Diploma Thesis / Master Thesis:
Non Invasive Histology of Atherosclerotic Plaque

Computer Aided Medical Procedures (CAMP) | Technische Universität München
Lehrstuhl 16 Prof. Navab / Prof. Klinker

Stroke is the third leading cause of death in Germany. It is a neurology injury, whereby the oxygen supply to parts of the brain gets cut off by stenosis. According to the American Heart Association plaques can be divided into different types, based on their consistency and structure. Until now the decision about a surgery was only based on the degree of the stenosis and not on the type of plaque causing it. This is a faulty approach since there is a plaque type (Type IV) which constitutes a relevant clinical danger, although it does not necessary come along with a stenosis. Unlike most other image modalities MR images do not only give information about the degree of the stenosis, but also about the consistency of the plaque.

Using different weighted MR images it is possible to correctly classify plaque into the types defined by the AHA. The main goal of this project is to create a classification tool based on T1, T2, Proton Density and 'Time of flight' weighted images. To achieve this goal the arteria carotis and the plaque have to be segmented from the images. Furthermore various features of the plaque have to be extracted in order to get information needed for the classification.

The goal of this Diploma or Master Thesis is to define and evaluate several features extraction methods based on multiple images. Besides the benefit of working on an interdisciplinary project in direct contact with medical partners. you have the chance to gain practical experience in machine learning and classification methods.

If you are interested, please contact Olivier Pauly (pauly@in.tum.de).
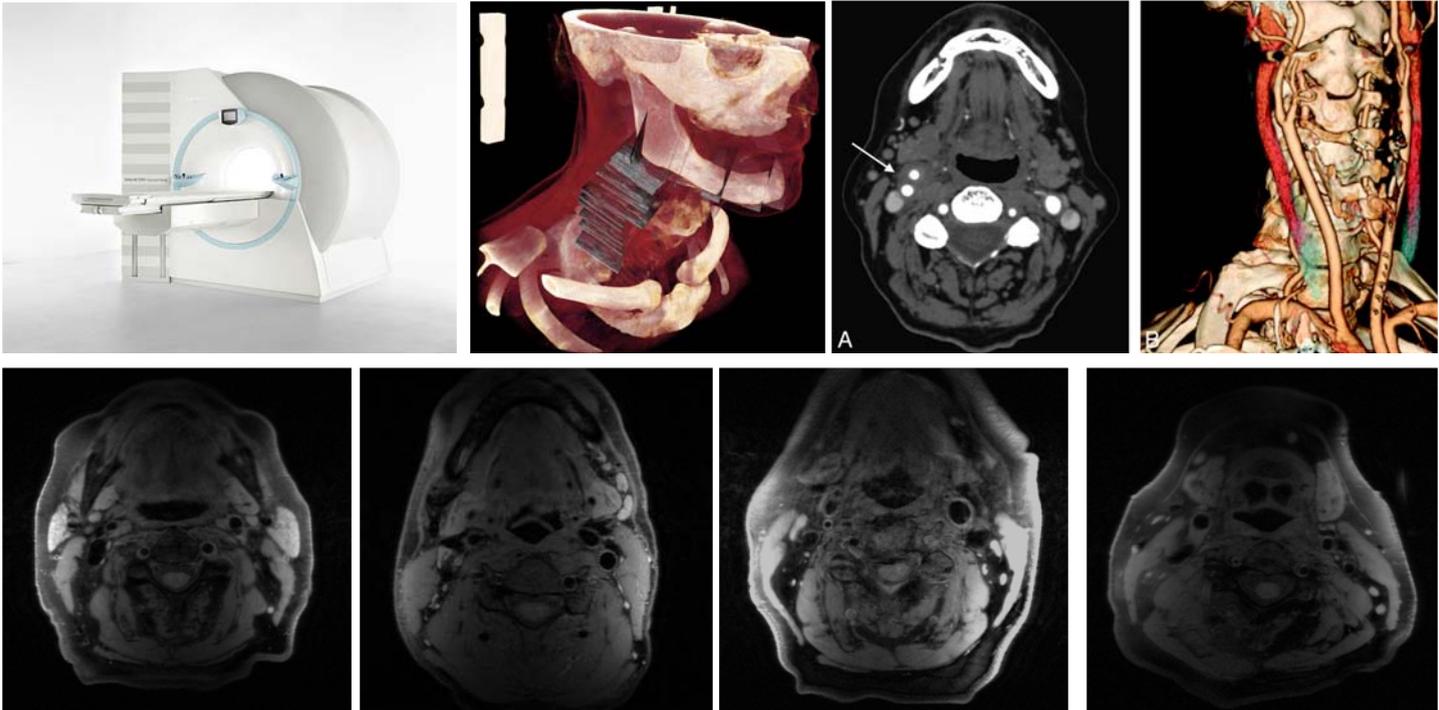
Requirements

• Programmiererfahrung (MatLAB und C++)

• Interesse an medizinischen Fragestellungen und Therapiemethoden

• Interesse an interdisziplinärer Zusammenarbeit

Nutzen

• Möglichkeit in interdisziplinärem Umfeld zu arbeiten
• Softwareentwicklung für medizinischen Einsatz
• Einblick in die fantastische und schnell wachsende Welt der neuesten medizinischen Bildgebungstechnik
• Lernen am Puls der Zeit