Practical session 3: Virtual biopsy of brain tumors combining magnetic resonance spectroscopy with artificial neural networks

Biomedical Data Science

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Data Science
Course 2022-2023

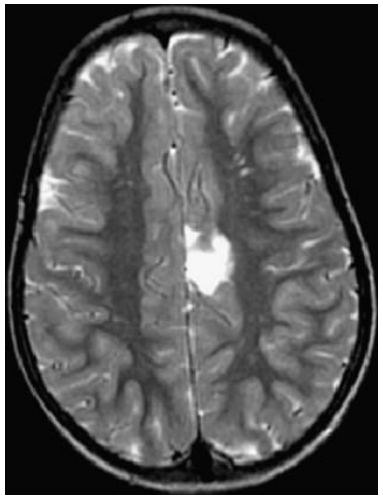
BDSLab Biomedical Data Science Lab

Instituto ITACA

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Virtual brain biopsy with MRS and ML

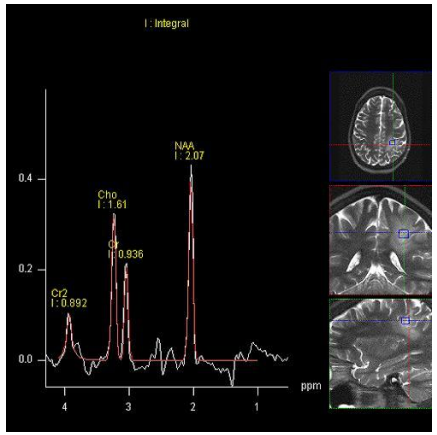
UNCERTAIN DIAGNOSIS



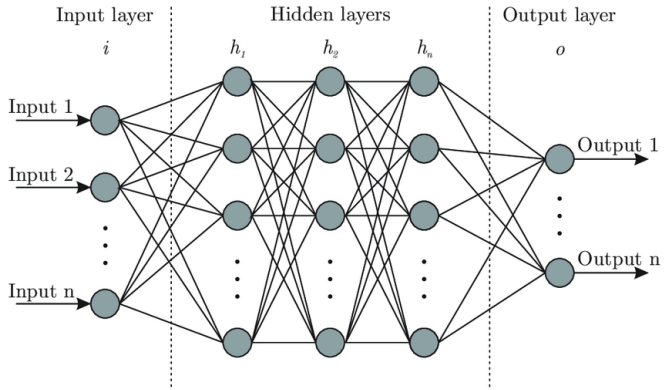
TRADITIONAL INVASIVE BIOPSY

NON-INVASIVE BIOPSY

MAGNETIC RESONANCE SPECTROSCOPY

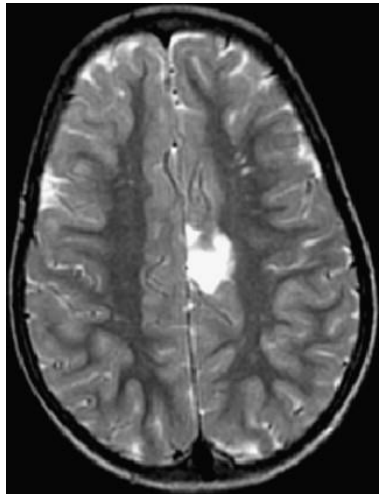


MACHINE LEARNING



Virtual brain biopsy with MRS and ANN

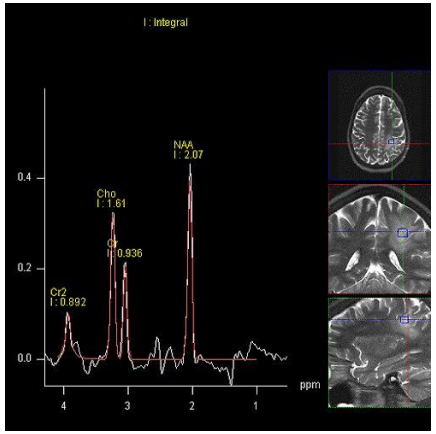
UNCERTAIN DIAGNOSIS



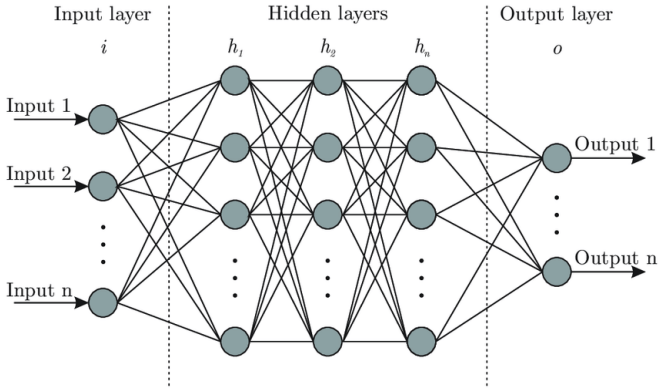
- Meningioma
- Astrocytoma
- Glioblastoma

CLINICAL DECISION SUPPORT SYSTEM

MAGNETIC RESONANCE SPECTROSCOPY



ARTIFICIAL NEURAL NETWORK

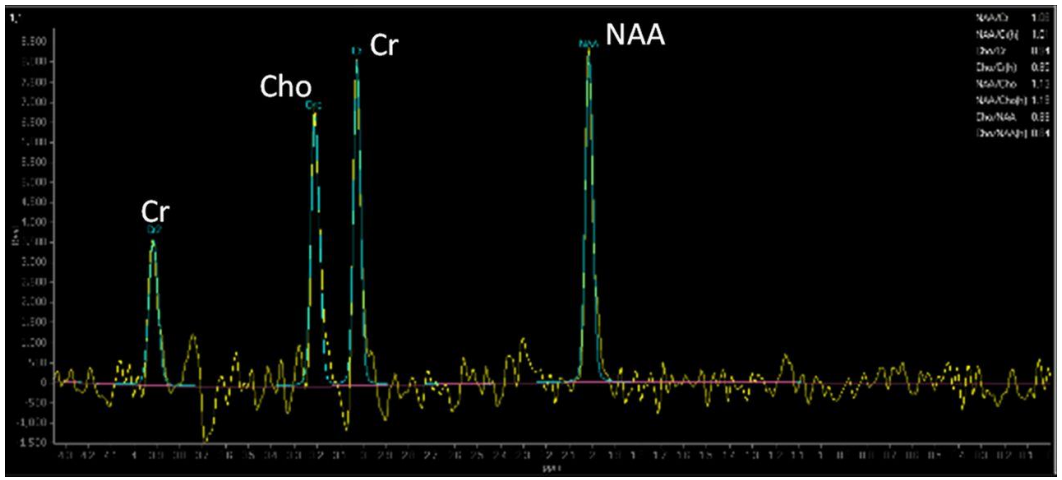


Material

Metabolite_concentrations_diagnosis.csv

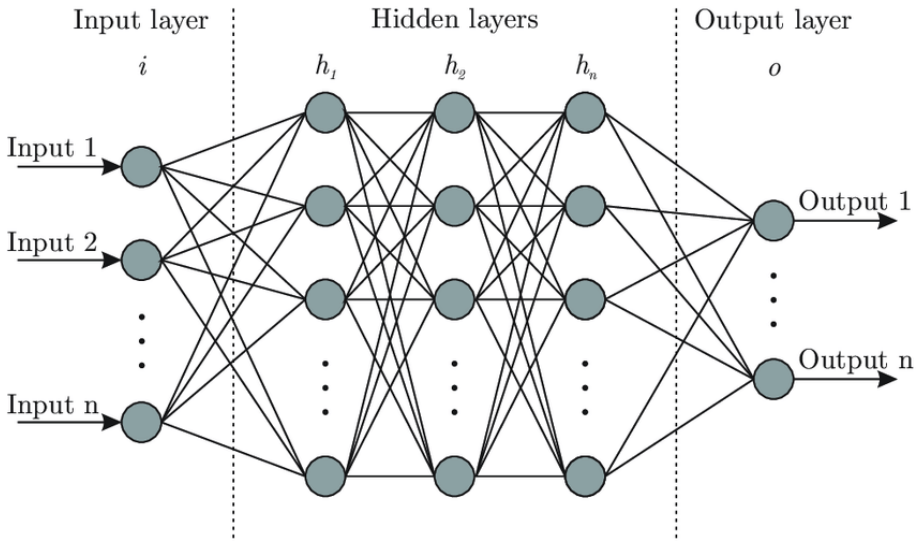
A hidden test partition will be used to evaluate your CDSS.

Block I: data preparation



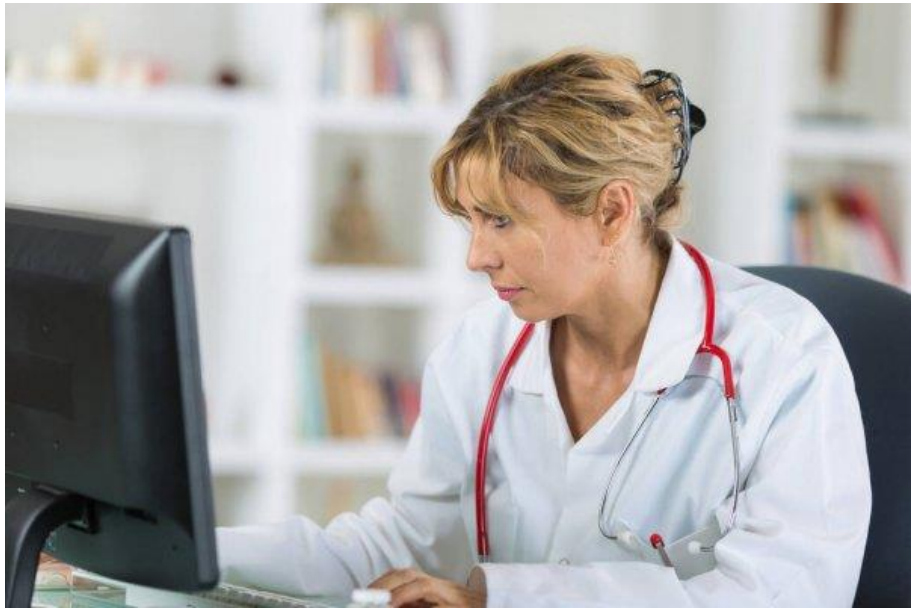
- Data loading.
- Data exploration.
- One-hot encoding.
- Data splitting.
- Robust scaling.

Block II: model training and selection



- Selection metric choice.
- Hyperparam tuning.
- Model evaluation.
- Retraining.

Block III: CDSS deployment



- Data preparation and model prediction pipelines encapsulation.

Evaluation

- Groups from **2 to 3 students**.
- It will be evaluated the practical session **report**, along with **code files**. The **data exploration report** (html file) should also be submitted.
- The report must include:
  - Page 1: cover page, title, authors and professors.
  - Page 2: contents.
  - Page 3 and following pages: answers to the questions and exercises of each block.
  - Last page: references.
- The report must be submitted to **Poliformat**, by means of a **task** (not in Shared folder). The deadline is **two weeks** after the practical session.

Questions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