Computer Vision

3D Object Detection

Supervise by :

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● Introduction

This a documentation of my effort in the final project , we have done a lot of efforts to get the project done , final results submitted based on Stereo R-CNN based object detection .

● Team Members

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● All of my efforts

- First we have found two papers
  - Frustum convnet (F-ConvNet)
  - Point net
- Point net had a lot of image processing details , and It's not end to end deep learning so we didn't use it.
- Starting with F-ConvNet first problem I've found that the data doesn't fit directly in colab storage ,
- training data is sufficient at least until we finish the training process so :
  - I downloaded the images ,labels and calib
  - Remove the test set
  - Compress the train part
  - Saving it on the drive
  - The same process applied for lidar data
- Completely done the preprocessing part of data
  - This part problems were in importing the correct file in the correct cell
- Starting the training part
  - We have tried for a long time to make it work but we couldn't .

        - The problem was in some cuda files written in c++, I've tried to compile them in a lot of different ways like pycuda , setupTools and cmd but no output
    - I've got a suggestion from other team to start in complex yolo
    - I've started in that code copying from github and it worked directly ,just changed some paths
    - At the same time I was working on complex yolo Mostafa Sherief was working on Stereo R-CNN and manage to start the training , so we preferred to use the stereo.
    - I just run the training for 2 epochs and saved the weights
    - Each epoch takes almost 5.5 hours
    - I've summarized part of F-ConvNet with Moustafa sherief
    - I've prepared the presentation slide of F-ConvNet
    - I've added F-Convnet part and Complex Yolo in the group report .

● References

- Point Net: https://arxiv.org/pdf/1612.00593.pdf
- F-ConvNet https://arxiv.org/pdf/1903.01864.pdf
- Complex Yolo https://arxiv.org/pdf/1803.06199.pdf
- Stereo R-CNN based 3d object detection https://arxiv.org/pdf/1902.09738.pdf