# Identifying Brain Tumors with Neural Networks Using MRIs

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# The Importance of Identifying Brain Tumors

Early and Accurate Detection:

- Saves Lives
- Reduces Treatment Costs
- Optimizes Resource Allocation
- Enhances Patient Trust and Brand Reputation
- Gives a Competitive Advantage

# Project Goals

- Develop a Model Capable of Identifying Brain Tumors from MRIs
- Develop a Model Capable of Distinguishing Between Types of Brain Tumors
- Test the Best Models on Unseen Data

# The Brain Tumors 256x256 Dataset

- Sourced from Kaggle.com
- 3,096 Brain MRIs
  - Pituitary Tumor - 844 images
  - Glioma tumor - 901 images
  - Meningioma tumor - 913 images
  - Normal - 438 images
- Uniform Resizing 256x256
- Image Quality Enhancement

# The Modeling Process

1. Preprocessing for Binary Modeling
2. Training and Validation of Binary CNN Models
3. Evaluation of Final Binary Model
4. Preprocessing for Multi-Class Modeling
5. Training and Validation of Multi-Class CNN Models
6. Evaluation of Final Multi-Class Model

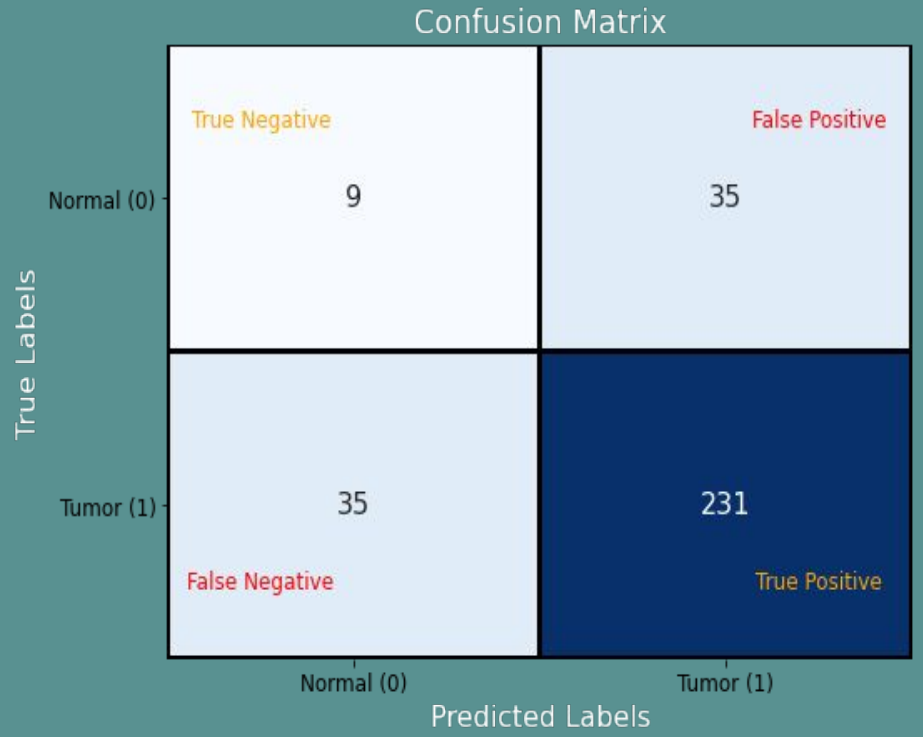
# The Final Model

Binary Model:

- 92% Accuracy
- Identified 86% of Tumors
- Misclassified 80% of Non Tumors
- Class Imbalance

Multi-Class Model:

- Failed to Distinguish between Different Tumor Types
- Not Ready for Deployment
- Limited Data Size



# Benefits of Implementing the Final Model

- Improved Diagnostic Accuracy & Speed
- Superior Patient Outcomes
- Increased Efficiency and Productivity
- Cost Reduction
- Enhanced Organizational Reputation

# Limitations

Data:

- Class Imbalance
- Limited Data Size
- Lack of Metadata

Models:

- False Positives
- Failure to Differentiate between Tumor Types
- Generalizability Concerns

# Summary

- Early Tumor Diagnosis is Crucial
- The Final Model:
  - Successfully Identified 86% of Tumors
  - Struggled with Non Tumors and Distinguishing between Types of Tumors
- Limitations Are Due to:
  - Class Imbalance
  - Dataset Size
- They can be Addressed By:
  - Further Training on More Robust and Balanced Data
- Implementing this Model can Lead to:
  - Improved Patient Outcomes
  - Enhanced Efficiency, Profitability, and Reputation

# Thankyou! Any Questions?