Brain Tumor Detection using Deep Learning

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Motivation

- The early detection and treatment of brain tumors can significantly reduce mortality rates.
- Traditional methods (CT, MRI, etc.) are used for detection but can be costly and time-consuming.
- Deep learning offers a promising alternative for efficient and accurate brain tumor detection using MRI images.

Problem Statement

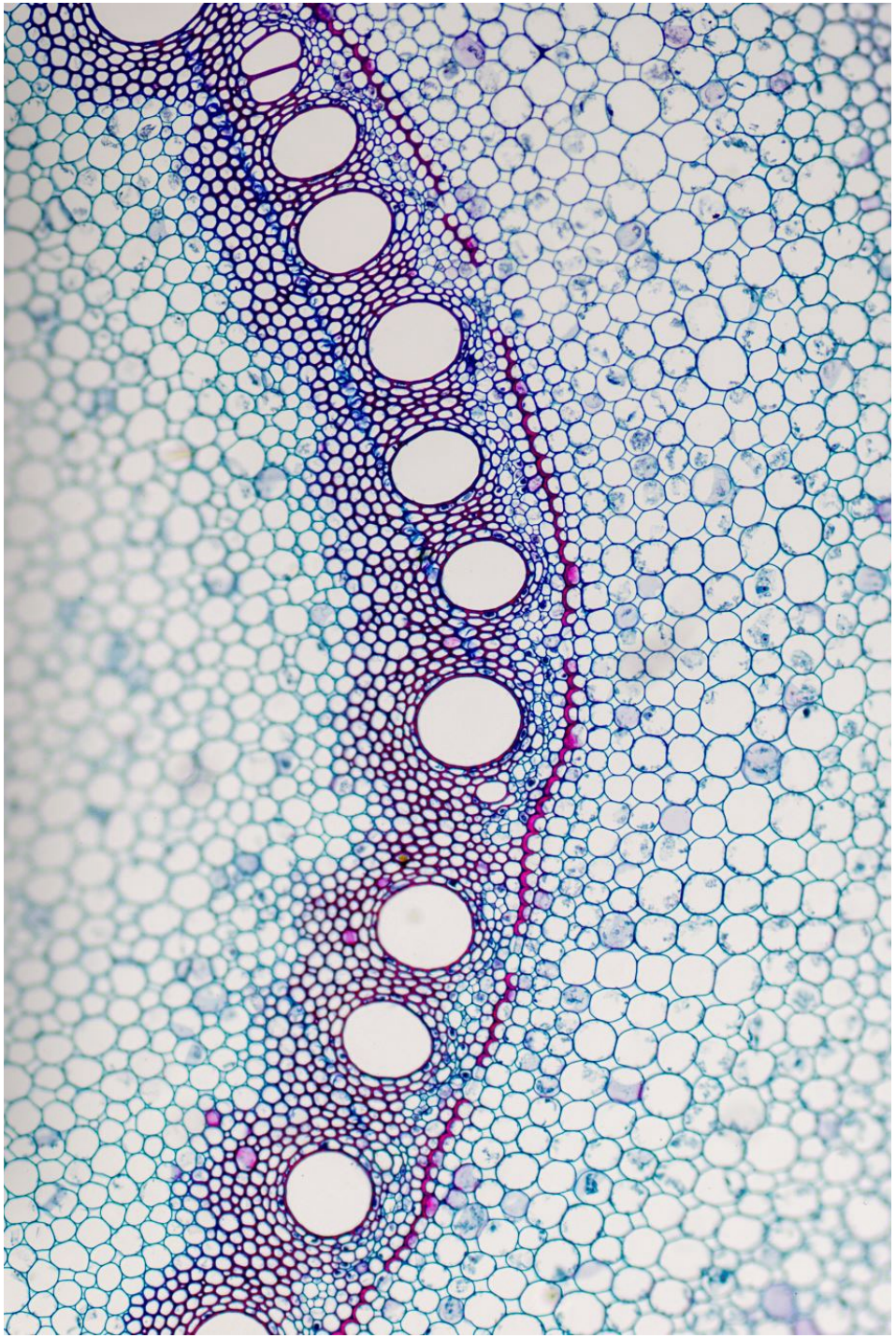
Brain tumors, both malignant and benign, require timely and accurate detection.

Existing diagnostic methods are often expensive and complex.

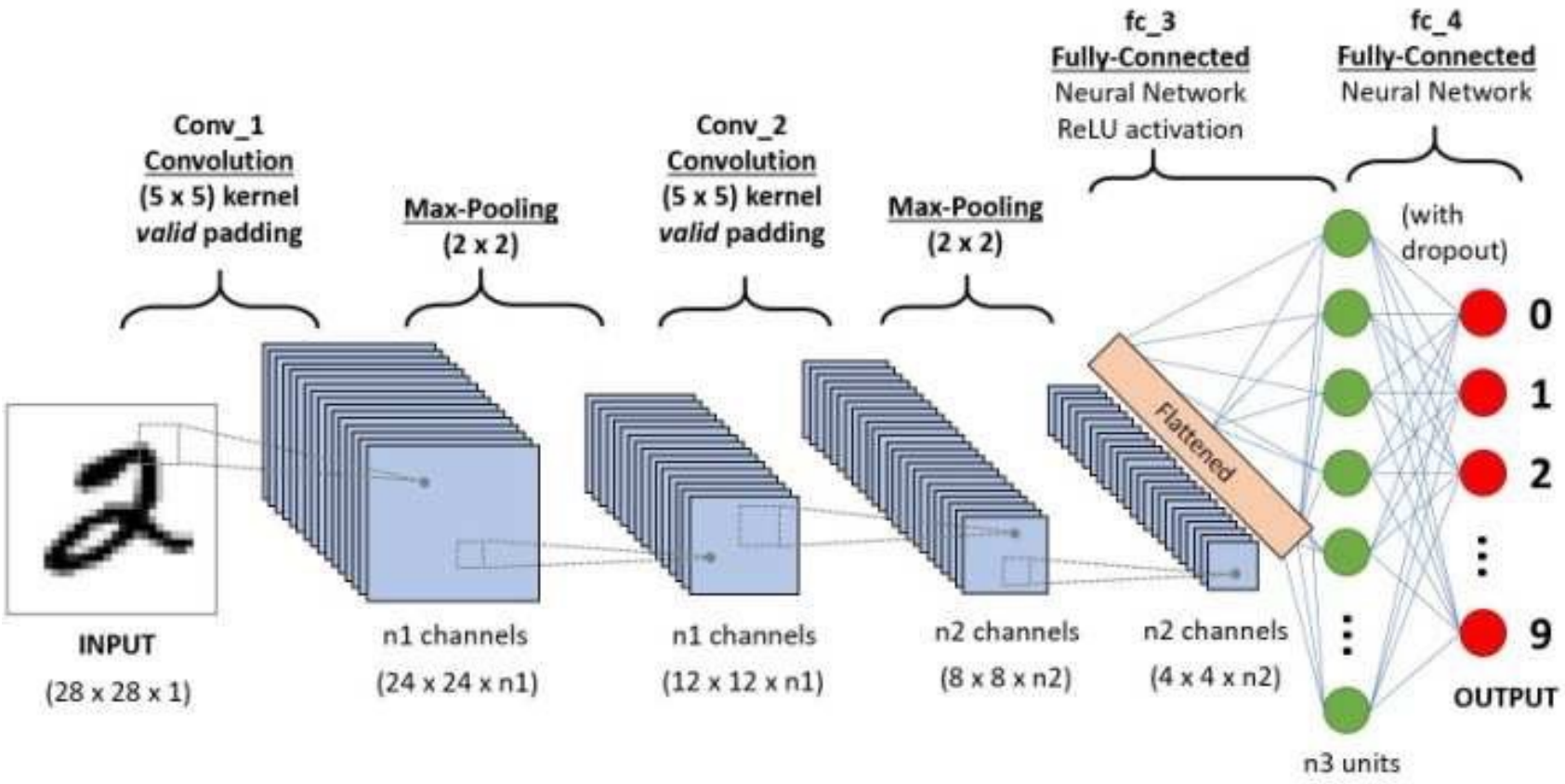
There is a need for an automated, efficient, and cost-effective method to detect brain tumors from MRI images.

Objectives

- To develop a system for detecting brain tumors from MRI images using deep learning techniques.
- To identify abnormal images and segment tumor regions.
- To estimate the density of the tumor from segmented masks for better therapeutic planning.

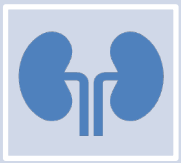


Architecture



Contributions

Development of a deep learning model using Convolutional Neural Networks (CNN) for brain tumor detection.



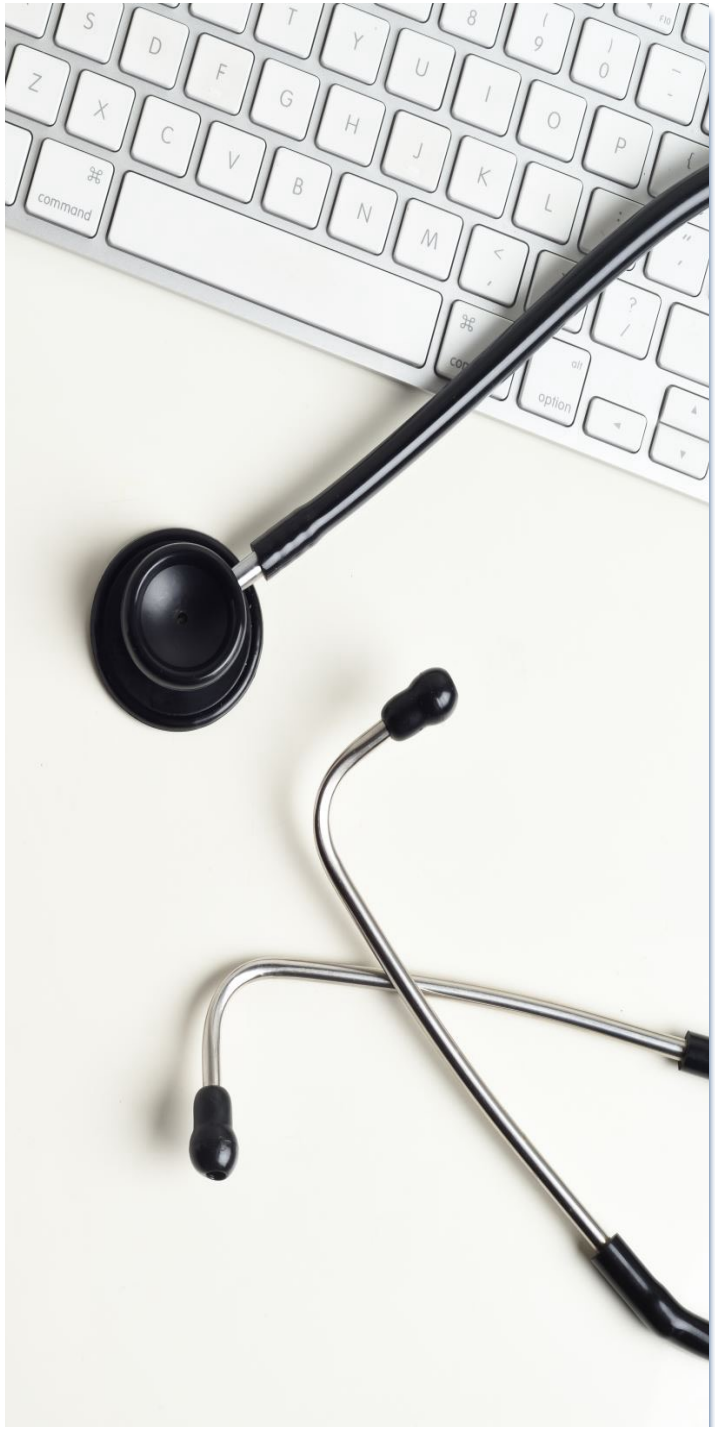
Implementation of multi-level thresholding for accurate tumor segmentation.

Creation of a dataset with augmented MRI images for robust model training.

Achieved a detection accuracy of 98% with the proposed method.

Results

- The model was trained on 2530 augmented images with a final dataset containing 980 normal and 1550 abnormal images.
- Achieved an overall accuracy of 98% in detecting brain tumors.
- ROC curves demonstrate high sensitivity and specificity for both normal and abnormal cases.
- Performance comparison with other methods shows superior accuracy of the proposed method.



Critical Analysis

Strengths:

- High accuracy and efficiency in detecting brain tumors.
- Automated process reduces the need for manual intervention and reduces diagnosis time.

Limitations:

- Model performance is dependent on the quality and quantity of training data.
- Further improvements needed for real-time clinical application.

Future Work:

- Integration with a web interface for broader accessibility.
- Expansion of the model to detect other diseases from MRI images.
- Exploration of additional parameters for improved therapeutic planning.

References

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THANK YOU