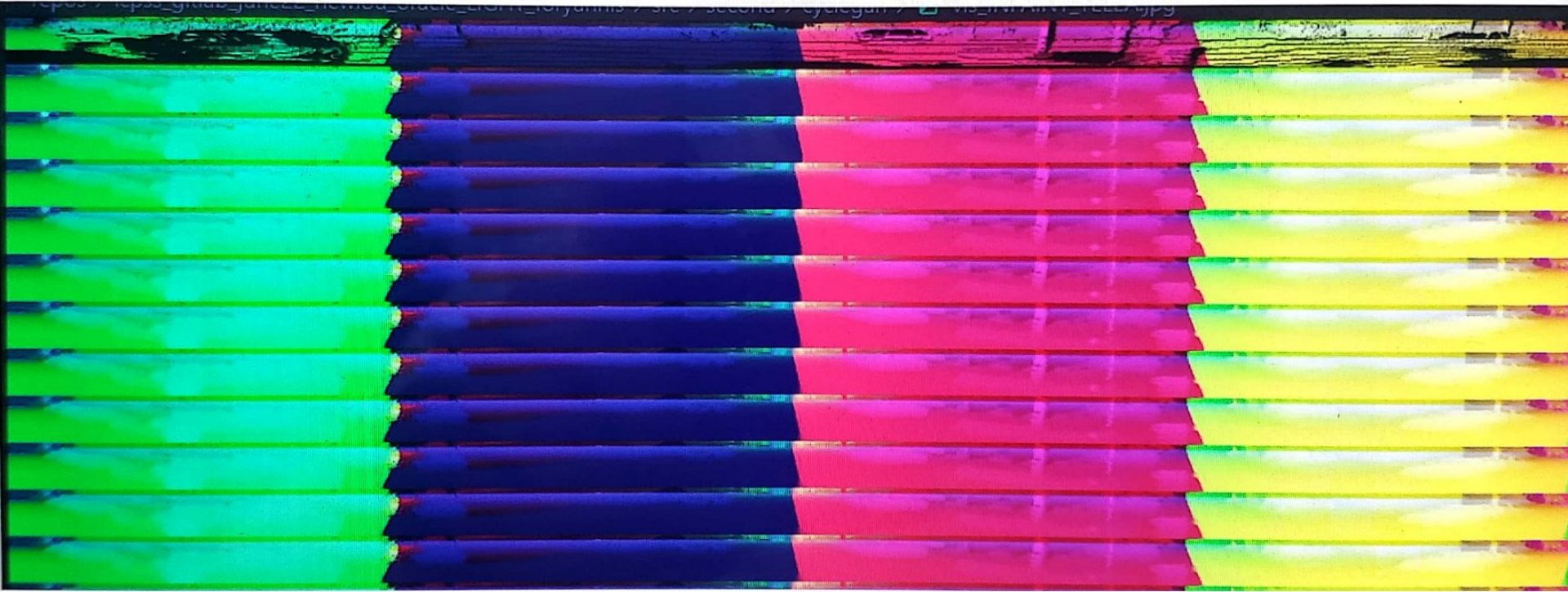
Depth completion on x,y,z coordinate using cv2.inpaint

- Flag = **INPAINT_NS**
- Radius: 0 - 11

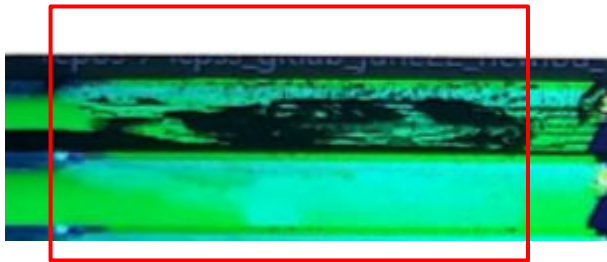


Depth completion on x,y,z coordinate using cv2.inpaint

- Flag = `INPAINT_TELEA`
- Radius: 0 - 11



Depth completion on x,y,z coordinate using cv2.inpaint - Discovery

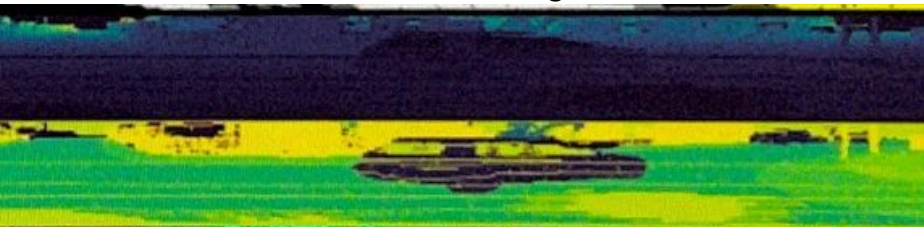


- If we are filling all holes, we could lose information such as windows.
 - We **are able** to select the region to fill and not fill by setting specific inpaint mask.
 - But how do we decide where to fill?

- July 6 (Tuesday)
 - Visualize proj_mask & raw_normal (done)
 - Found a bug in mask (solved)
 - Meeting with Thomas @ 2:30pm
 - Found a bug in the 3D normal generation (solved)
 - Clean up the code before sending to Eduardo (TODO)
 - Suggested his algorithm for im_gt instead of inpaint.
 - Adding inpaint as an option for depth completion method (in progress)
- July 7 (Wednesday)
 - Adding inpaint as an option for depth completion method
 - Visualize im_xyz, with inpaint on nuscnenes
 - Visualize im_gt with inpaint
 - Compare the performance with current 3x3 method
 - Find inpaint's mechanism (make sure its not interpolation for ground truth)
 - Find the ideal radius for inpaint
 - Radius = 3-5 (to be determined based on nuscnenes's completion visualization)
 - Train model with inpaint

- July 8 (Thursday)
 - Merge code base: light weight(for debug) → actually code base (for training)
 - Modify Thomas's network (for im_range) to work with ground_truth_label: im_gt
 - Visualize the result
 - Meet with Eduardo for next step
 - Fix the im_xyz visualization (currently have a channel shift, see below)
 - Further modify the hole filling pipeline to fill im_xyz, im_remission
 - Create cv.inpaint pipeline and compare performance
 - Request access for desktop for graphics interface for many visualization tasks
 - Waiting for Arash's Response

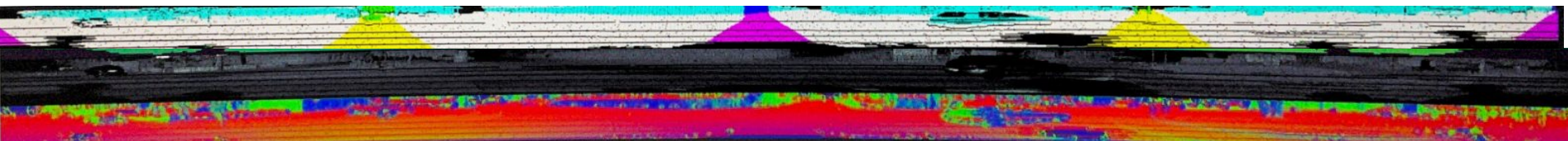
Before Filling



After Filling



Im_xyz, Remission & Surface Normal



- July 9 (Friday)
 - Fix the im_xyz visualization
 - Further modify the hole filling pipeline to fill im_xyz, im_remission
 - Create cv.inpaint pipeline and compare performance
 - Visualize the result for hole filling for the new modifications
 - Noah's Ark Lab Canada Forum @ 11am:
 - Generalizable Cross-graph embedding for GNN-based congestion prediction
 - Merge to a new code base (debugged by Eduardo)

End of July 9th, Weekly Report

Weekly Progress Report

July 12-16th, 2021

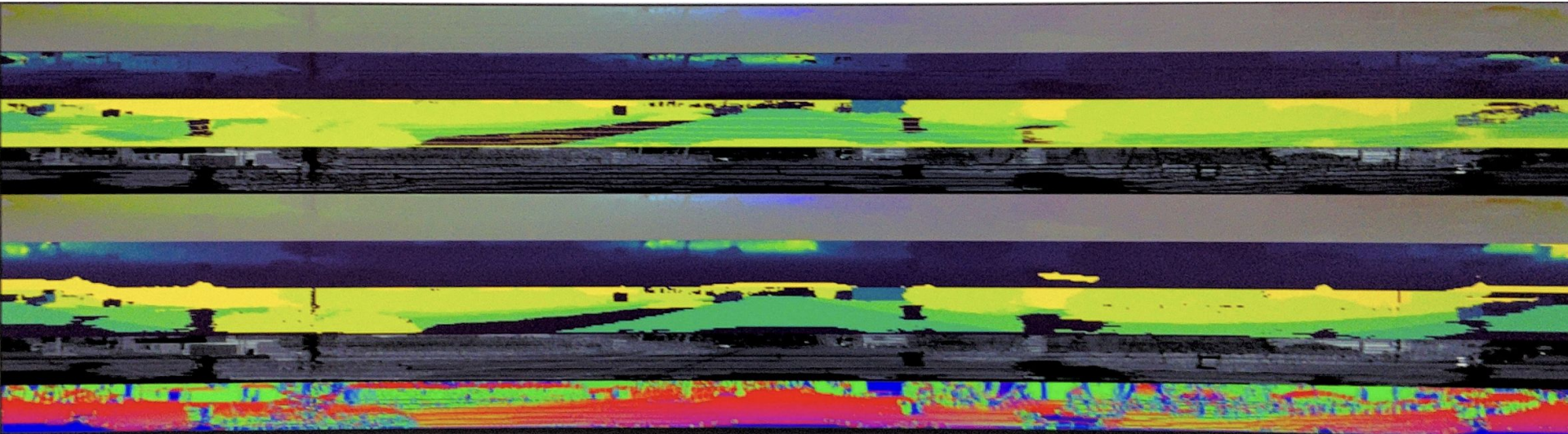
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- July 12 (Monday)
 - Further modify the hole filling pipeline to fill im_xyz, im_remission
 - Create cv.inpaint pipeline and compare performance
 - Visualize the result for hole filling for the new modifications
- July 13 (Tuesday)
 - Debug the hole filling pipeline: Issue with gpu 0, 1 on gx9
 - Milestone completed! deliver the code base to Eduardo



Holes Filling (Top: before vs Bottom: after)

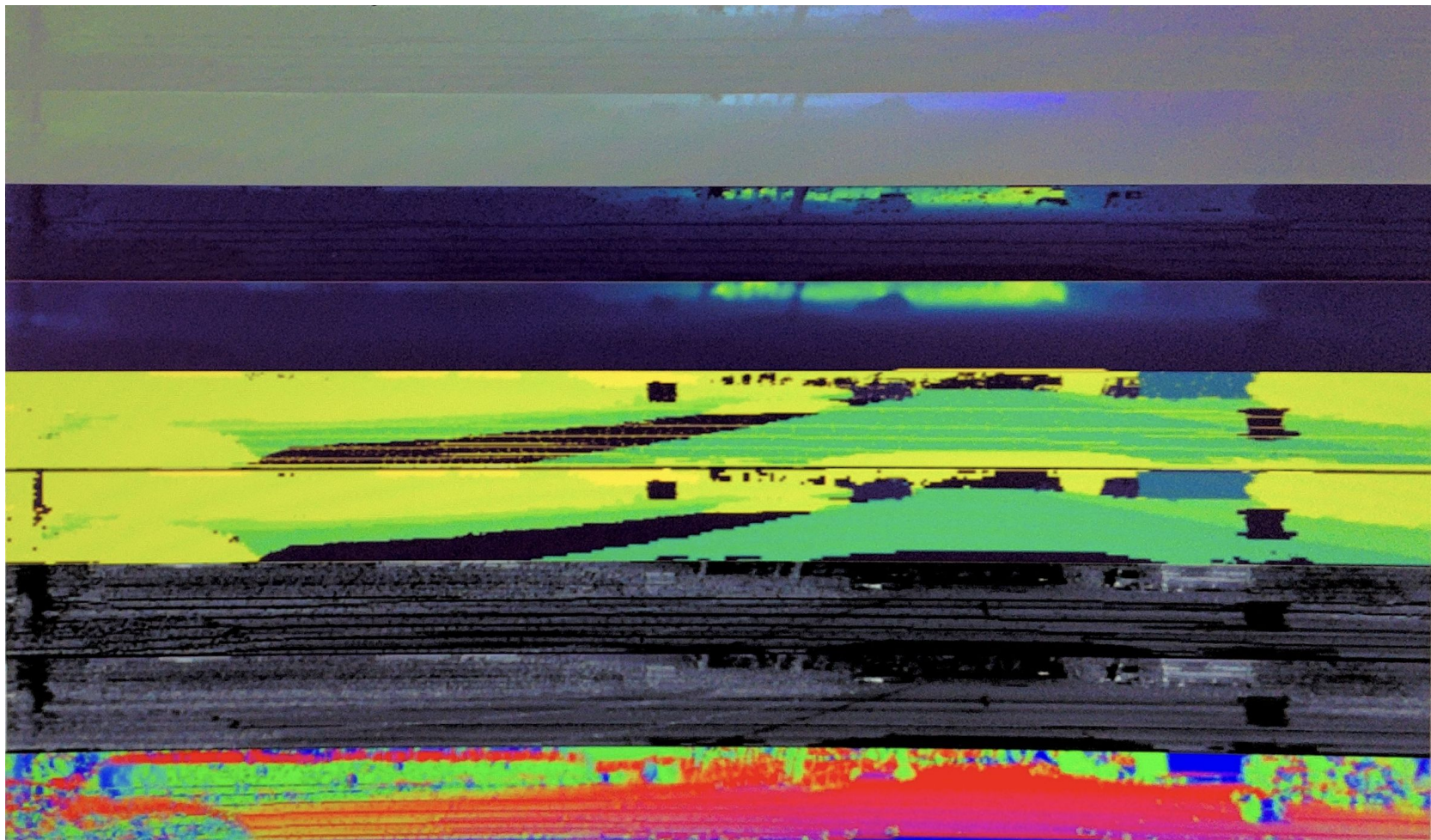
im_xyz

im_range

im_gt

im_remission

3D normal vector

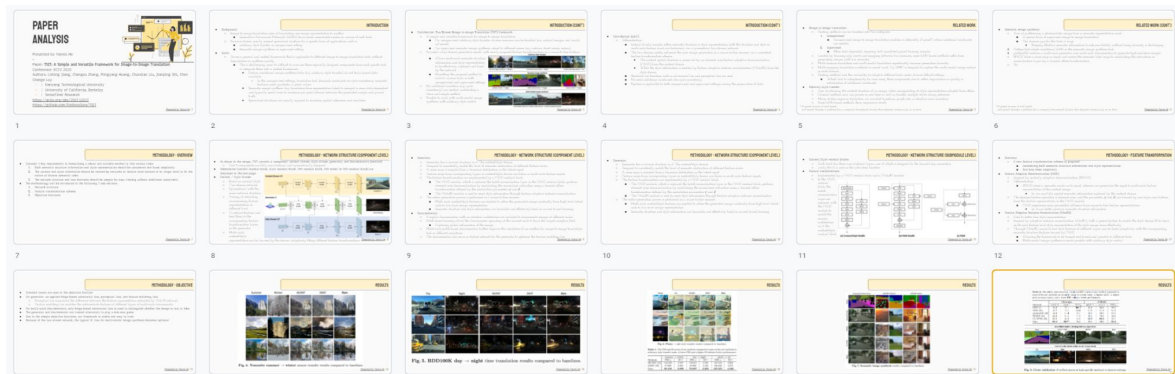


- July 14 (Wednesday)
 - Shift focus to TSIT
 - High level goal:
 1. Get TSIT to work on RGB images, reproduce numbers reported by paper & github repo
 2. Study code and decide if we
 - a. extract TSIT from that repo and integrate into our framework. So it consumes LiDAR data and sends its outputs to the semantic segmentation networks

OR

- b. Just add semantic segmentation network inside of TSIT

- Paper reading: *TSIT: A Simple and Versatile Framework for Image-to-Image Translation*
- Clone TSIT from github



- July 15 (Thursday)
 - Finished Paper analysis: *TSIT: A Simple and Versatile Framework for Image-to-Image Translation*
 - Replicate paper results on RGB images
 - Install required package to dockers
 - To replicate result of 3 RGB tasks in the repo:
 1. Arbitrary Style Transfer (AST): in progress
 2. Semantic image synthesis (SIS): used Cityscapes dataset (copying to gx9)
 3. Multi-modal image synthesis (MMIS): which needs BDD100K dataset (cannot download)
 - Tried to download pre-trained model (~~no access to Google drive, asked Bingbing, waiting for response~~) Asked Eduardo to download
 - Need GPU to train a TSIT model (~~all GPUs are currently occupied~~) training with gpu7
- July 16 (Friday)
 - Noah's Ark Lab Canada Forum @ 11am:
 - i. Knowledge distillation with noisy labels
 - Replicate paper results on RGB images (cont')
 - i. Tested the pre-trained model for AST (with visualization)
 - ii. Study the code
 - iii. Waiting for cityscapes dataset
 - Train a model
 - Test the pretrain model

End of July 16th, Weekly Report

Weekly Progress Report

July 19-23rd, 2021

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- July 19 (Monday)
 - Visualize TSIT results (AST, SIS)
 - Work on the ICRA report and re-style into Huawei Format
 - Request access to computer-15
- July 20 (Tuesday)
 - Copy checkpoints & datasets (cityscapes) from gx9 to computer-15
 - Finished re-styling the ICRA report into Huawei Format
 - Huawei iLearning: *Mission and Responsibilities of the Strategic Reserve Team of Smart Car Solutions*
 - Finished Unit 1 (3 in total)
- July 21 (Wed)
 - Received access to my desktop
 - Compare their pretrain vs the one I trained
 - Look into replacing lcpss with TSIT
- July 22 (Thursday)
 - Docker set up (different from gx9)
 - Waiting for no machine set up
 - Learning the code: how to visualize training progress
 - Look into the method to visualize it in the webpage
- July 23 (Friday)
 - Find out the connection point for the pipeline:
 - Look into input (checkout difference between dataloader of HYLDA and TSIT)
 - Look into output (how to connect TSIT to the SALSA)
 - Is there a paper session today?



End of July 23rd, Weekly Report