

Brain Tumor Detector Project Specification

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Detailed Project Description

This project aims to present a view of the brain and its condition regarding tumors. A medical image will be uploaded to a web page, and it should output the brain tumors classifications. This will be achieved through the use of traditional machine learning methods and deep learning models. Depending on the result, a simple advice will be shown to the user using the ChatGPT API. Machine learning will be trained using a publicly available dataset provided through Kaggle[1].

Detailed Outline

By using Google Colab, data will be entered to introduce exploratory data analysis (EDA), data preprocessing, comparison of traditional machine learning and deep learning models. The focus will be on convolutional neural networks (CNNs) using Python to choose the most optimal machine learning model. The design of the interface should introduce the user to a web page that asks for the input of a medical image of the brain. It should perform with the data evaluated to give an output of the brain tumor detection on another page, along with advice provided by ChatGPT using the ChatGPT API, which will be connected to the program.

Biweekly Outline

Weeks 1-2: Project start point and Data Collection

Tasks

- Set up the project repository.
- Collect and download the brain tumor dataset from Kaggle[1].
- Upload the dataset to Google Colab for initial exploration.
- Begin the exploratory data analysis (EDA) to understand the dataset's characteristics.

Estimated Hours

- Project setup: 2 hours
- Dataset collection and upload: 3 hours
- Initial EDA: 5 hours

Weeks 3-4: Data Preprocessing and Model Selection

Tasks

- Preprocess the dataset for training, including resizing, normalization, and augmentation.
- Split the dataset into training and testing sets.
- Implement and train traditional machine learning models (SVM, Random Forest).
- Begin the implementation of Convolutional Neural Networks (CNNs) for deep learning.

Estimated Hours

- Data preprocessing: 5 hours
- Traditional ML model implementation and training: 6 hours
- CNN implementation: 6 hours

Weeks 5-6: Model Evaluation and Web Interface Development

Tasks

- Evaluate the performance of traditional ML models and CNNs on the testing set.
- Select the most accurate model for brain tumor classification.
- Start the development of the web interface using HTML, CSS, and JavaScript.
- Implement backend functionality for image processing and model integration.

Estimated Hours

- Model evaluation: 4 hours
- Web interface development (frontend): 8 hours
- Backend implementation: 8 hours

Weeks 7-8: Integration with ChatGPT API and Testing

Tasks

- Integrate the web application with the ChatGPT API for generating advice.
- Test the end-to-end functionality of the system, including image upload, classification, and ChatGPT interaction.
- Address any issues identified during testing.

Estimated Hours

- ChatGPT API integration: 6 hours
- Testing and issue resolution: 8 hours

Weeks 9-10: Final Adjustments and Presentation Preparation

Tasks

- Make final adjustments to the web interface and code.
- Prepare the presentation slides with key project details.
- Rehearse the presentation to ensure a smooth delivery.

Estimated Hours

- Final adjustments: 5 hours
- Presentation preparation: 6 hours
- Rehearsal: 4 hours

Week 11: Project Submission and Presentation

Tasks

- Submit the final project on the designated platform.
- Deliver the project presentation, showcasing the implemented system and results.

Estimated Hours

- Project submission: 2 hours
- Presentation: 1 hour

Total Time expected in this project

Approximately 75 hours of total work.

References

- [1] Kaggle Brain Tumor Dataset, <https://www.kaggle.com/datasets/jakeshbohaju/brain-tumor/data>, Accessed on 01/27/2024.