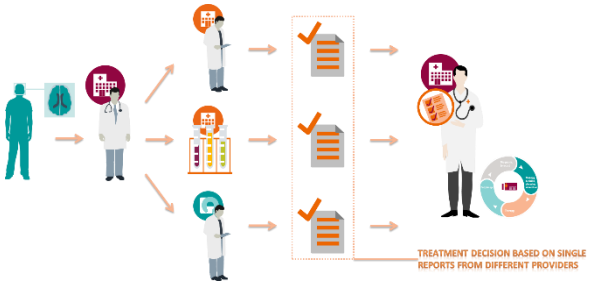
Master Thesis:
Integrated Dementia Diagnosis

Description and Objective



Alzheimer's disease (AD) is a progressive neurodegenerative disorder affecting many individuals worldwide with no effective treatment to date. AD is characterized by the formation of senile plaques and neurofibrillary tangles, followed by neurodegeneration, which leads to cognitive decline and eventually death. In AD, pathological changes occur many years before disease onset. Since disease-modifying therapies may be the most beneficial in the early stages of AD, biomarkers for the early diagnosis and longitudinal monitoring of disease progression are essential. Multiple imaging and laboratory diagnostic techniques with associated biomarkers are used to identify and monitor AD. In this project, we would like to expore how to combine data from different modalities – namely magnetic resonance imaging (MRI)-derived imaging biomarkers and psychometry (e.g., the MMI score) to aid differential diagnosis as well as prognosis, e.g., cognitive decline of a specific patient from mild cognitive impairement, a precursor of AD, to full AD in 5 years.

This Master Thesis is a collaboration between the Department of Artificial Intelligence in Biomedical Engineering of the FAU and the Siemens Healthineers Innovation Hub in Lausanne, Switzerland. Data from the world-renowed ADNI (https://adni.loni.usc.edu/) study will be employed which might be amended by data from the partners. The student will work in an interdisciplinary environment, in close contact with AI experts, MRI scientists and clinicians and with a clear clinical goal motivating the project. Previous experience with Python coding and image processing is required.

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