OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

MEDIZINISCHE FAKULTÄT UNIVERSITÄTSKLINIKUM MAGDEBURG A.ö.R.

MedDigit

Bachelor/Master thesis

in the field of „Atlas Generation“

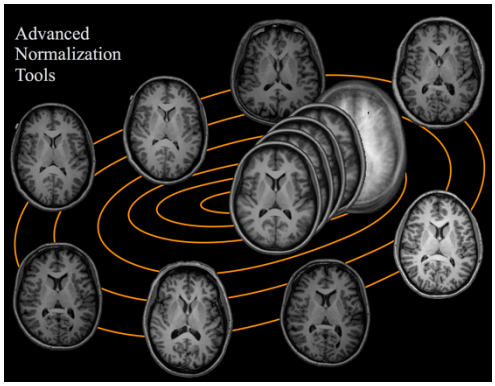

Fig. 1: ANTs computes high-dimensional mappings to capture the statistics of brain structure and function [1].

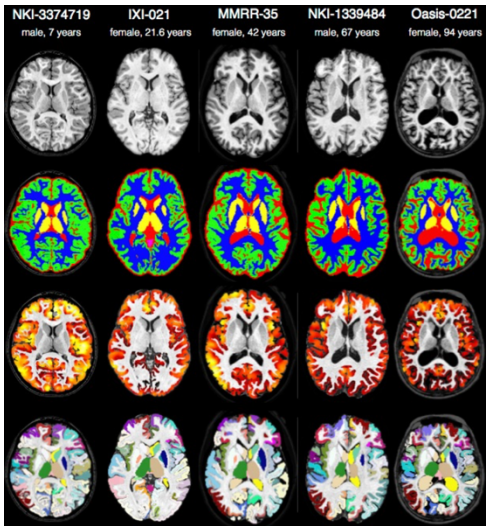

Fig. 2: ANTs allows to organize, visualize and statistically explore large biomedical image sets [1].

Project description

We are looking for a reliable student to work in a project at the Department of Neurology of the medical faculty in the work group ‘Medicine and Digitalization’. Within the project, clinically acquired magnetic resonance imaging (MRI) brain data of the past years is processed retrospectively. Using these data your primary task is to create a brain template with the Advanced Normalization Tools (ANTs) [1] which will serve as a reference in diagnosis in neurodegenerative and psychiatric diseases. Beyond this, your further tasks may vary depending on the individual skillset and type of work, e.g. after sorting the data appropriately, we want to generate dynamic templates within a certain age range, gender as well as pathology. Furthermore, the data needs to be analyzed with MRIQC and quantified with FreeSurfer. Lastly, the results need to be analyzed statistically. In case a hardware related bias is identified the results need to be harmonized.

[1] https://github.com/ANTsX/ANTs

Your potential tasks

- Generation of a brain template by registration (Advanced Normalization Tools)
- Generation of dynamic brain templates, e.g. age and gender (Advanced Normalization Tools)
- Identification of healthy subjects and subjects with pathology
- Sorting of data according to age and gender
- Quantification of brain structures (FreeSurfer)
- Comparison of individual quantitative results to healthy brain template
- Quality assessment of data (MRIQC)
- Statistical analysis of results
- Identification of hardware related effects on quantitative results
- Harmonization of quantitative results across different hardware

Your profile

- Studying engineering, informatics, physics, statistics, or related field
- Basic knowledge in any one of these topics is preferred:
  - Magnetic resonance imaging
  - Image processing (ANTs, FreeSurfer)
  - Unix
- Good communication skills in English or German

Additional information:

Please send your relevant and persuasive application together with an actual transcript of grades per e-mail to:

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Masterar thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de

Bachelor/Master thesis MedDigit Falk.luesebrink@med.ovgu.de