Automated diagnosis of neurogenerative disease from PET images of the brain

Background

The prevalence of neurodegenerative diseases such as Parkinson´s and Alzheimer´s disease is increasing. Treatment options vary depending on the underlying disease and the importance of a correct diagnosis cannot be overestimated. The aim of this project is to investigate if machine learning methods can be used to automatically provide a correct diagnosis from PE2I PET images of the human brain, and distinguish between classical neurodegenerative diseases such as Parkinson's disease, multiple system atrophy, and progressive supranuclear palsy.

The data available for this project is a set of PE2I PET volume images, with corresponding diagnosis. The plan is to train a convolutional neural network (CNN) to correctly classify unseen images into a set of predefined diagnoses.

Work plan

The following steps are involved in the project:

1) Setting up a pipeline for reading and writing PET images from a common medical imaging file format.
2) Selecting, based on a brief literature survey, an architecture for the CNN.
3) Training the CNN on available data with associated ground truth.
4) Evaluating the performance of the CNN on test data.
5) Create a poster and write the report.

Supervisors

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