Idea/Approach Details

Ministry Category: Government of Pondicherry

Problem Statement: RADIONOMICS: EPITOME EXTRACTION FROM MEDICAL IMAGES

Problem Code: #GPY1

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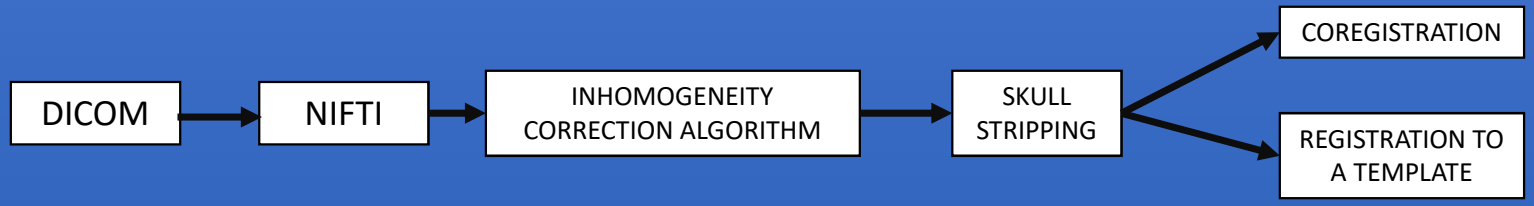
College Code: 6892

Objective: To design a simple opensource scripted software that depends on minimum no. of software platforms and is dedicated to diagnosis of a disease by extracting epitomes from medical image.

Idea description:-

- Automated identification of diseases using filtered medical imaging with the aid of computers is essentially an image-based pattern recognition problem, which can be solved in two successive steps: *feature extraction* and *pattern classification*.



- We will first do preprocessing in the following main conceptual steps: Inhomogeneity correction, Spatial Interpolation, Skull stripping, Spatial Registration.

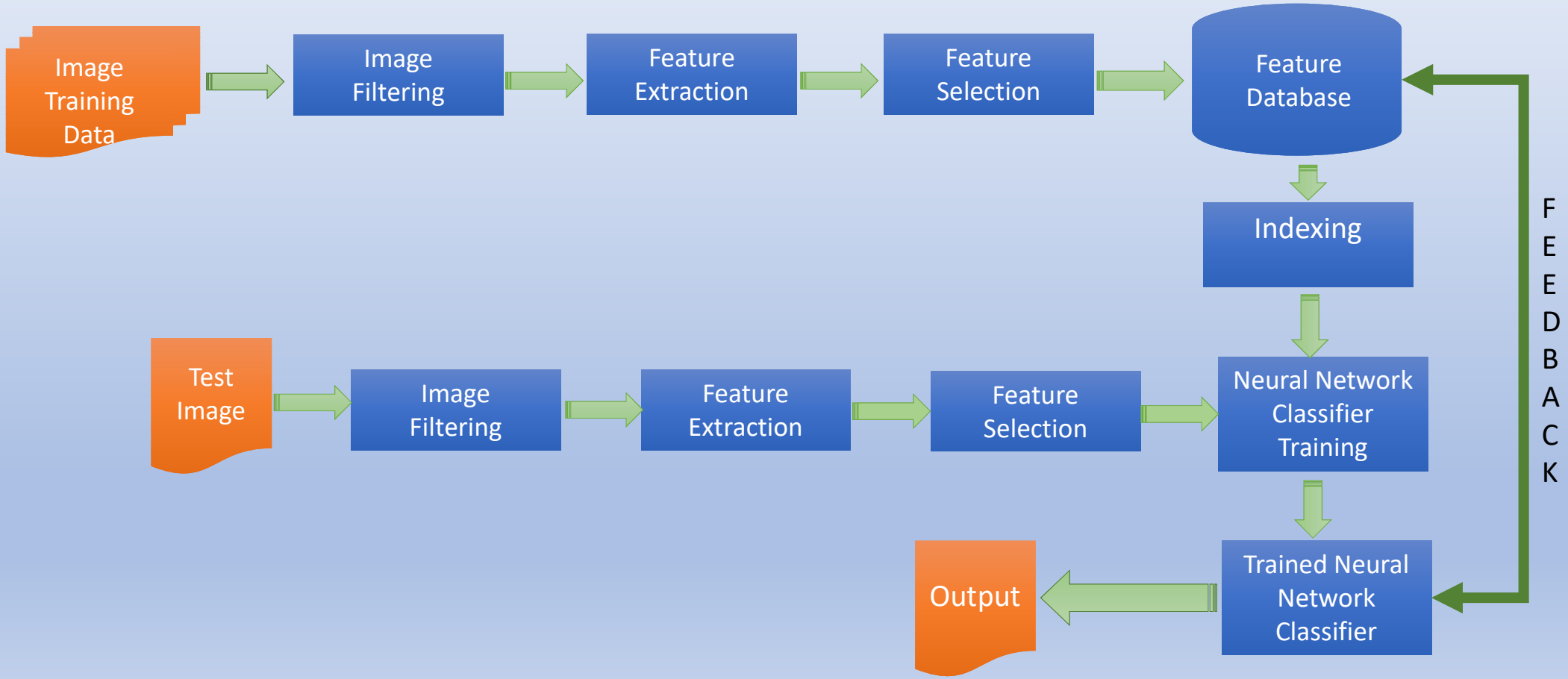
- During the training stage, image features that can characterize the patterns of various types or stages of diseases are calculated based on the quantitative analysis of medical images. Those features are usually selected and/or combined to reduce their dimensionality and are stored in feature database before training a classifier with the supervised learning techniques.

- The trained classifier encapsulates the knowledge gleaned from the images and is capable of producing the expected predictions. For each testing image, the features extracted, selected, and combined in the same way are applied to the trained classifier to generate a predicted class label that indicates to which type or stage the disease case belongs.

- Our system will take a medical image in DICOM format and output will show the input medical image, condition to be checked, result of the classification, list of features of normal and similar abnormal cases in a GUI interface.

- The diagram of a typical automated disease identification system is shown in flow chart.

Data flow Diagram



Technical details:

- We'll be using OASIS which contains cross-sectional and longitudinal MRI datasets of the brain.
- Feature selection will be done by wrapper method.
- The images in this database are in DICOM format.
- We'll be working on detection and classification of ***Dementia***

Technology Stack:

- Python.
- R.
- Convolutional Neural Networks.
- HTML, CSS.
- Medical Image Database(OASIS).