

## **Magnetic Resonance Imaging: Machine learning algorithms in prediction of cancer subtype and status.**

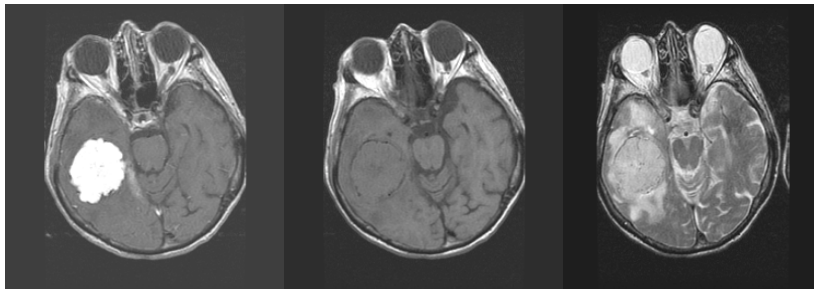
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Project type: Numerical/image processing.

Main goal: To implement and compare two different machine learning algorithms applied to MRI data to predict cancer subtype and biomarker status.

Project background:

- Magnetic Resonance Imaging is increasingly used in cancer diagnosis and management. The wide variety of contrasts available in MRI results in a high number of acquired images. This represents a challenging task for the human observer to interpret manually.
- Instead the different types of MR images can be thought of as a single multidimensional image, and analysed using machine learning approaches to identify the important features of the image in predicting the clinical status of the patient.



**Figure 1. Three different MR-images of the same brain illustrating varying tissue contrast.**

Project description:

- The student will choose two different machine learning algorithms, implement them if required and perform the required coding in order to apply them to the image data we have.
- The MRI data will include standard T1 and T2-weighted images, dynamic contrast enhanced images, and most importantly various types of diffusion weighted images. The cancer lesions are already outlined by ROIs.
- The student will use the above MRI data from an ongoing breast cancer study to try to predict cancer subtype and hormone status by training the machine learning algorithms, and evaluate the performance of the two different algorithms.