Project Title: Brain Decoding usign FMRI data and Graph Neural Netwroks

Outline

Problem Definition

Datasets, Tools

Deliverables

Prior Works and Problem Definition

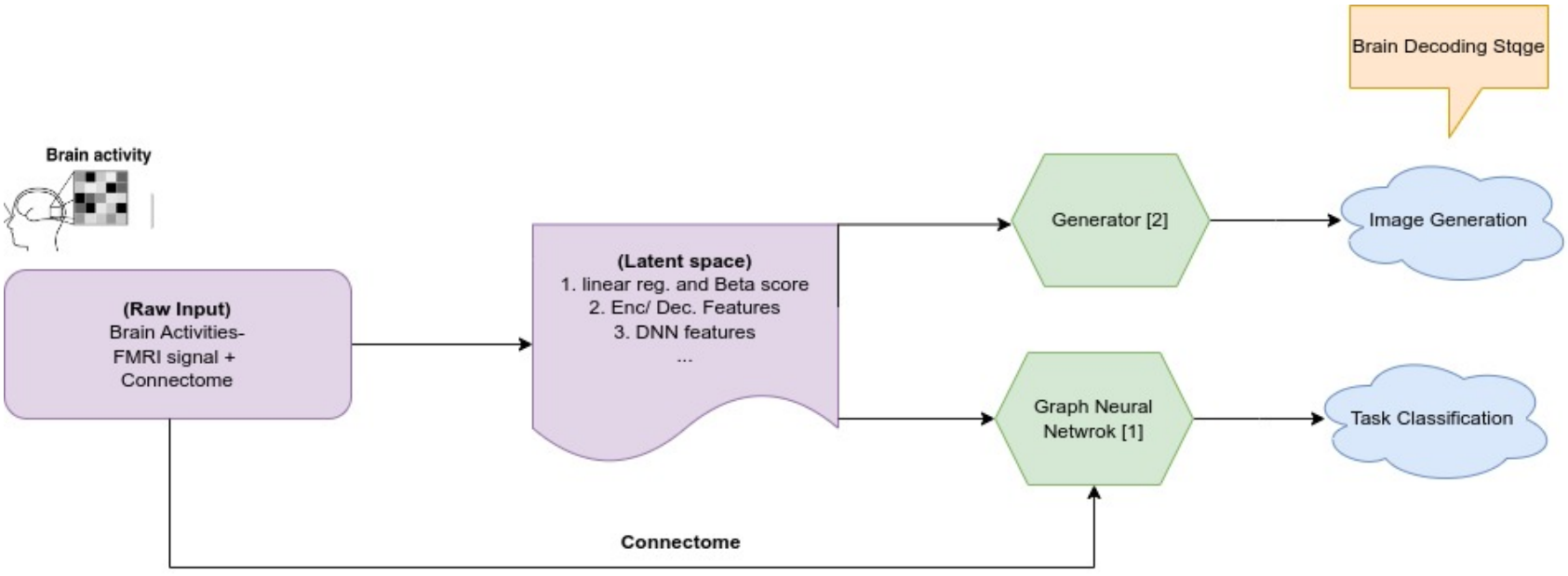

Figure 1: Process

Datasets and tools

I would like to learn the following skills including:

Tools

- `nilearn`
- `torch.geometric`
- `Docker` (just playing with it to see how it works on Colab)

Dataset

- `IUGM-preprocessed data`
- Two Examples:

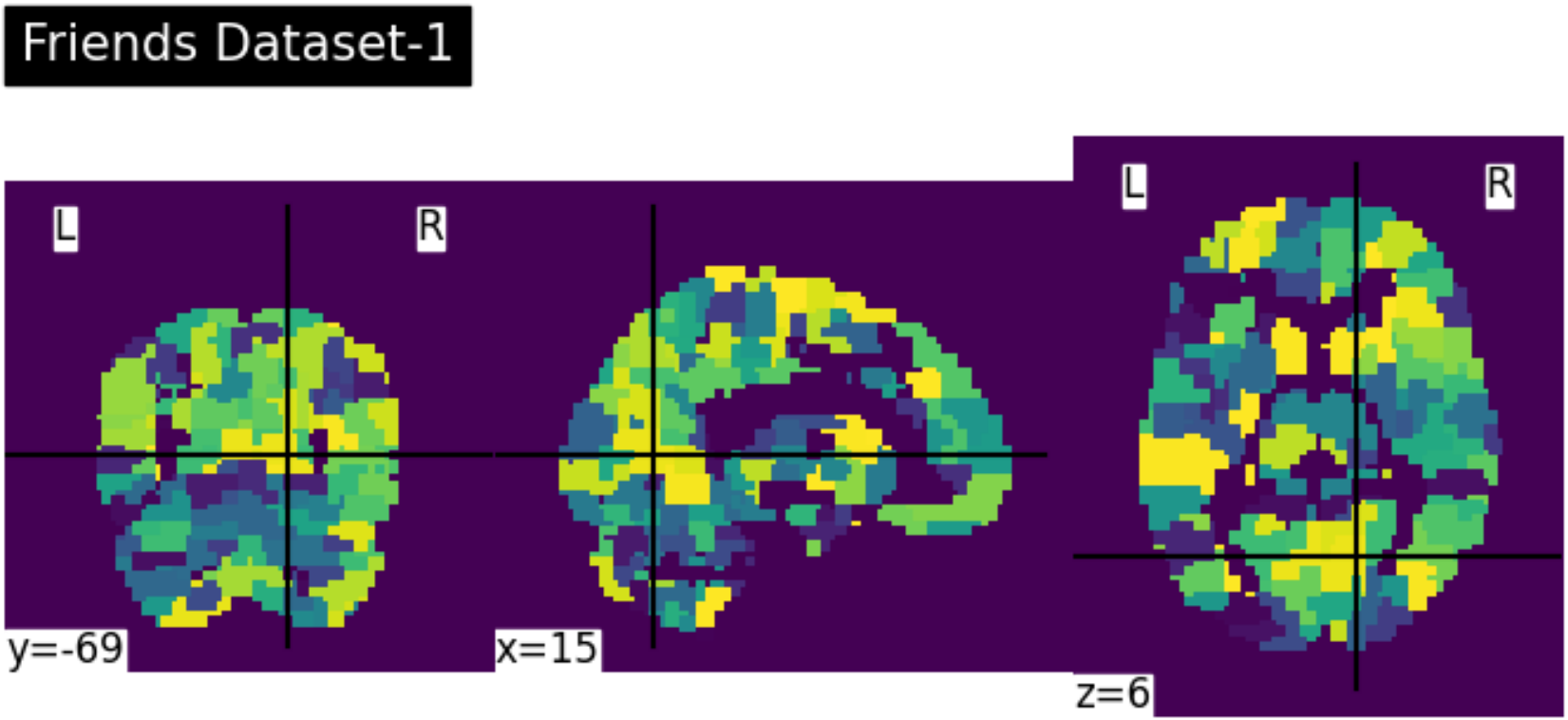

Figure 2: Example 1

Dataset2

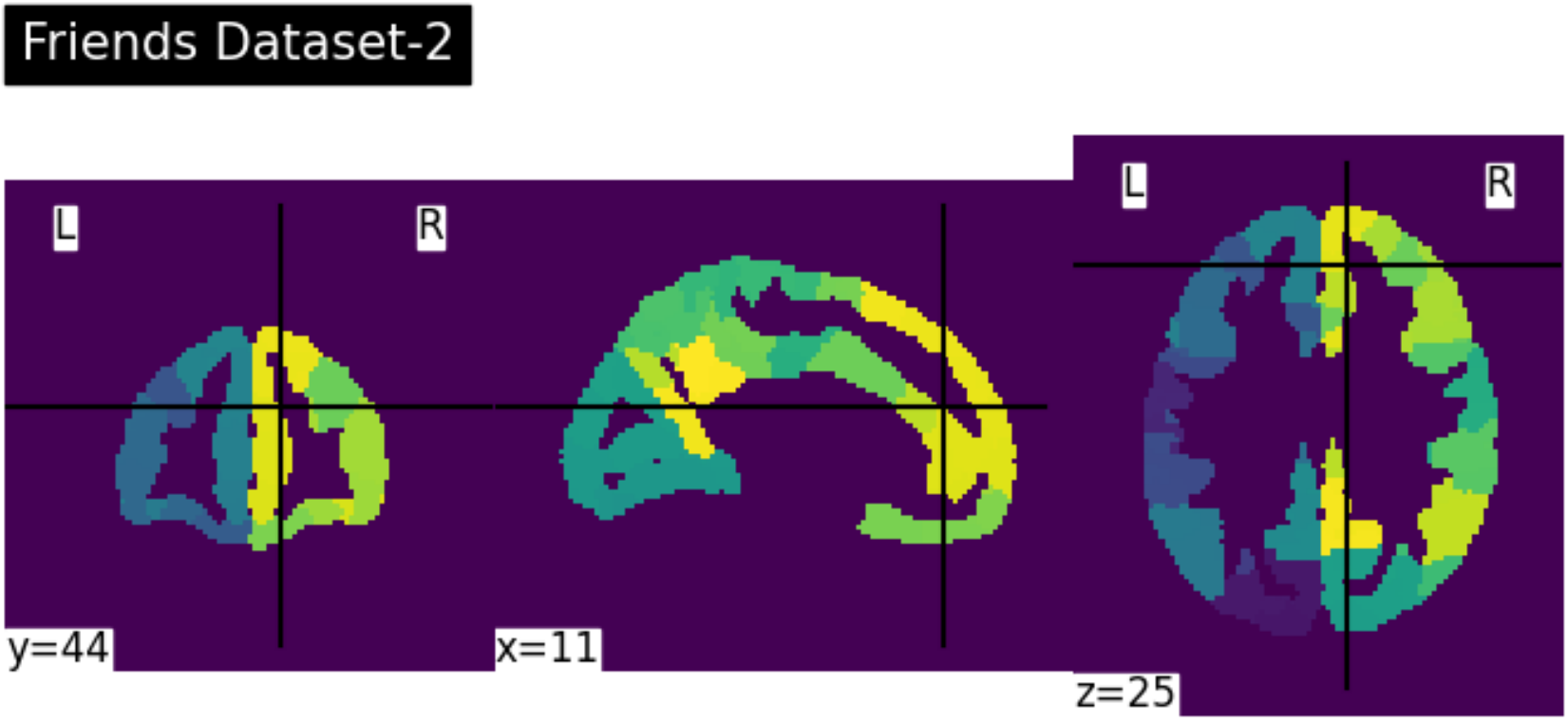

Figure 3: Example 2

Methods

- Graph Signal Processing
- Graph Neural Networks
- ChebNet

Deliverables of the Project

The deliverables of this project is: - Notebooks for community to use - Github repository - Training materials - Data

References

- [1] Yu Zhang, Loïc Tetrel, Bertrand Thirion, Pierre Bellec, "Functional annotation of human cognitive states using deep graph convolution," *NeuroImage*, Volume 231, 2021, 117847, ISSN 1053-8119.
- [2] Shirakawa, K., Nagano, Y., Tanaka, M., Aoki, S. C., Majima, K., Muraki, Y., & Kamitani, Y. (2024). Spurious reconstruction from brain activity. arXiv preprint arXiv:2405.10078.