Department of Nuclear Medicine, Hospital of the LMU
Preclinical imaging group

Our preclinical imaging group at the Department of Nuclear Medicine in the hospital of the LMU in Großhadern is currently looking for a talented and motivated

MASTER STUDENT

to join our experimental physics team.

Background

Nuclear medicine imaging provides unique diagnostic opportunities for cancer and neurodegenerative diseases. However, manual image analysis is time consuming and results often are examiner-dependent. Machine learning techniques can be used to automate and standardize analysis procedures and therefore, to support clinical workflows. Areas of interest in the image data of individual patients need to be registered and segmented, in addition to ensuring inter-patient comparability. This preprocessing may introduce errors and thus has a major influence on the analytical quality, especially when aiming at automated image analysis.

Aims

Supervised machine learning approaches to image analysis use quantified characteristics of an image dataset, so-called features, to answer a specific question. In the context of this master thesis, the features are extracted from [^{18}F]-FDG-PET images of the brains of small animals (rats). We are aiming at classifying these animals with induced vestibular disorder into three groups. However, image preprocessing may have influence on the performance of machine learning classification. Particularly, influences of the registration algorithm, of the image value normalization procedure, and of image filters need to be evaluated.

Tasks

Data have been acquired using a dedicated small animal PET scanner in our department. You will need to set up the processing of these [^{18}F]-FDG-PET images and the corresponding machine learning analysis pipeline using PMOD software and Python. Then, you will process three cohorts of small animals with different types of preprocessing and evaluate the machine learning classification performance by using the PET image derived features.

Knowledge of PET physics and image generation will be necessary for this work. While Python skills are not mandatory beforehand, basic programming skills are beneficial.

If you are interested in working in our team (physicists, physicians, veterinarians, chemists), we would be happy to receive your application including a short motivational letter, your transcript of records, your CV, and, if available, a description of previous experiences in programming and/or medical imaging. For further information or a lab tour you are always welcome to visit us in Großhadern.

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