Project Proposal - ISE 244 - Sathwik Edupuganti

Link for the Paper: https://arxiv.org/pdf/1505.04597.pdf

1. What is the problem the selected article is trying to solve and why is it important to study that problem?

Ans: There is a consensus that successful training of a deep network requires thousands of training samples, in this paper a network and a training strategy are presented to optimize the usage of the existing training samples more efficiently.

So, in this project, I would like to implement what the authors have done and I would like to extend it with another dataset such as retina images to see if it works in similar proficiency.

2. What is novel in this paper compared to what came before it?

Ans: In comparison to the papers published previously or the techniques used earlier, the training strategy in this paper makes use of strong data augmentation to teach the network to achieve the desired invariance and robustness properties when only a few training samples are available.

3. What has been the impact and/ or limits in the scope of the application of the approach proposed in the selected article?

Ans: U-Net is one of the fully convolutional neural networks widely used in medical image segmentation. However, U-Net is limited in extracting some of the complex features that could help image segmentation in medical images.

4. A few lines on what are the broader implications of the work?

Ans: The UNET was developed by Olaf Ronneberger et al. for Biomedical Image Segmentation. The architecture contains two paths. The first path is the contraction path (also called the encoder) which is used to capture the context of the image. The encoder is just a traditional stack of convolutional and max-pooling layers. The second path is the symmetric expanding path (also called the decoder) which is used to enable precise localization using transposed convolutions. Thus it is an end-to-end fully convolutional network (FCN), i.e. it only contains Convolutional layers and does not contain any Dense layer because of which it can accept images of any size. U-net's data augmentation using elastic deformations results in a very good performance in a variety of biomedical segmentation applications. Due to the small number of annotated images needed and the fast training time, only 10 hours are required for training.