RSNA-MICCAI Brain Tumor Radiogenomic Classification

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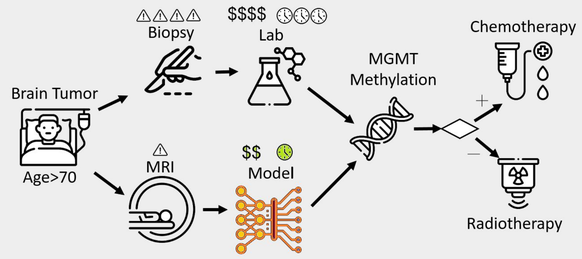
Github

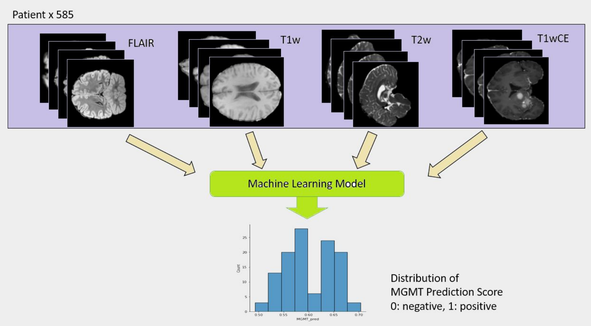
Introduction

- malignant tumor in the brain is a life-threatening condition.
- MGMT promoter methylation is a strong predictor of responsiveness to chemotherapy.
- The goal of this project is design a model can detect MGMT value from MRI scan.



Structure

- Reshape data: use same amount of mri pictures for each type data.
- Training: we tried four different models.
  - EfficientNetb0
  - ResNet50
  - CNN
  - DenseNet121



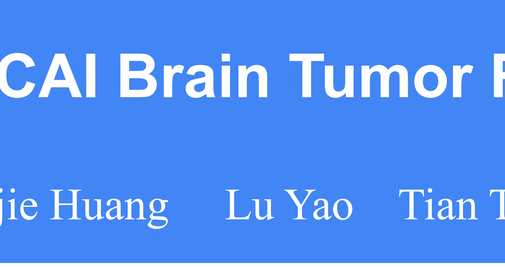
Result

Two sets of results are presented:

1. **ResNet50-LSTM Model:**
   The model trained on a RSNA-MICCAI database of MRI (magnetic resonance imaging) scans of 509 patients.
   (AUC = 0.66)

2. **DenseNet121-Monai Model:**
   Monai is a deep learning framework for medical imaging.
   The model tested on 76 test samples.
   (AUC=0.58).

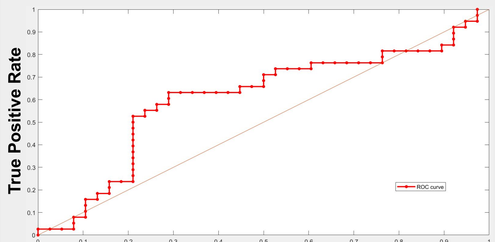
ResNet50-LSTM Model
ROC Curve (on test data)



ResNet50-LSTM Model
Confusion Matrix

Total Data 76		Predicted: Positive (MGMT = 1)	Predicted: Negative (MGMT = 0)
Actual	Positive (MGMT = 1)	29	9
Actual	Negative (MGMT = 0)	19	19

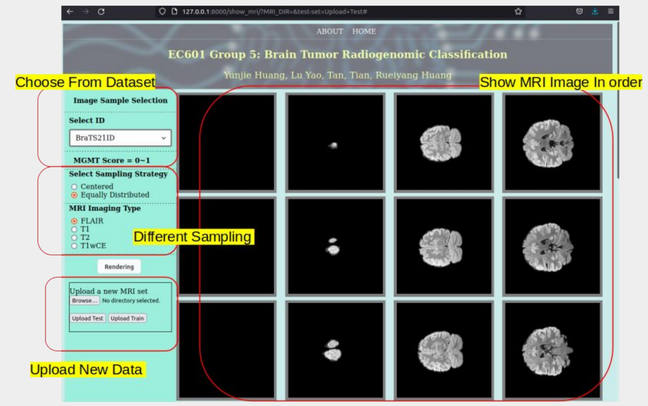
ResNet50-LSTM Model
ROC Curve (on test data)

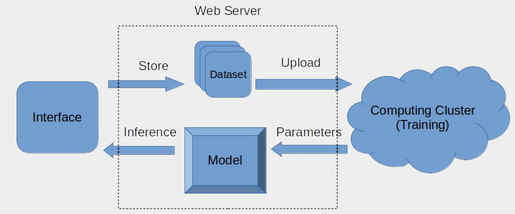


DenseNet121-Monai Model
Confusion Matrix

Total Data 76		Predicted: Positive (MGMT = 1)	Predicted: Negative (MGMT = 0)
Actual	Positive (MGMT = 1)	4	34
Actual	Negative (MGMT = 0)	7	31

Interface





Feature improvement

- Collect more Training data
- Training model only with the tumor on it

Team Members	Score	Entries	Last
	0.62174	17	3mo
	0.61881	28	4mo
	0.61732	9	2mo
	0.61562	124	3mo
	0.60751	5	2mo
	0.60696	196	2mo
	0.60394	1	4mo
	0.60322	12	3mo