MAHARASHTRA INSTITUTE OF TECHNOLOGY, AURANGABAD.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(2021-22 PART-I)

MINOR PROJECT REVIEW - 2

BRAIN TUMOR SEGMENTATION WITH DEEP NEURAL NETWORKS

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Guided by:

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COURSE OUTCOMES:

- CO 1 Identify real world problems.
- CO 2 Recognize system requirements and analyze them.
- CO 3 Apply design methodologies.
- CO 4 Implement and validate the results.
- CO 5 Work efficiently as an individual , and as a member in a team.
- CO 6 Efficiently communicate technical information in presentation and writing by adhering to ethical principles.

INTRODUCTION (AND/OR ABSTRACT):

Image segmentation is the process of partitioning a digital image into multiple segments. Image segmentation is used to locate objects and boundaries in images. It is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics. The result of image segmentation is a set of segments that collectively cover the entire image, or a set contours extracted from the image . Each of the pixels in a region are similar with respect to some characteristics such as color, intensity, texture. Clustering algorithms groups the samples of a set such that two samples in the same cluster are more similar to one another than two samples from different clusters.

GENETIC ALGORITHM:

Genetic Algorithm (GA) is one of the most well-regarded evolutionary algorithms in the history. This algorithm relates Darwinian theory of survival of the fittest in nature. This Algorithm presents the most fundamental concepts, operators, and mathematical models of this algorithm. The most popular improvements in the main component of this algorithm selection, crossover, and mutation. The algorithm has the application of this technique in the field of image processing. In fact, the GA algorithm is employed to reconstruct a binary image from a completely random image.

Five phases are considered in a genetic algorithm.

1) Initial population
2) Fitness function
3) Selection
4) Crossover
5) Mutation

OBJECTIVES AND NECESSITY:

- To develop computational methods and algorithms to analyze and quantify biomedical data.

- To monitor the changes in pathologies of medical images.

- To provide better image processing(object detection and segmentation) and better image quality for biomedical data.

- Applying information analysis and visualization to biomedical research data.

DOMAIN/AREA OF APPLICATION (SOCIAL/RESEARCH/PRODUCT…ETC) :

1) RESEARCH
2) MEDICAL

Technical Area (cloud, security etc..) :

1) Python
2) Convolutional Neural Networks (CNN)
3) Deep Neural Networks

Literature survey (format 1):

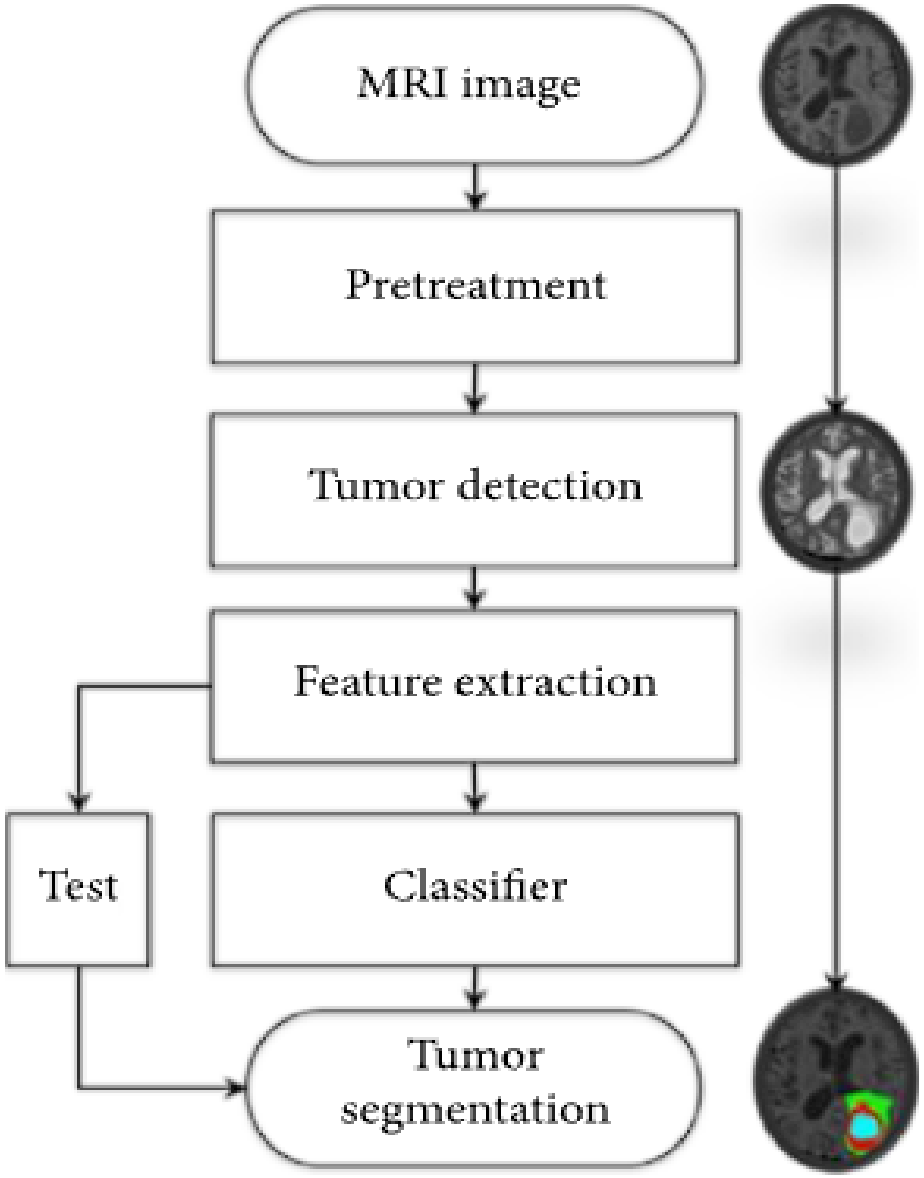
Sr. No	Paper Title, Author, Journal/ conference	Method / Approach used	Dataset used	Advantages	Drawback(s)	Future Scope
1.	Genetic Algorithm. MDU Rohtak	Genetic Algorithm, Crossover operators, Mutation Operators		employed for a wide variety of optimization problems.	Premature convergence occurs.	Function Optimizations.
2.	Genetic Algorithm. IEEE Conference.	Genetic Algorithm,Inheritance,Crossover		Handles large, poorly understood search	Definition of representation for the problem	Strategy planning.
3.	Genetic algorithm: past, present, and future	Classical Genetic Algorithm.		Easily modified for different problems.	The problem of identifying fitness function.	TSP and sequence scheduling

PROBLEM STATEMENT AND SCOPE:

1) Machine Learning–Designing neural networks, both architecture and weights, improving classification algorithms.

2) To predict and localize brain tumours through image segmentation from the MRI dataset available in Project.

3) The main aim of future work is to maintain high level of performance and high quality of reconstructed images.


MRI image
Pretreatment
Tumor detection
Feature extraction
Test
Classifier
Tumor segmentation

PROJECT PLAN:

Implementation details;

Hardware Requirement:

1) Browser
2) Google colab Notebook
3) Operating System

Software Requirement:

1) Python
2) Python Libraries
3) Convolutional neural network

Language:

1) Python

REFERENCES:

https://link.springer.com/article/10.1007/s11042-020-10139-6

https://www.researchgate.net/publication/341371936_Literature_Review_on_Genetic_Algorithm

https://ieeexplore.ieee.org/document/8862255/keywords#keywords

https://www.hindawi.com/journals/cmmm/2015/450341/

THANK YOU.