# Team Ball
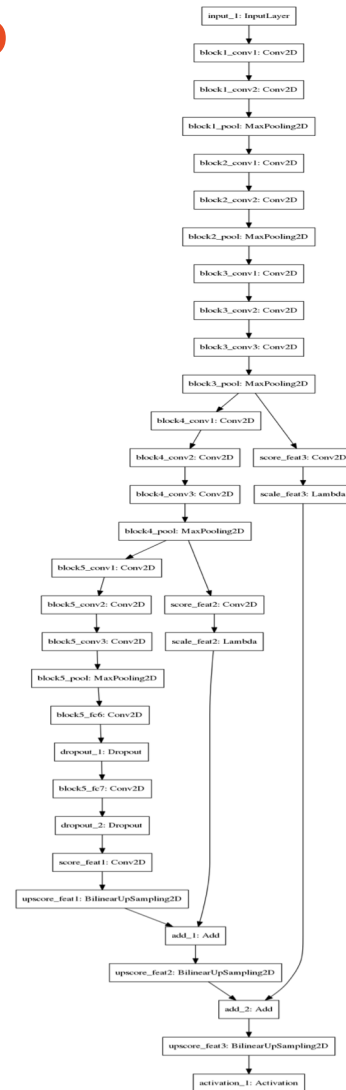
Neuron Finder Project

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# Pre-Processing
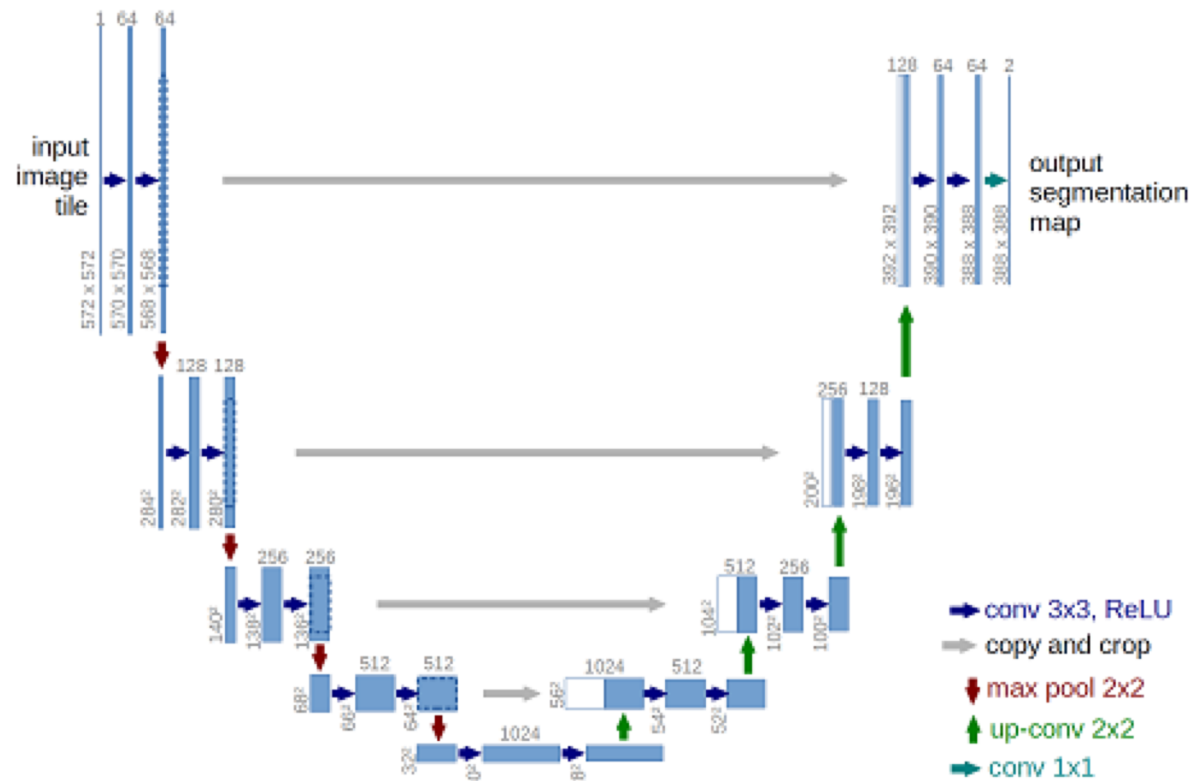
▶ We examined :

    ▶ Flattening each dataset to one image using summation

    ▶ Flattening each dataset to one image using normalized summation

    ▶ Flattening each dataset to one image using summation then applying smoothing

▶ Thus we had :

    ▶ Training and validation : 19 images with their ground truth ( Whattttt?!  )
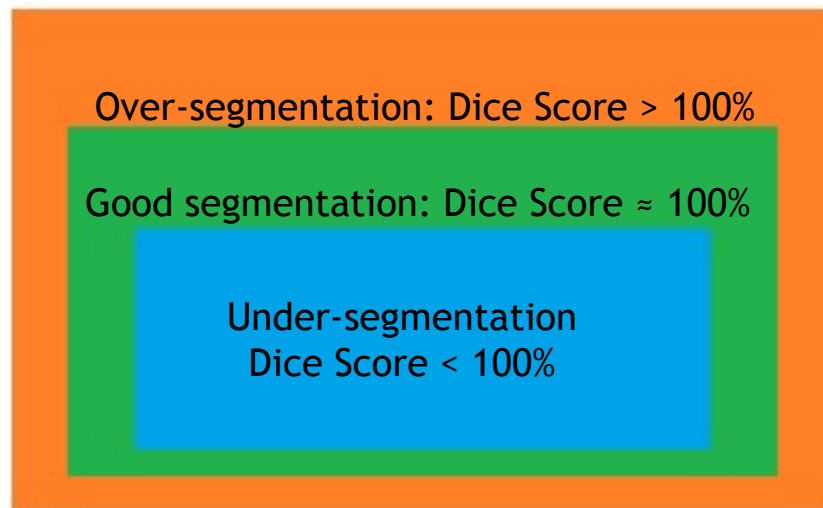
    ▶ Testing 9 provided samples

# FCN based on VGG-16



input_1: InputLayer

block1_conv1: Conv2D

block1_conv2: Conv2D

block1_pool: MaxPooling2D

block2_conv1: Conv2D

block2_conv2: Conv2D

block2_pool: MaxPooling2D

block3_conv1: Conv2D

block3_conv2: Conv2D

block3_conv3: Conv2D

block3_pool: MaxPooling2D

block4_conv1: Conv2D

block4_conv2: Conv2D          score_feat3: Conv2D

block4_conv3: Conv2D          scale_feat3: Lambda

block4_pool: MaxPooling2D

block5_conv1: Conv2D

block5_conv2: Conv2D          score_feat2: Conv2D

block5_conv3: Conv2D          scale_feat2: Lambda

block5_pool: MaxPooling2D

block5_fc6: Conv2D

dropout_1: Dropout

block5_fc7: Conv2D

dropout_2: Dropout

score_feat1: Conv2D

upscore_feat1: BilinearUpSampling2D

add_1: Add

upscore_feat2: BilinearUpSampling2D

add_2: Add

upscore_feat3: BilinearUpSampling2D

activation_1: Activation

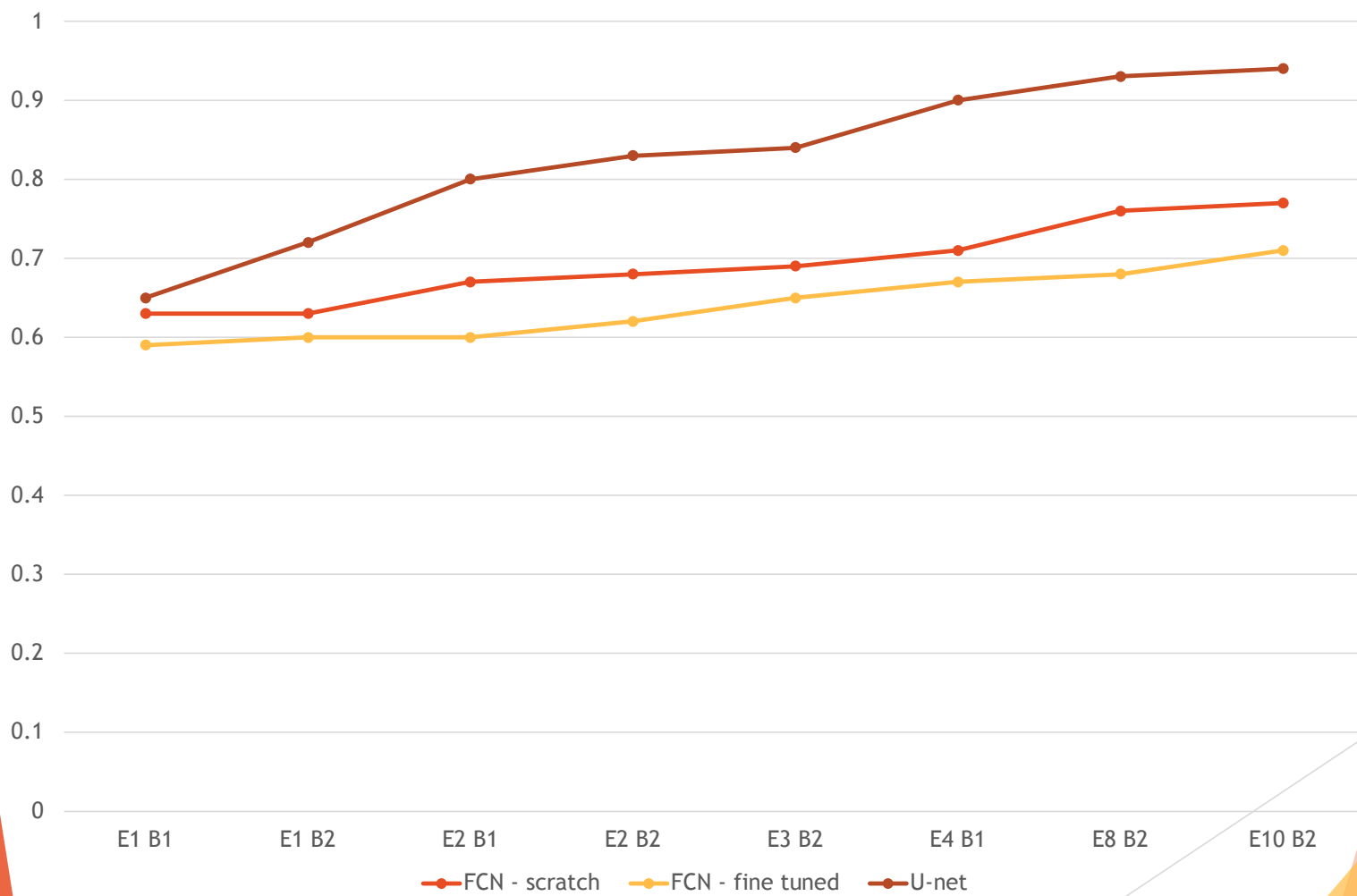https://github.com/JihongJu/keras-fcn

# U-Net



https://arxiv.org/pdf/1505.04597.pdf

# Evaluation Measure

▶ **Dice Score(%):** Measuring the degree of overlap among ground truth area and algorithmic result area

Over-segmentation: Dice Score > 100%

Good segmentation: Dice Score ≈ 100%

Under-segmentation
Dice Score < 100%

Improvement Trend

FCN - scratch   FCN - fine tuned   U-net

# Best Results

*Classifier Results :*

| Method | Accuracy |
|---|---|
| FCN – Trained from scratch | 0.77 |
| FCN – Fine tuned | 0.76 |
| U-Net | 0.94 |
| NMF | ☹ |

*AutoLab Results :*

| Score | Value | Rank |
|---|---|---|
| Total Score | 3.03533 | #4 |
| Average Precision | 0.80668 | #-2 |
| Average Recall | 0.76954 | ok |
| Average Inclusion | 0.66662 | #2 |
| Average Exclusion | 0.76954 | #2 |