A CUTTING-EDGE APPROACH FOR MRI BRAIN TUMOR DEDUCTION USING SWIN-LSTM

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Abstract

- The abstract discusses Magnetic Resonance Imaging (MRI) as a cutting-edge non-invasive tool for detecting and diagnosing brain tumors, crucial for early intervention and treatment planning.. Established datasets, such as the BraTS dataset, are widely utilized for classification and feature extraction in MRI brain tumor analysis, with accuracies often surpassing 90%.
- This underscores the importance of identifying anomalies associated with brain tumors, prompting the exploration of a novel network architecture employing SWIN-LSTM deep learning techniques. The simulated results demonstrate that the SWIN-LSTM algorithm outperforms traditional methods, showcasing its potential for enhancing accuracy in brain tumor detection and classification compared to standalone SWIN or LSTM models.

Introduction

This project pivots towards pioneering advancements in MRI brain tumor deduction, leveraging the innovative SWIN-LSTM approach. The study investigates the properties and potential applications of SWIN-LSTM technology in MRI brain tumor deduction, offering insights into its effectiveness and viability in clinical settings. By merging cutting-edge technology with critical medical diagnostics, this research aims to revolutionize the field of neuroimaging, providing sustainable solutions for improved patient care and environmental stewardship.

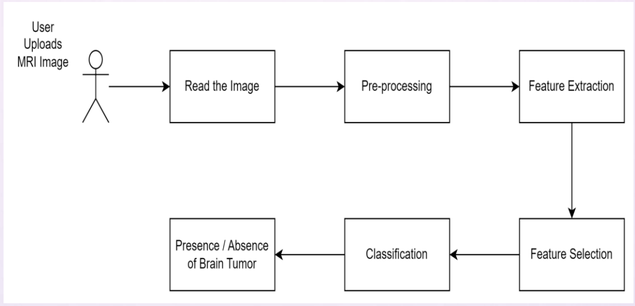
Objective

- Develop a SWIN-LSTM model for MRI brain tumor deduction, aiming for superior accuracy.
- Integrate SWIN architecture with LSTM layers to enhance spatial and temporal analysis of MRI scans.
- Evaluate SWIN-LSTM's clinical relevance through performance assessments on diverse MRI datasets.

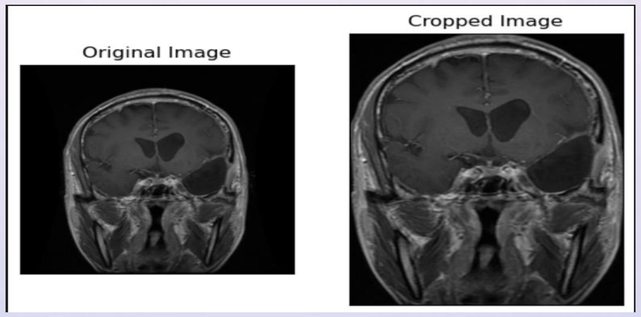
Dataset

- Organize the MRI brain tumor dataset into distinct folders representing different tumor types, including glioma, meningioma, pituitary tumors, and a separate folder for images without tumors ("notumor").
- Ensure proper labeling and categorization within each folder to facilitate efficient data loading and preprocessing during model development and training phases.

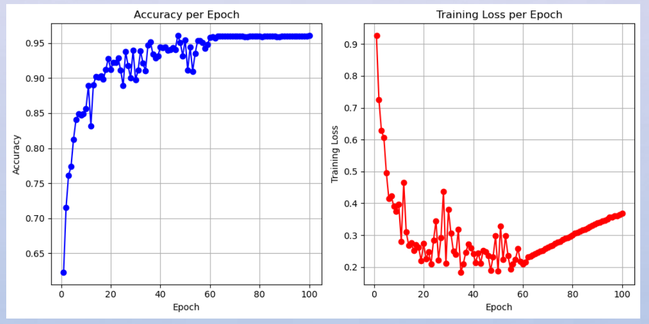
System Design



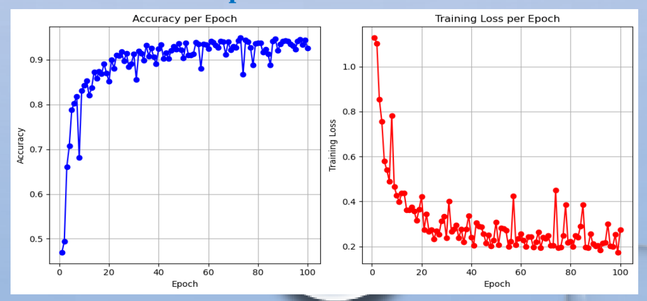
Pre Processing



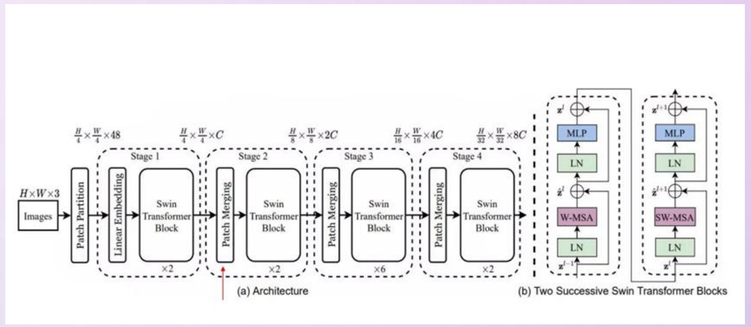
SWIN Output



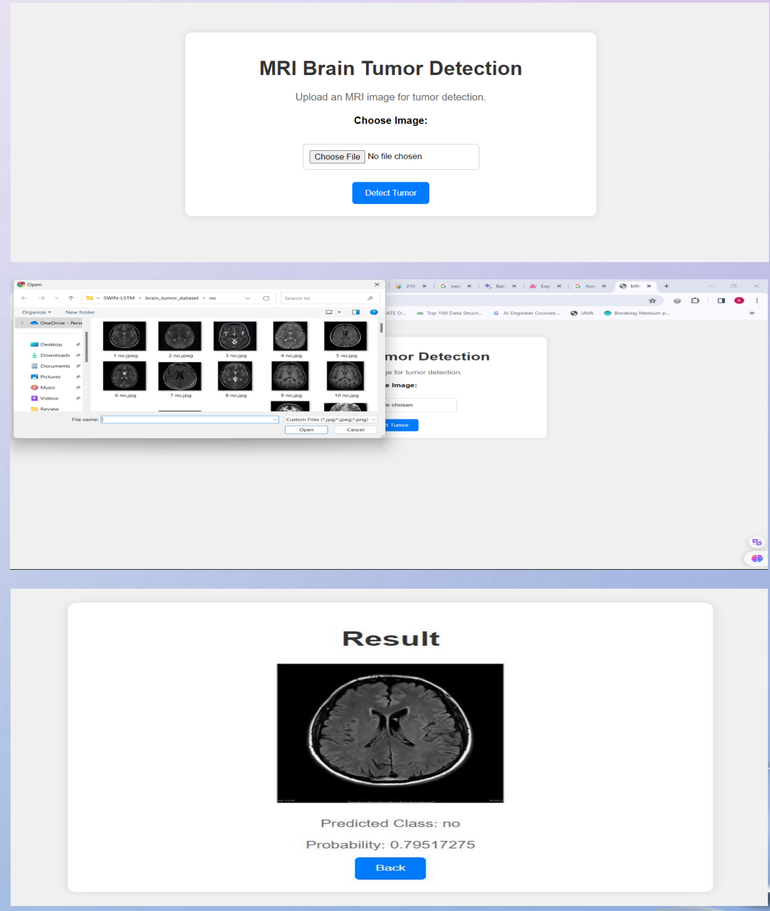
SWIN-LSTM Output



SWIN Architecture



Results



Conclusion

The integration of SWIN-LSTM demonstrates remarkable efficacy in detecting MRI brain tumor characteristics, highlighting its potential for advanced diagnostic capabilities in neuroimaging.