**Term Project Proposal**

**Finding Nuclei in Divergent Images**

**( 2018 Data Science Bowl )**

**Problem Statement:**

The human body is composed of trillions of cell and each cell contains nucleus. Each nucleus contain DNAs which are the genetic code that program each cell. Researchers develop the treatment of a number of diseases by understanding the biological process of how a cell reacts to a particular treatment. One of a challenge in this process is to identify each individual cell in a sample which is usually done by identifying nuclei.

Our aim is to detect these nuclei from a given sample images by creating a model that would take an image as an input and will spit out the regions where nuclei are spotted.

We will test our model and validate our results by competing the “2018 Data Science bowl” [1] kaggle challenge.

**Dataset:**

The dataset that we will be using for this project is from the Kaggle challenge, “2018 Data Science Bowl” [2]. This dataset consists of a training and testing dataset, the training dataset contains a large number of segmented nuclei of different cell type, magnification and imaging modality. Each image in training data is associated with an imageID and contains a corrosponding mask dataset which contains multiple masks for each nucleus in the image.

The testing dataset consists on unseend images which has to be tested with our model and create the corrosponding mask to identify the regions

**Our Approach:**

Currently we plan to try two approaches which we have tried in our previous projects.

1) NMF to identify the region coordinates of the nuclei.

2) Unet to segment the input image to predict the corrosponding mask.

We will first test these two approaches and if we do not get desired results we will try other deep learning segmentation models like tiramisu or some other image processing techniques.

**Team:**

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**References:**

**[1]** Kaggle “2018 Data Science Bowl” Challenge, <https://www.kaggle.com/c/data-science-bowl-2018>

**[2]** Kaggle Dataset, <https://www.kaggle.com/c/data-science-bowl-2018/data>