

# **ANALYSING FLOOD IMPACT: SEMANTIC SEGMENTATION OF IMAGERY WITH FLOODNET DATASET**

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# DATASET FLOODNET - 221

Total Images - 2000

Train - 1445

Test - 485

Annotations - Manual by  
rescue team

Classes - 10

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0 - Background

1- Building Flooded

2 - Building non-flooded

3- Road flooded

4 - road non-flooded

5 - Water

6 - Tree

7 - Vehicle

8 - Pool Grass

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# DATASET FLOODNET

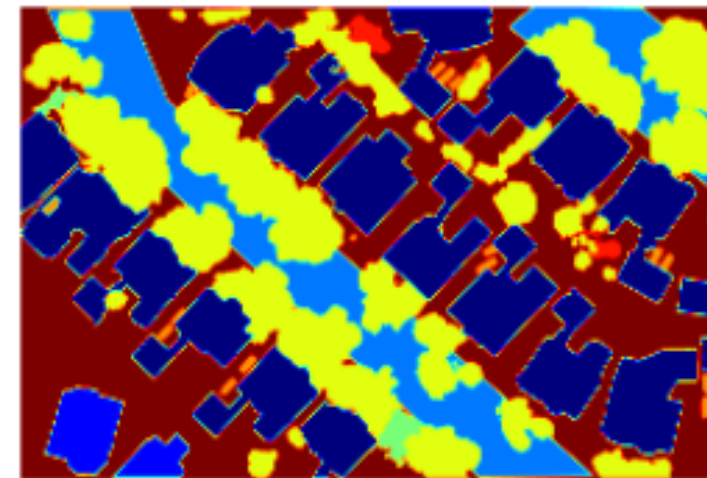
Image



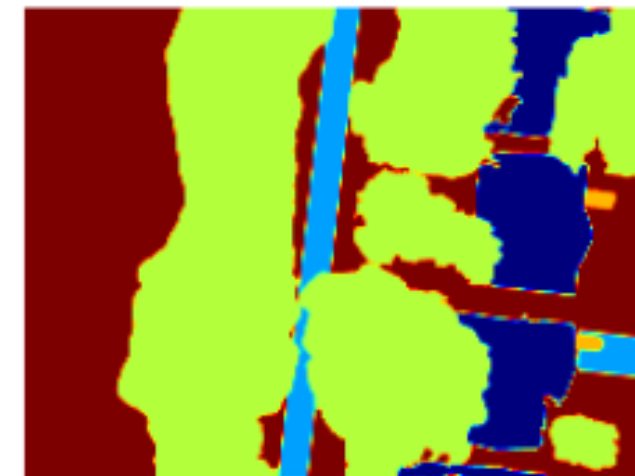
Image



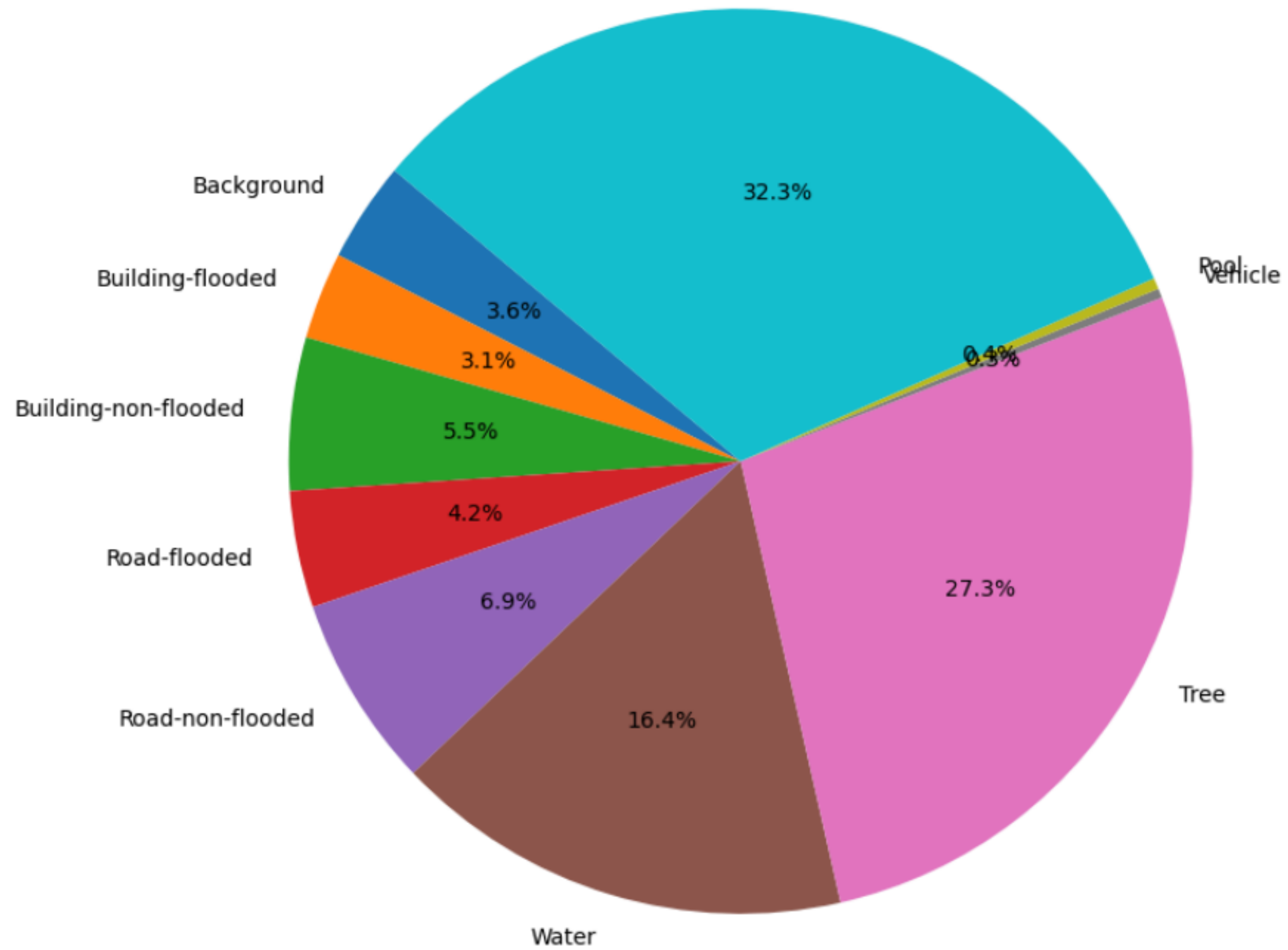
Mask

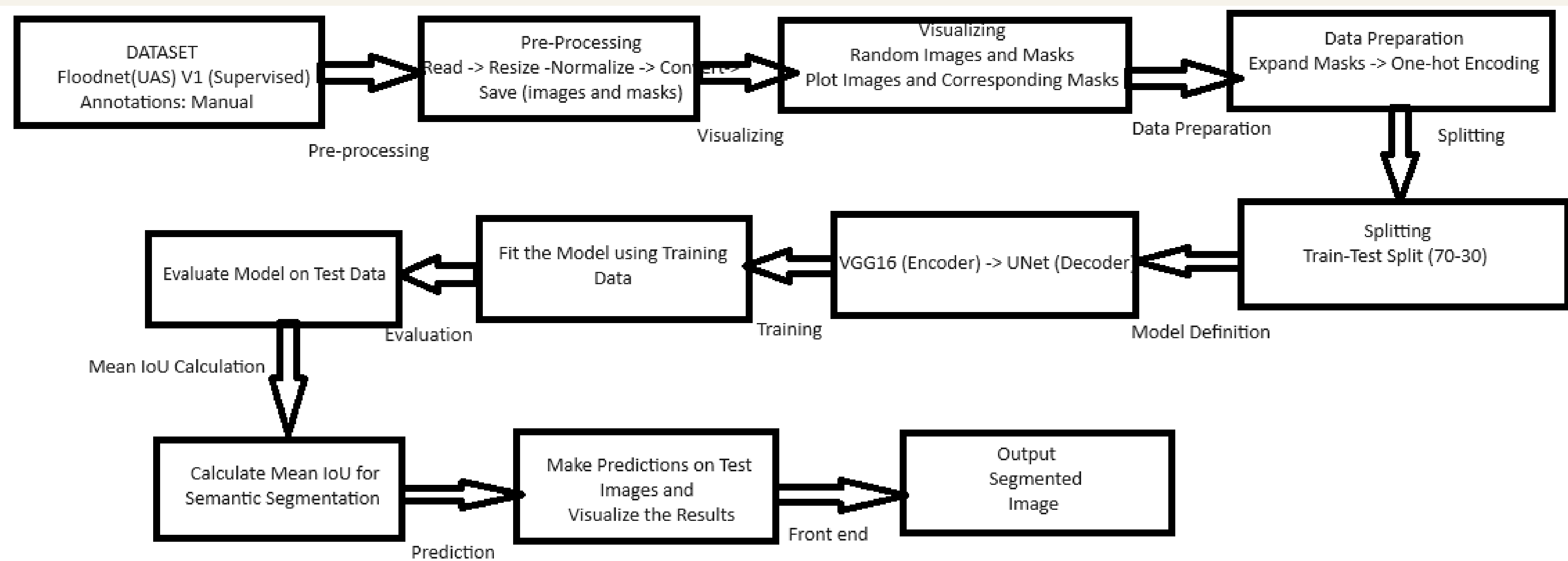


Mask



Label Distribution in Masks  
Grass

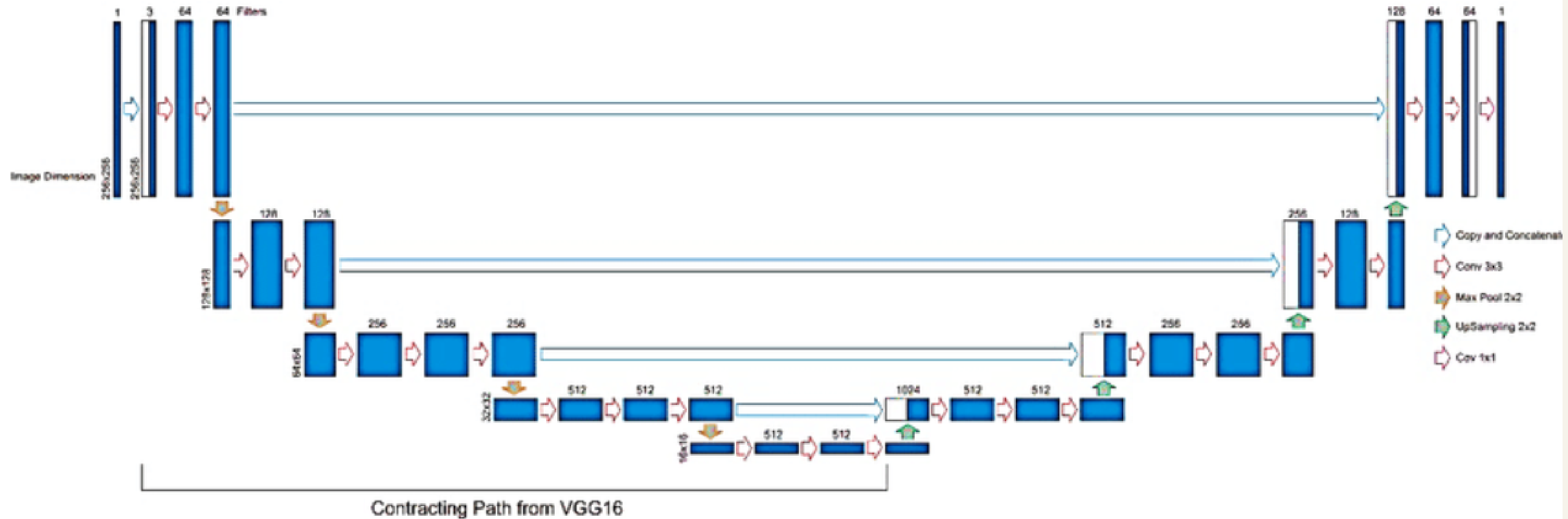




# PRE - PROCESSING

1. Read all the images
2. Resized to 256x256 (For VGG16)
3. Normalized the images
4. Saved in the form of numpy arrays
5. Conversion of masks into categorical
6. Used these arrays for further project

# ARCHITECTURE



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1. Encoder Layers (VGG16): 5 layers (from block1\_conv2 to block5\_conv3).
2. Decoder Layers: Multiple convolutional and transposed convolutional layers in the decoder:
  - Conv2D layers: 6 layers
  - Conv2DTranspose layers: 5 layers
  - Concatenation layers: 5 layers

Total decoder layers: 16 layers

3. Output Layer: 1 layer

Therefore in total, we have used approximately 22 layers in the U-Net architecture with the VGG16 backbone



# Hyper-parameter tuning

Loss = Categorical Entropy

Optimizer	Data Augmentation	Accuracy	Mean IOU
Adam	Yes	58.41	0.17
Adam	No	63.33	0.211
SGD	Yes	59.08	0.17
SGD	Yes	64.80	0.25
<b>RMS Prop</b>	<b>No</b>	<b>73.33</b>	<b>0.47</b>
RMS Prop	Yes	68.08	0.29

# Results

