

Deep Learning Final Project Proposal - Team 3

Topic: Image Segmentation - automatically segment stomach and intestines on MRI scans

Problem Selection: Biomedical image segmentation is a crucial task in medical research, aiding in various applications such as disease diagnosis and drug discovery. Segmenting neuronal structures can contribute to understanding brain functions and neurological disorders.

Dataset: The dataset we used is [UW-Madison GI Tract Image Segmentation](#) with size 2.49GB.

Deep Network: We will use convolutional neural network (CNN) and U-Net as our network (standard form). U-Net is a type of (CNN) that was designed for biomedical image segmentation. We will compare the results of these two models.

Framework: PyTorch would be suitable frameworks for implementing the CNN and U-Net architecture due to its popularity, extensive documentation, and strong support for deep learning operations.

Reference Materials: The original paper - [U-Net paper by Ronneberger et al. \(2015\)](#) for a detailed understanding of the architecture and its applications in biomedical image segmentation. The github notebook - [Biomedical Image Segmentation with U-Net](#)

Performance Evaluation: Metrics like Intersection over Union (IoU), and Dice coefficient will be considered when we train our model. They are common metrics for evaluating the performance of biomedical image segmentation models.

Project Schedule:

Week 1: Data collection and preprocessing, including data augmentation if necessary.

Week 2: Implementat initial CNN and U-Net architecture, and training the model

Week 3: Continue working on model like fine-tuning hyperparameters and start Streamlit demo

Week 4: Write the final report and prepare for the presentation