Report and Results

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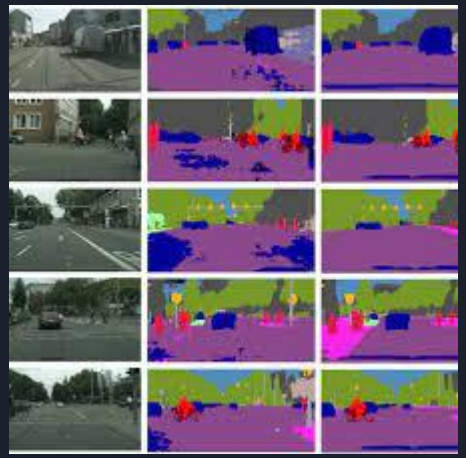
Content:

1. Introduction
2. Model Architecture
3. Purpose
4. Training Details
5. Results

Introduction:
Semantic Segmentation : (A type under image segmentation)

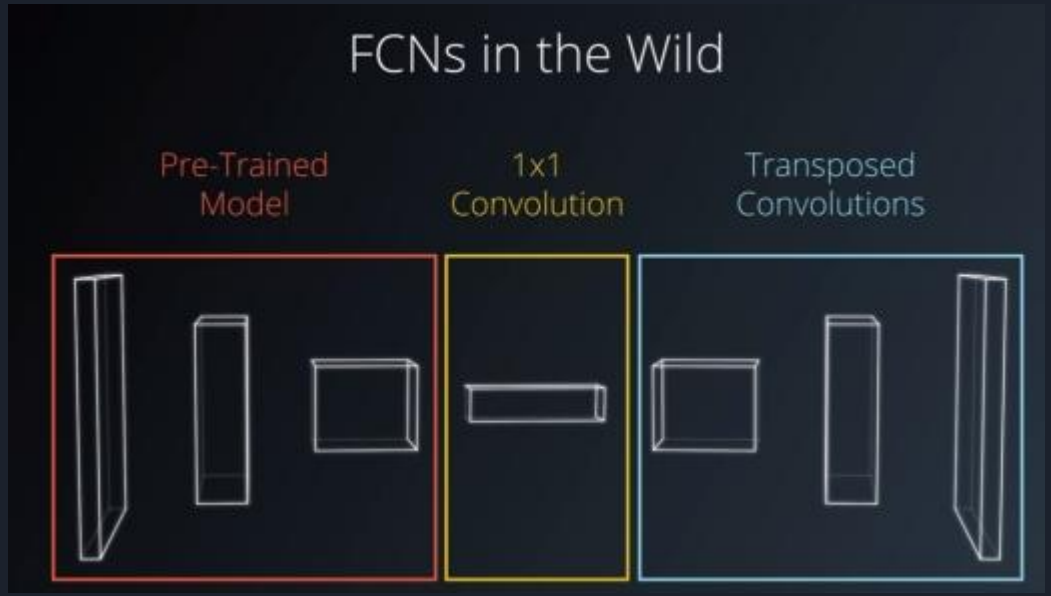
Semantic Segmentation is **the process of assigning a label to every pixel in the image**. This is in stark contrast to classification, where a single label is assigned to the entire picture. Semantic segmentation treats multiple objects of the same class as a single entity.



Model Architecture:

Here, I used the pretrained VGG-16 network as the Pre-Trained Model.

1X1 convolution in place of FCNs.



Purpose:

The main reason behind using VGG-16 as the pretrained model (which combines which 1X1 convolution to form encoder network) is that I have worked on projects related to Style Transfers and there I have witnessed that VGG-16 are good at extracting the features of an image and learn from them pretty smoothly. Also this paper confirms the use of VGG-16 is good in semantic segmentation related works - paper.

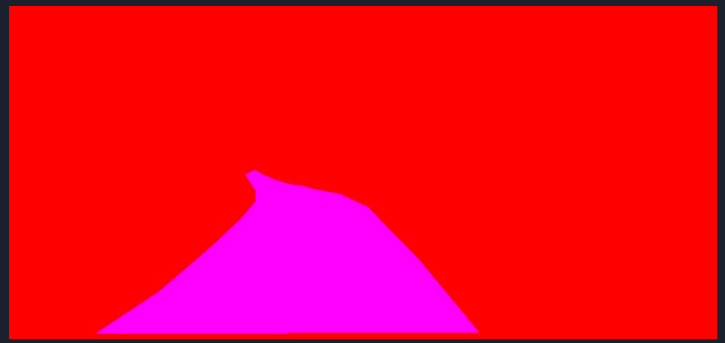
Datasets Used in experiment:

1. Kitti Dataset
2. Plain Road Dataset
3. Garden Dataset
4. Forest Dataset
5. Agro-field Dataset

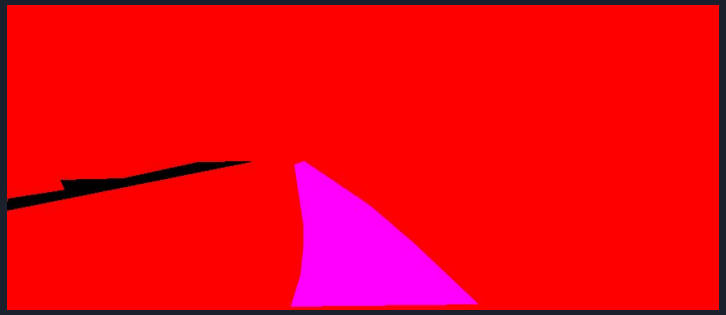
1. Kitti Dataset

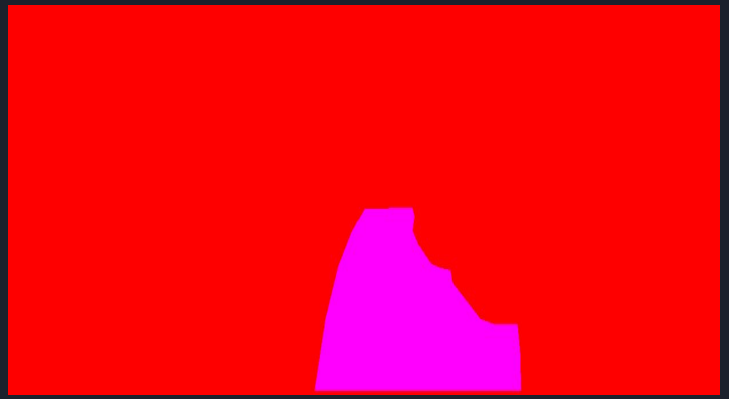
For this experiment I used the KITTI dataset whose link to download is : - link.

Some preview images are : Image and its mask.

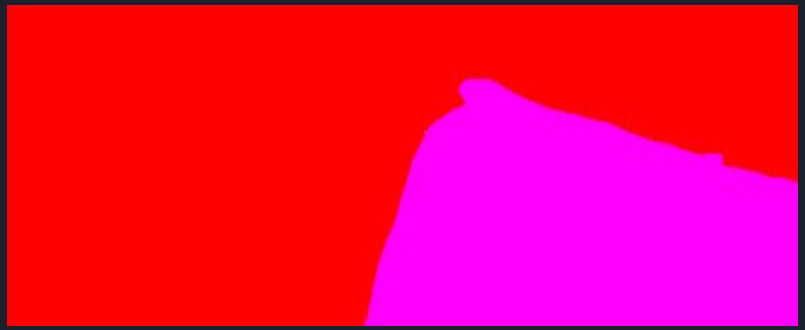


1. Kitti Dataset Continued: (image vs masks)

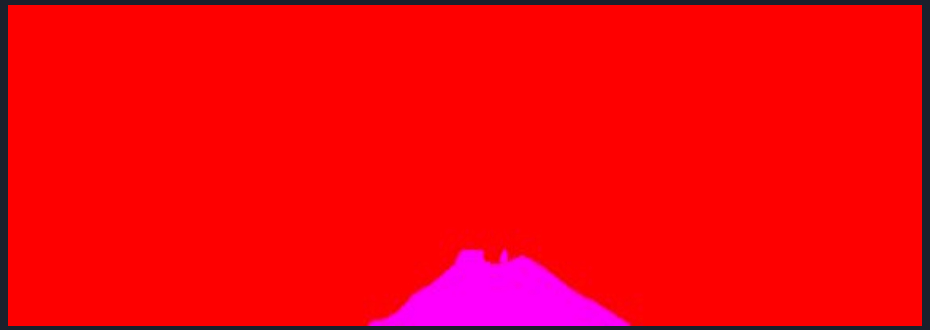


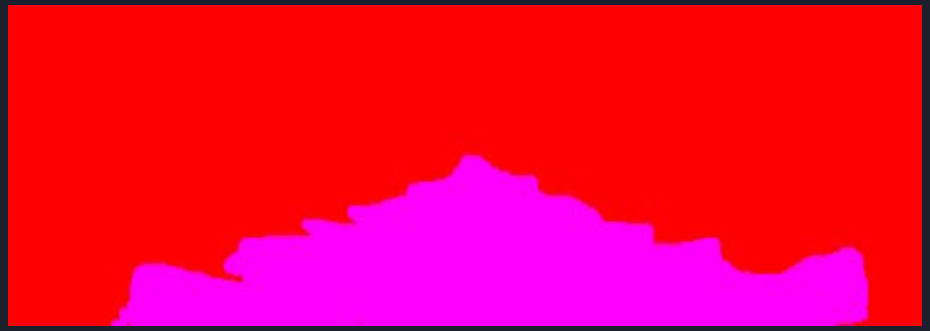


2 Plain Road Dataset.



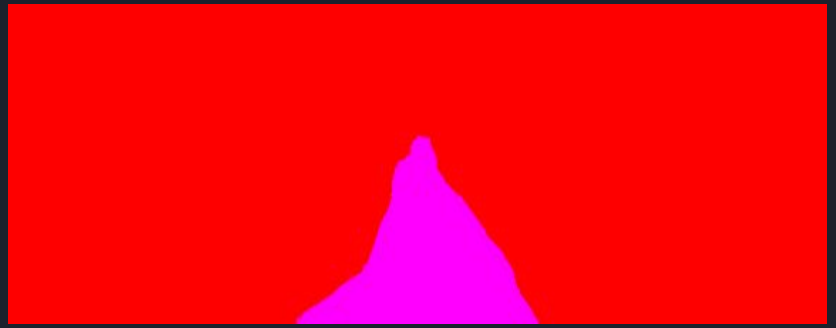
3. Garden Dataset

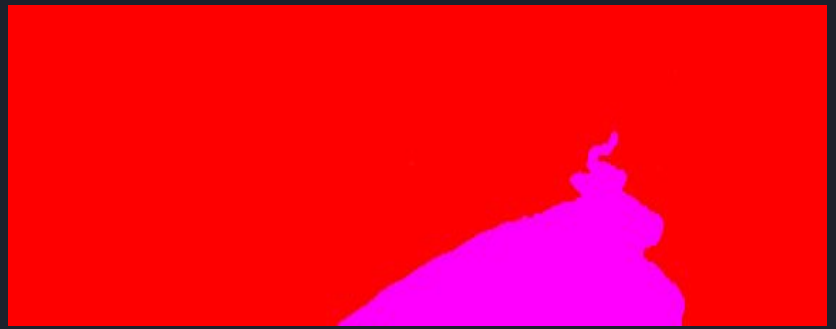




5. Agro field Dataset

4. Forest Dataset





Training Details:

Number of Epochs : 4

Batch Size : 8

Learning Rate : 0.001

Optimizer : Adam

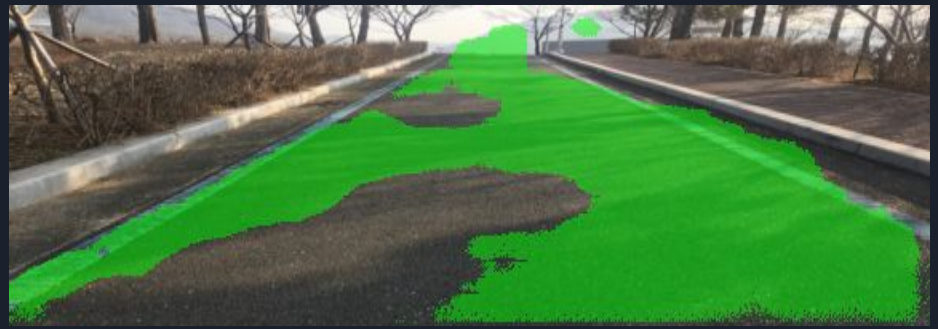
Random Initializer with Std. Deviation = 0.01

L2 regularization parameter = 0.0001

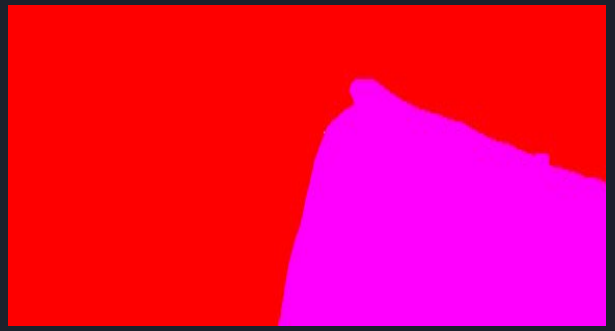
Training Logs :

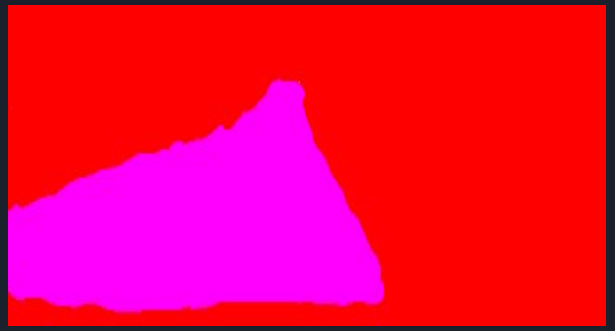
Number Of Epochs	Average Loss
10	0.240
20	0.141
30	0.119
40	0.075
50	0.071

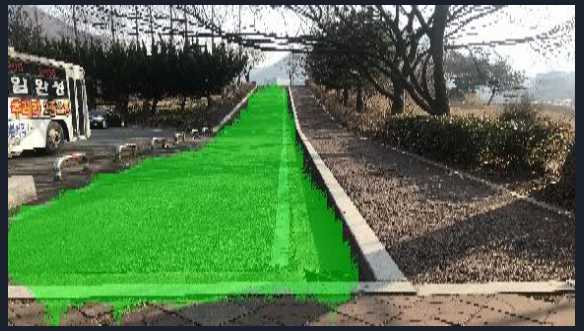
Results (older):



Final Results: (Plain Road)







IMAGE

MASKS

OUTPUT

Final Results: (Garden Dataset)

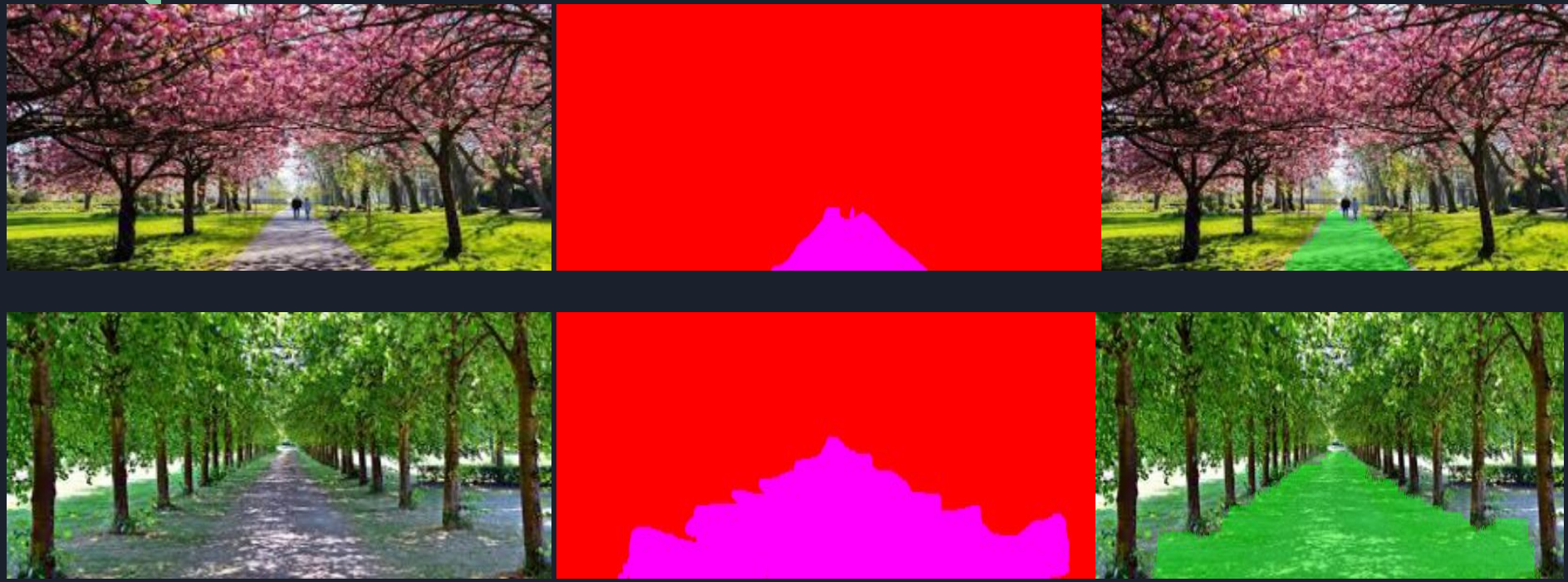


IMAGE MASKS OUTPUT

Final Results: (Agro field)






IMAGE MASKS OUTPUT

Final Results (Forest) :





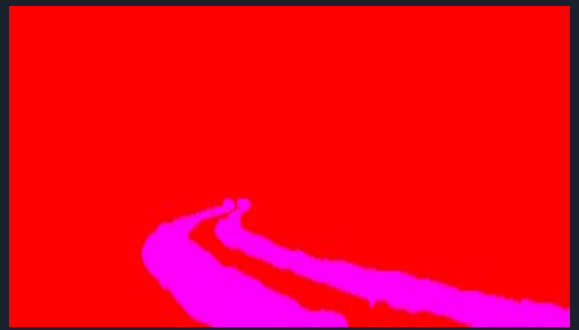
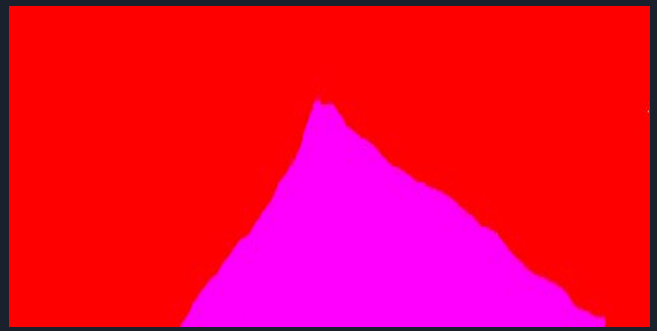



IMAGE MASKS OUTPUT

Some more Results:








IMAGE

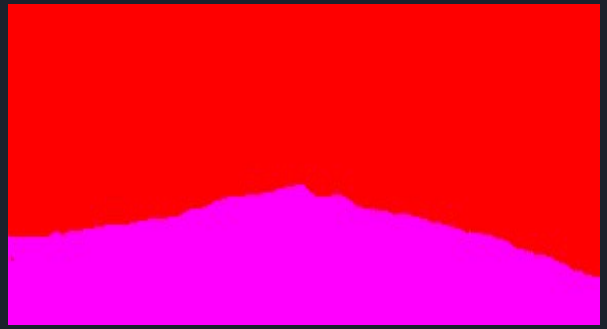
MASKS

OUTPUT

Some more results:





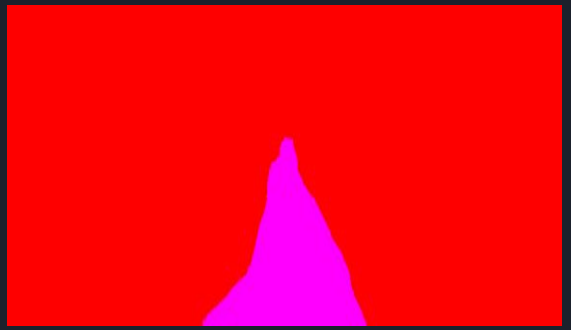


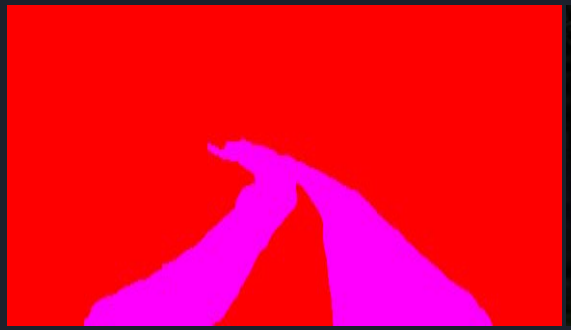

IMAGE

MASKS

OUTPUT

Some more results :


IMAGE

MASKS

OUTPUT

Thank You !