

Enhancing Brain Tumor Detection using Deep Learning

Group 22



Introduction

- Background Study
- Problem in brief
- Proposed solution and significance of study
- Project Description



Background Study

- Brain tumors are a significant global health concern, impacting millions of individuals annually.
- Traditional diagnostic methods for brain tumors, such as clinical observation and imaging techniques, can be subjective and prone to human error.
- Image processing techniques offer a non-invasive and objective approach to analyzing medical images for brain tumor detection.
- Recent advancements in laser and photonics-based medical imaging technology have improved the accuracy and efficiency of brain tumor diagnosis.

Research Questions

- 1** can the integration of automated brain tumor detection improve the accuracy and efficiency of disease diagnosis ?

- 2** In what ways can machine learning algorithms streamline the diagnostic process for brain tumors, reducing reliance on manual interpretation and enhancing accessibility to specialized expertise?

Problems

- Brain Tumors are need to be identified in initial state and the appropriate treatments should be provided.
- Brain Tumors affect a wide range of demographic groups and necessitate prompt and accurate diagnosis in order to initiate effective treatment.
- A neurosurgeon may also find it difficult to diagnose the brain tumors and may require expensive laboratory tests to correctly identify the type and stage of the disease.

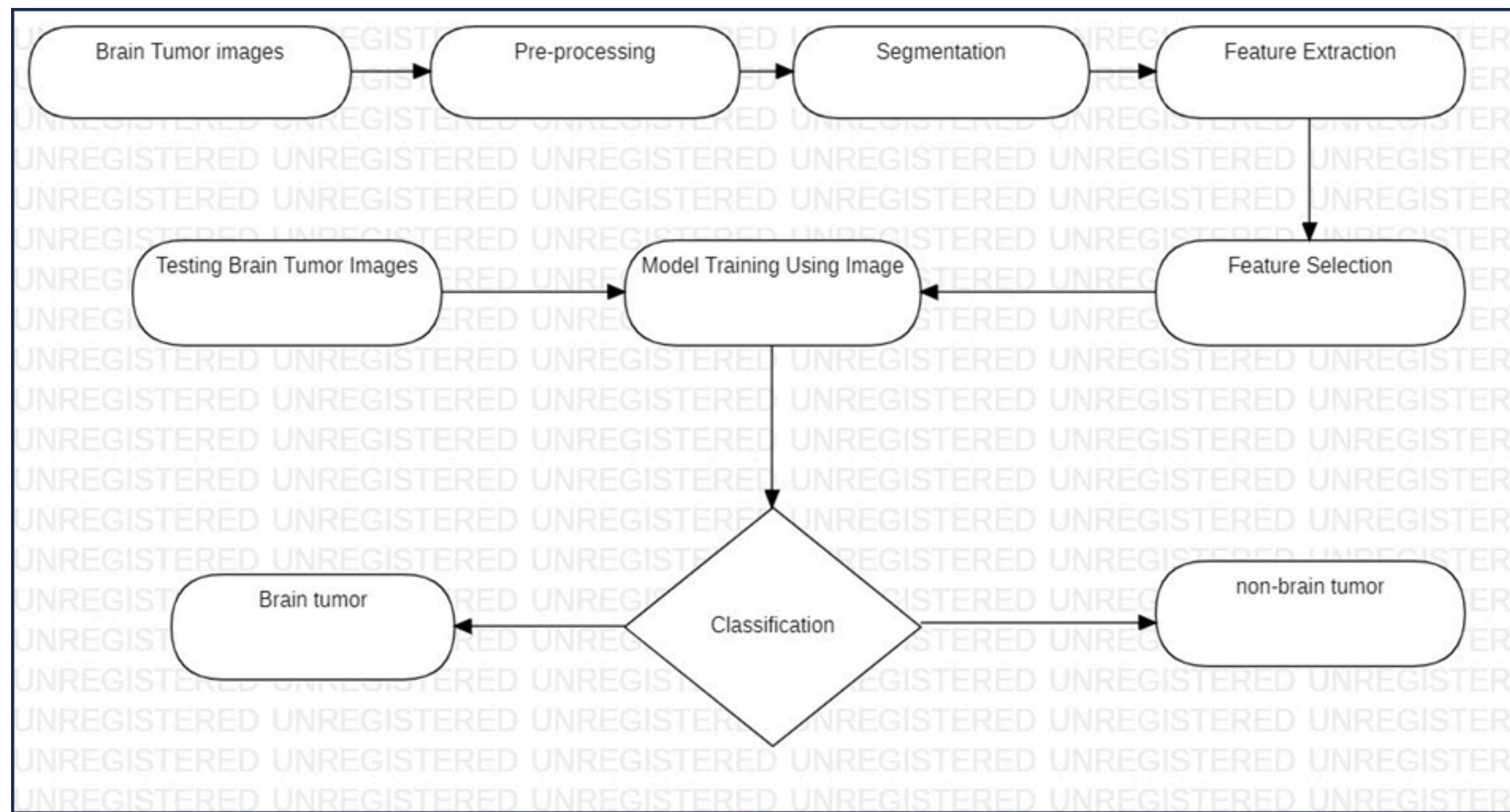
Proposed solution and significance

- Machine learning algorithms and image processing techniques have demonstrated promise in distinguishing between a variety of the tumor conditions.
- Our system will not only detect the brain tumor it will classify the brain tumor according to the place of the tumor in the brain. We are using CNN, SVM and a new algorithm so the result is multi versatile and more reliable.

Project Description

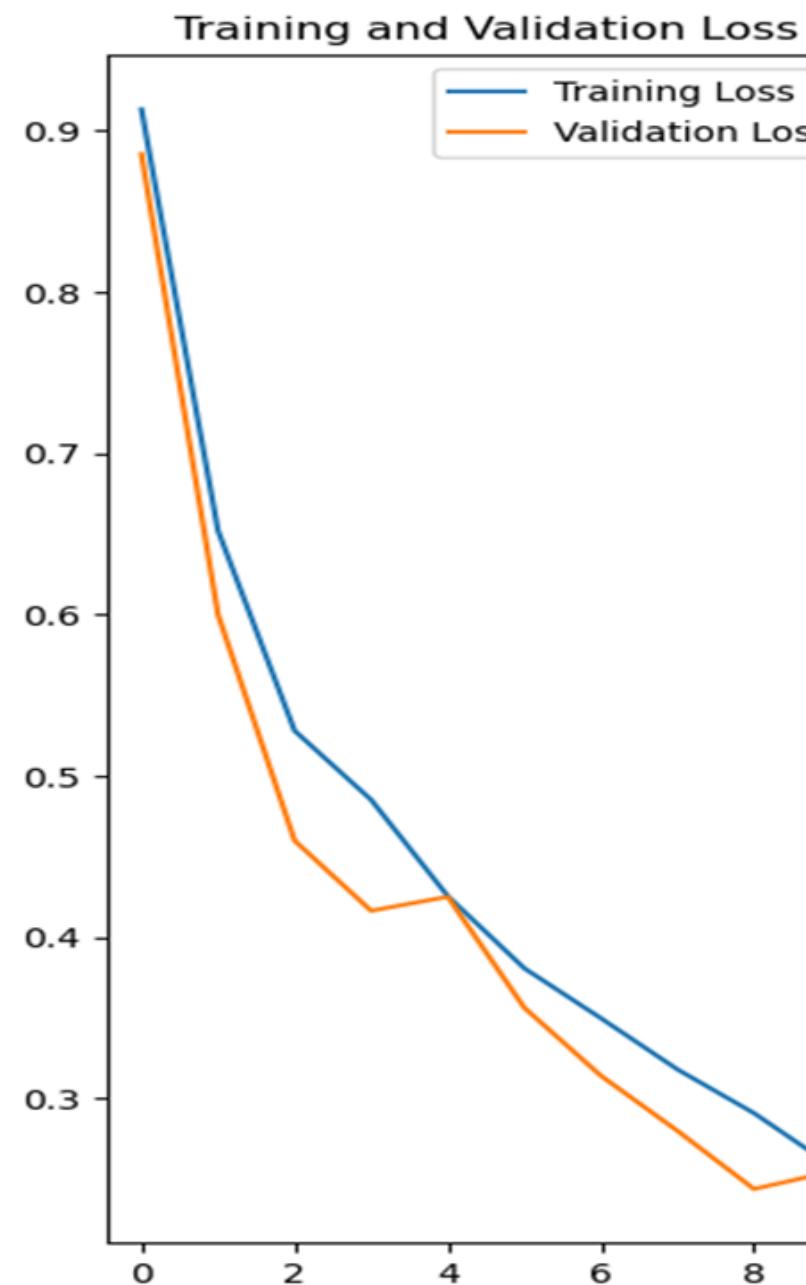
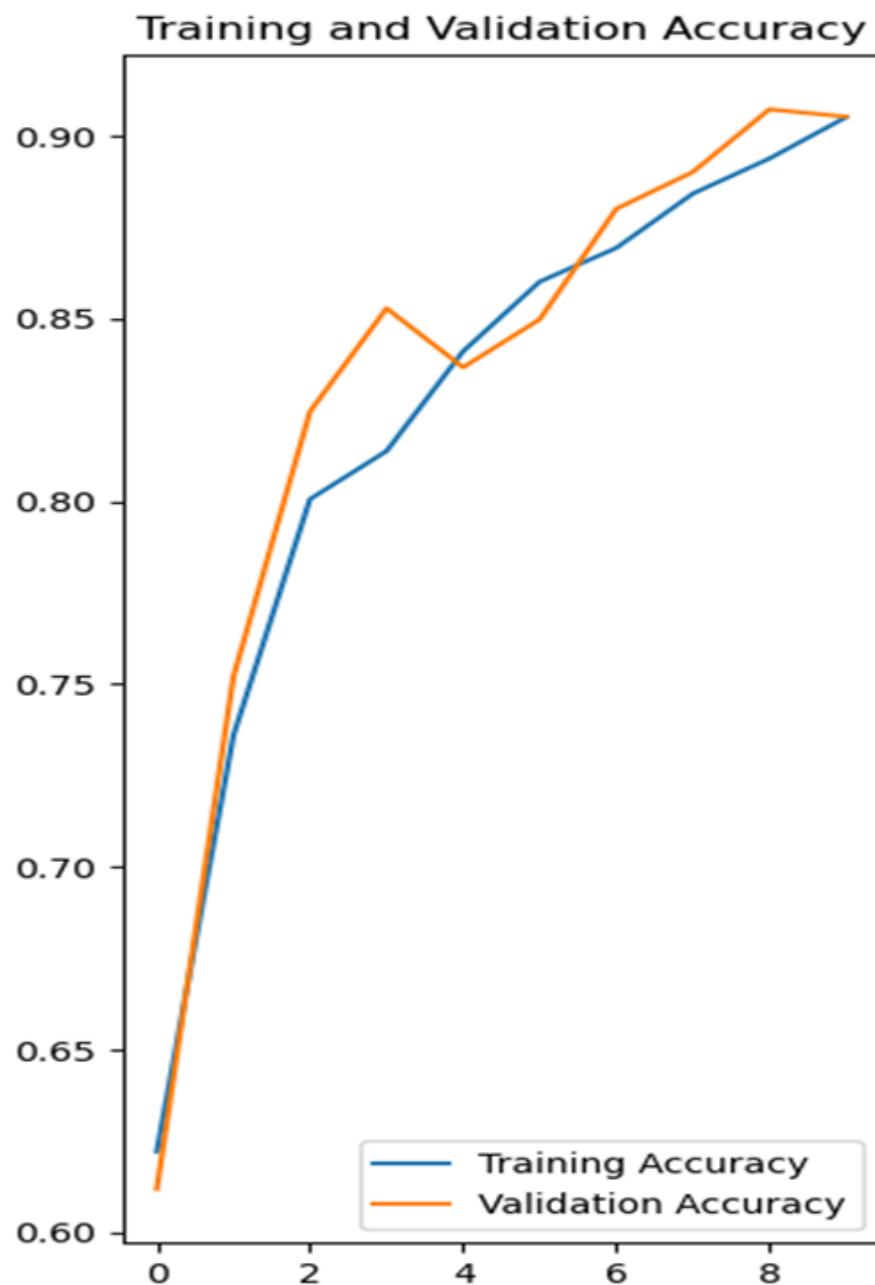
- Nowadays many people didn't recognize how big diseases they got as brain tumor. They have no idea about that they have tumor or just a headache. We have found a remedy for that.
- First we have firstly collected the adequate data for this. Then we have done the data augmentation and the necessary things for our research.
- Then we have trained our model using the datasets that we have collected. Finally we are ready to detect brain tumor using the models we have.

Methodology



Results and Discussions

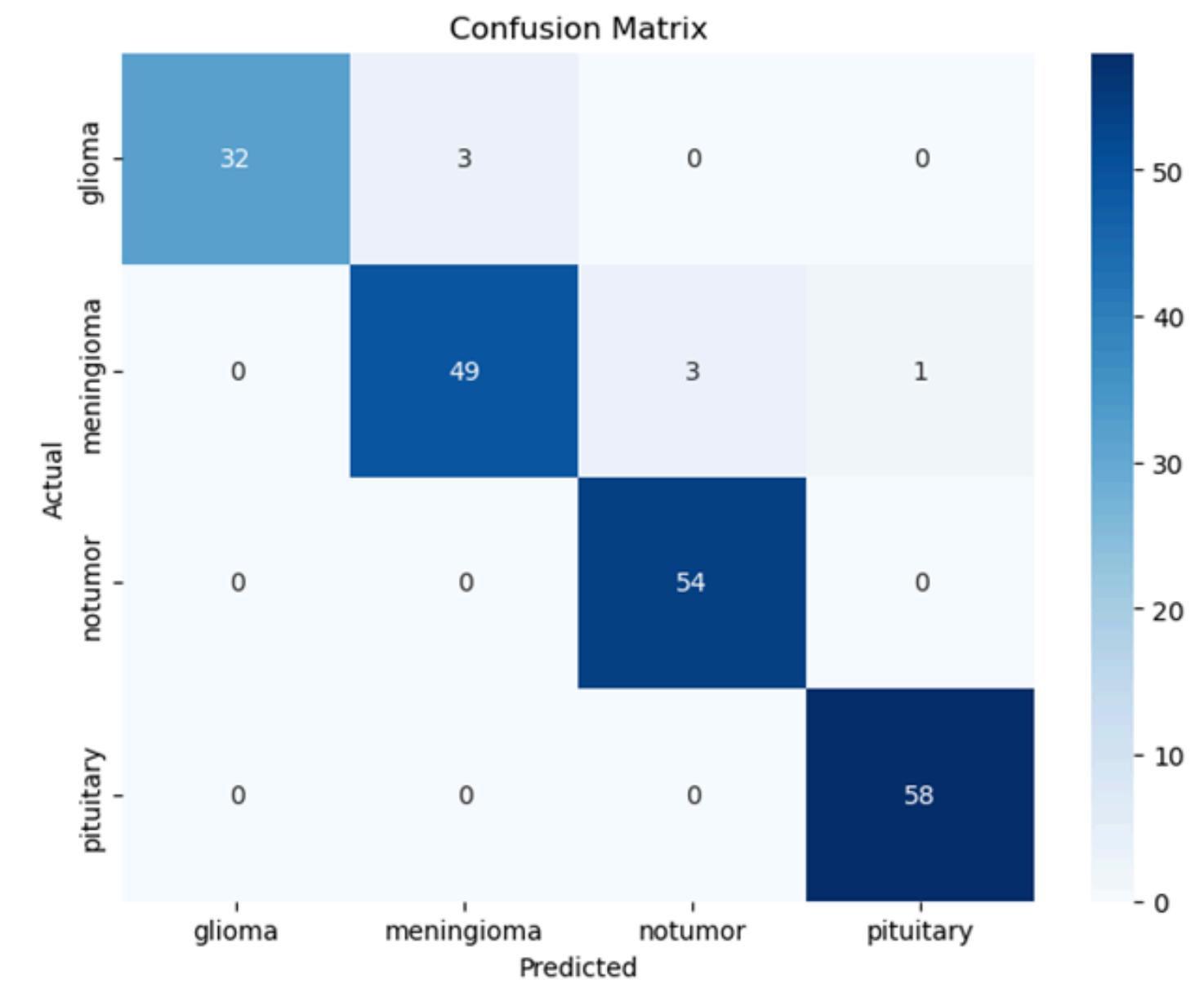
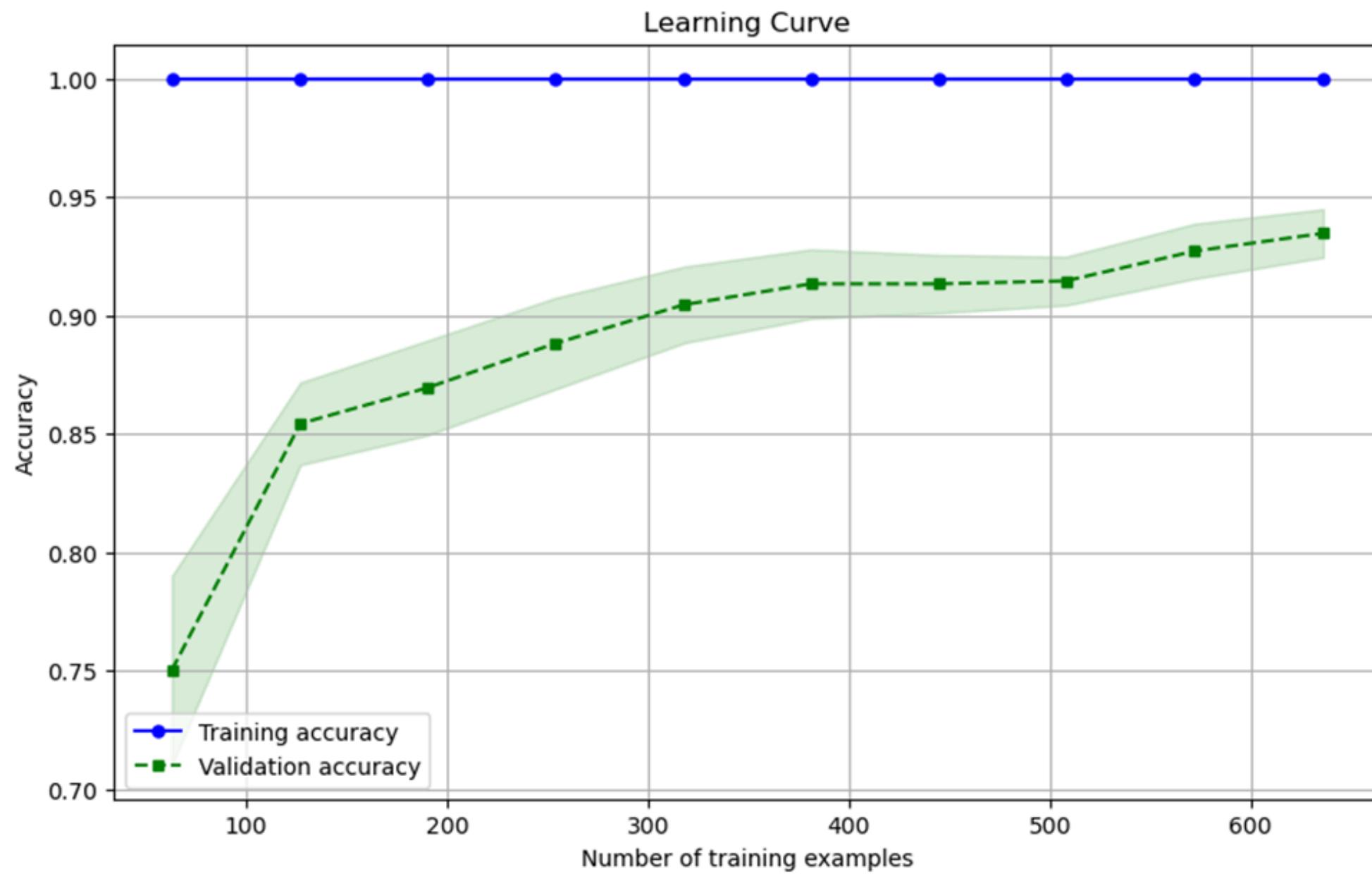
CNN Model



... Model: "sequential_4"

Layer (type)	Output Shape	Param #
sequential (Sequential)	(None, 256, 256, 3)	0
conv2d_9 (Conv2D)	(32, 254, 254, 32)	896
max_pooling2d_9 (MaxPooling2D)	(32, 127, 127, 32)	0
conv2d_10 (Conv2D)	(32, 125, 125, 64)	18496
max_pooling2d_10 (MaxPooling2D)	(32, 62, 62, 64)	0
conv2d_11 (Conv2D)	(32, 60, 60, 64)	36928
max_pooling2d_11 (MaxPooling2D)	(32, 30, 30, 64)	0
flatten_2 (Flatten)	(32, 57600)	0
dense_4 (Dense)	(32, 64)	3686464
...		
Total params:	3743044 (14.28 MB)	
Trainable params:	3743044 (14.28 MB)	
Non-trainable params:	0 (0.00 Byte)	

SVM Model



classification Report:

	precision	recall	f1-score	support
glioma	1.00	0.91	0.96	35
meningioma	0.94	0.92	0.93	53
notumor	0.95	1.00	0.97	54
pituitary	0.98	1.00	0.99	58
accuracy			0.96	200
macro avg	0.97	0.96	0.96	200
weighted avg	0.97	0.96	0.96	200

Accuracy: 0.965

Required Resources

Hardware Requirements

- Laptop or pc
- Internet Connection

Software Requirements

- TensorFlow
- Google Colab
- Keras
- Windows 10/11 operating system
- MS Office package

Individual Contribution

UWU/CST/19/004

- Background study and problem identification
- Data collection
- Literature review
- Training the CNN model
- Testing the CNN model
- Thesis writing

UWU/CST/19/010

- Background study and problem identification
- Data collection
- Classification
- Data Augmentation
- Training the SVM model
- Thesis writing

UWU/CST/19/020

- Background study and problem identification
- Data collection
- Literature review
- Training the SVM model
- Testing the SVM model
- Thesis writing

Plan and Schedule

Our Team

1

UWU/CST/19/004 Kunarasa Tharsujan

2

UWU/CST/19/010 Kugathasan Sharangan

3

UWU/CST/19/020 Balachandran Thinusan

Thank You