Deep Learning CS-671

Initial Hackathon Document

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Problem Statement

Optimizing Image Segmentation using Flood Filling Networks[1]. Flood filling networks have been developed to segment objects over n number of iterations. FFN[1] start with one pixel and keep on iterating till a final segmentation is produced. What we propose is that using a simple traditional neural –net to first produce a mask and then this mask be fed to the FFN[1].

This has the following benefits:

1. The FFN[1] doesn't have to start with one-pixel as a mask input.
2. The traditional neural net need not be a complex neural net.
3. Our implementation of FFN[1] can be used to increase accuracy of underperforming segmentation models.

Dataset

We are using iris dataset, this was acquired during CS671 Assignment 3, we will also try to get data online. We were also able to receive some more data from our TA Mr. Ranjith.

Tentative Procedure

- Firstly, a traditional model(say NN1) would work upon the input and perform image segmentation up to a certain degree of accuracy.
- A flood-filling network[1] (say NN2) is given "a RGB input image and its respective mask produced by our traditional model" input (in the form of three-dimensional sub volume of data), and it processes it to produce an object mask probability map. The inputted sub volume is comprised of two channels, one to indicate the raw image intensity, and the other providing the local state of the object mask in the form of a probability map.
- To try out different iteration we will be feeding the output mask back into NN2 for better learning of the model.

Final Deliverable

- A model architecture that can be used in the following tasks:
  - Increasing accuracy of an underperforming model.
  - A FFN architecture that doesn't start iterating from a single pixel.

[1] To understand the working of FFN kindly read this paper:
https://arxiv.org/pdf/1611.00421.pdf