**Introduction**

Prostate cancer is one of the most prevalent cancers among men worldwide, and Magnetic Resonance Imaging (MRI) is a critical tool for its detection and diagnosis. However, accurate prediction of clinically significant cancer remains challenging. Segmentation of MRI images into relevant regions can aid this diagnosis. Deep learning offers promising solutions by leveraging MRI data for predictive modeling and image segmentation.

**Objective of the Project:**

This project aims to develop deep learning models for predicting clinically significant Prostate Cancer from MRI and segmenting MRI images into relevant regions. The work will be done in collaboration with a second project oriented to the synthesis of MRIs to extend existing databases. One of the objectives of the project will be to compare segmentation and prediction results when data augmentation with synthesized images is performed.

**Approach:**

1. Data Collection and Preprocessing:
   * Gather a diverse dataset of Prostate MRI scans, real and synthesized, including annotated images for training and evaluation.
   * Preprocess both real MRI and synthesized MRI images to ensure consistency and compatibility.
2. Predictive Modeling:
   * Develop deep learning models for predicting clinically significant Prostate Cancer from MRI.
   * Train the models using the collected dataset
3. Image Segmentation:
   * Implement deep learning-based image segmentation algorithms, such as U-Net for segmenting MRI images into relevant regions, such as the prostate gland and surrounding tissues.
4. Integration and Evaluation:
   * Integrate predictive models and segmentation algorithms into a unified pipeline for automated Prostate Cancer diagnosis from MRI.
   * Evaluate the performance of the developed models with original and extended databases.

**Financing:**

This Project is developed in the context of the [European Project FLUTE](https://www.fluteproject.eu/) and will be funded with a collaboration grant. You can contact us for more details.

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