

IBBM Project Proposal: Bachelor/Master thesis

Deep Learning Approach for Automating Quality Assessment of MR Spectroscopic Imaging Data

Keywords

Out-of-Distribution; OOD; Magnetic Resonance Spectroscopy; MRSI; Quality Control; Deep Learning

Abstract

MRS data is composed of 1D spectra that can quantitatively characterize the metabolic composition of *in-vivo* tissue. This is especially useful for characterizing brain tumors. The primary drawback to this data type is the extensive and costly pre-processing and analysis necessary to prepare and annotate the data. Attempts to accelerate this work using deep learning is a budding, active research field.

Similar to MRI data, artifacts can render clinical scans unusable. This is especially problematic in quantitative imaging because the resolution of the FIDs has a direct impact on the quantification pipeline's ability to produce accurate results. Because of the great variability of these artifacts and our inability to sufficiently model all the non-linearities associated with data acquisition, we would like to explore the use of OOD classifiers on time-domain FIDs to identify anomalous spectra.

Required Skills

- Proficient with PyTorch
- Experience with Computer Vision
- Signal processing is beneficial

What we expect from you

We are looking for a **highly-motivated student** with an above-average academic track record. You should have a technical background including data analysis and machine learning, good problem solving skills, and **be able to work independently**.

What we offer you

You will receive **strong support** to make your thesis a success. You will gain experience working with a unique, specialized data type from an international collaboration. Successful completion of this project will give you a good chance at **co-authorship** on a high-profile **journal publication**.

If you are interested, please send a CV, transcript, and letter of motivation to jlamaste@gmail.com.



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