

Automatic diagnostic prediction of iNPH using deep learning

Master Thesis Proposal in Image Analysis and Machine Learning at the Division Vi3, Dept. of Information Technology.

Supervisors & Contact

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Background

Idiopathic normal pressure hydrocephalus (iNPH) is a potentially treatable form of dementia characterized by dilated brain ventricles. The neuroradiologists currently use several mostly 2-dimensional measurements/evaluations of the brain in order to evaluate a brain for signs of iNPH. You will be provided with a suitable radiological dataset and experiment with different neural networks architectures and ensembles to develop an algorithm that automatically predicts the radiological probability for iNPH.

You will be working with neuroradiologists that will help you to deeply understand the radiological problem and come up with a suitable clinically relevant method. Your method has the potential to be used and tested clinically, helping both the patients and the physicians.

Aim

To develop and evaluate a method for automatic diagnostic prediction of iNPH using deep learning.

Prerequisites

- Proficiency in image analysis/processing and computer programming.
- Knowledge on deep learning environments (TensorFlow, Keras, and/or PyTorch) and GPU optimization
- Experience in medical imaging physics and analysis (e.g., MRI, CT) is preferable.

Examples of published methods: Caligiuri, M. E. et al. Neuroinformatics 13, 261–276 (2015)