Capstone Project Report

Executive Summary

**I want to apply and test the ability of state-of-art techniques connecting text with image, zero-shot classification models, to predict or annotate unlabeled medical images, MedMNIST dataset which is a benchmark dataset used to test new algorithms or new methods. The general ImageNet zero-shot models can annotate the high-level labels, like chest or breast, with a high accuracy on this medical benchmark dataset. However, it performs poorly on granular-level labels like malignant, normal, benign and so on. We then train some traditional CNN models on one of dataset by using labels annotated by zero-shot model and fine-tune it to have the best accuracy on its test dataset.**

Introduction/background

**Because there are millions of unlabeled medical images generated in hospitals waiting for annotations before they can be downstream analyzed, but manually labeling them is too time consuming. Also, sometimes, the labels or classes that we want to predict are not in the all pretrained models or some of them are not. At this time, we come across zero-shot, one-shot or few-shot transfer learning.**

Data

**MedMNIST v2: A large-scale**

Methodology

Results

Conclusion/Next Steps

**There are some pretrained medical image deep learning models, like in the monai, medical open network for artificial Integillence which provides domain-optimized foundational capabilities for developing healthcare imaging training workflows in native PyTorch language. In the future, I may plan to embed them into current zero-shot, N-shot transfer learning architecture then apply them into MedMNIST image dataset because current N-shot learning is trained on ImgaeNet which is far off medical fields.**

**Once the open AI releases their codes which are used to trained the their zero-shot classification model, I plan to use those codes to train on all medical dataset, like all MedMNIST benchmark dataset and fine-tune it. Then I can have a medical domain adaptation zero-shot models. Then I test and apply them to some other medical dataset to annotate them and evaluate the results. In this case, the results should be much better than the general ImageNet -based zero-shot’s performance.**