College of Engineering and Technology
Project Work/Internship – Student Hand Book

Project Batch ID. CT10B278

Degree/ program	B.Tech	Specialisation	Computer Science & Engineering
Academic Year	2023-2024 (Even)	Semester	8

Name of student	Register Number	Department	Mobile Number	Email ID
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Working Title of the Project:	**Brain Tumor Detection Using Machine Learning Techniques**
Project Site / Location	SRM IST , SRM university
Name and address of the company / organisation (Applicable for projects with industry or industry support)	SRM IST, Kattankulathur, Chengalpattu District-603203

Supervision Team			
	Supervisor	**Co-Supervisor**	**External Supervisor (If applicable)**
Name	Muruganandham B		
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Course Code	18CSP109L/ 18CSP111L	Course Title	Brain Tumor Detection Using Machine Learning Techniques

<div align="center">Mission Statement</div>

Problem (or) Product Description:

Brain tumors are among the most dangerous and deadly forms of cancer. Early detection and accurate diagnosis are crucial to improving the prognosis of patients with brain tumors. However, brain tumors can be challenging to detect due to their non-specific symptoms, small size, and lack of imaging modalities specifically designed for detecting them. Machine learning techniques have shown promising results in the field of medical imaging. By leveraging advanced algorithms, these techniques can analyze medical images and accurately detect brain tumors.

Objective: The objective of this solution is to provide an accurate and efficient method for brain tumor detection using machine learning techniques.

Solution Description: This solution uses a combination of machine learning algorithms, including convolutional neural networks (CNNs) and support vector machines (SVMs), to accurately detect brain tumors from medical images. The solution includes a user-friendly web interface that allows users to upload images for analysis. The images are then preprocessed and converted into a format suitable for input to the machine learning models. The models are trained using a dataset of labeled brain images, with each image being classified as either containing a brain tumor or not. The performance of the models is evaluated using metrics such as accuracy, precision, recall, and F1-score. The best performing model is selected as the final brain tumor detection algorithm.

Advantages:

Accurate and efficient detection of brain tumors.

Easy-to-use web interface for uploading and analyzing images.

Seamless integration with existing medical imaging systems.

Real-time analysis of brain images, allowing for prompt diagnosis and treatment.

Limitations:

Requires a dataset of labeled brain images for model training.

The accuracy of the detection algorithm.

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Division of work and contributors

Time period		Activities or components of the project	Name/Register Number of the Individual Contributor	Names/Register Number of the Joint Contributors
From Date	**To Date**			
Nov 20, 2023	Feb 10, 2024	Dataset Collection	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
Jan 15, 2024	Feb 16, 2024	Data Pre-processing	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
Feb 21, 2024	March 10, 2024	Trend Prediction	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
Jan 8, 2024	March 18, 2024	Image Gradient	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
March 25, 2024	March 30, 2024	Representation of Cells	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
March 1, 2024	April 2, 2024	Cross Validation	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
Feb 25, 2024	March 30, 2024	Re-Training, Testing	RA2011003010470 Jogeswar Panigrahi	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623

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March 2, 2024	April 10, 2024	Improving Model Accuracy, Prediction	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
April 12, 2024	April 15, 2024	Result Evaluation	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623
March 1, 2024	April 22, 2024	Documentation	ANINDYA MANDAL RA2011003010623	RA2011003010470 Jogeswar Panigrahi ANINDYA MANDAL RA2011003010623

Summary record of major progress meetings with supervisors

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Summary record of major progress meetings with supervisors			Working title of dissertation/research project:	
Meeting date & supervisors present	**Progress since last meeting**	**Agreed programme of work and target dates**	**Other issues, e.g. facilities, supervision, training needs, etc.**	**Date of next meeting**

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Worksheet / Data collection / Observation etc

How did you collect the dataset?

The dataset was collected from research papers and additional data were taken from Kaggle. All the data was gathered and organized for research purposes.

How did you do the pre-processing?

The fundamental process that facilitates both histogram grouping and normalization is the combination of cells into blocks. A block histogram can be defined as the result of normalizing these groups of cells. One significant benefit of computing histograms using image blocks is their ability to strengthen the image's resistance to local lighting variations, thus increasing its reliability in diverse lighting.

What did the dataset consist of?

Brain MRI Images. A private collection of T1, contrast-enhanced T1, and T2 magnetic resonance images separated by brain tumor type.
Images without any type of marking or patient identification, interpreted by radiologists and provided for study purposes.
The images are separated by astrocytoma, carcinoma, ependymoma, ganglioglioma, germinoma, glioblastoma, granuloma, medulloblastoma, meningioma, neurocytoma, oligodendroglioma, papilloma, schwannoma and tuberculoma.

Journal Publication Details