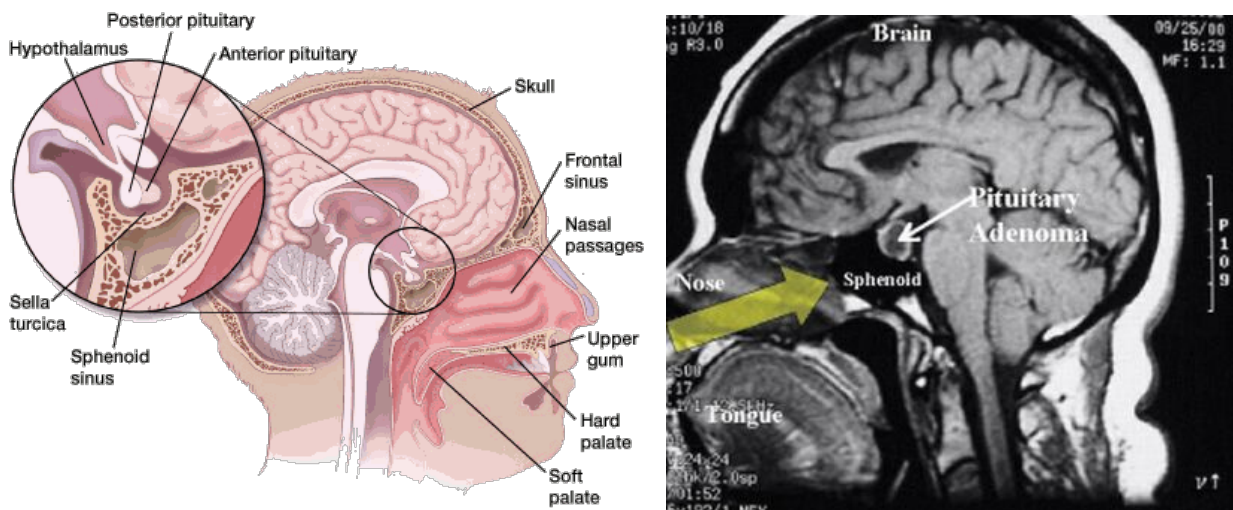


TU/e MSC project “Pituitary gland tumor segmentation and analysis using MRI”

Background information

The pituitary is a small gland found inside the skull just below the brain and above the nasal passages (left picture below, <https://www.cancer.org/cancer/pituitary-tumors/about/what-is-pituitary-tumor.html>). Benign tumors may develop in the pituitary gland, which may press against surrounding tissues such as the optic nerve, causing degradation or loss of vision. These tumors are usually imaged by magnetic resonance imaging (MRI) (right picture below, from <https://brain-surgery.com/insensitive-pituitary-adenoma-dealing-with-radiation/>).



Problem description

At present, pituitary tumors are detected by visual inspection of the MRI data, which can be a cumbersome and time consuming activity, and may lead to variation between observers. Tools are needed for the automatic detection of these tumors and for the analysis of its various tissues.

Project description

The project aims to design, implement and evaluate image analysis and machine learning methods for:

- Automatically detecting and segmenting the pituitary tumor
- Estimation of tumor size and volume
- Analysis of the texture of the various tumor tissues

The project will consist of the following phases:

- Literature study
- Getting familiar with the image analysis and machine learning platform and already available functionality
- Design, implementation and evaluation of tumor segmentation and tissue analysis algorithms
- Writing, presenting and defending MSc thesis

Required background

- Image analysis & machine learning
- Basic Python programming skills

Duration, location & supervision

This is a 60 EC (study points) TU/e MSc project that will be performed in the Biomedical Imaging Group (BIGR) of the Erasmus Medical Center Rotterdam, under the daily supervision of dr. Stefan Klein (<http://bigr.nl/people/StefanKlein/>), in cooperation with dr. Sebastian Neggens of the Department of Endocrinology and prof.dr.ir. Marcel Breeuwer of TU/e (responsible graduation prof.).