BRAIN TUMOR SEGMENTATION

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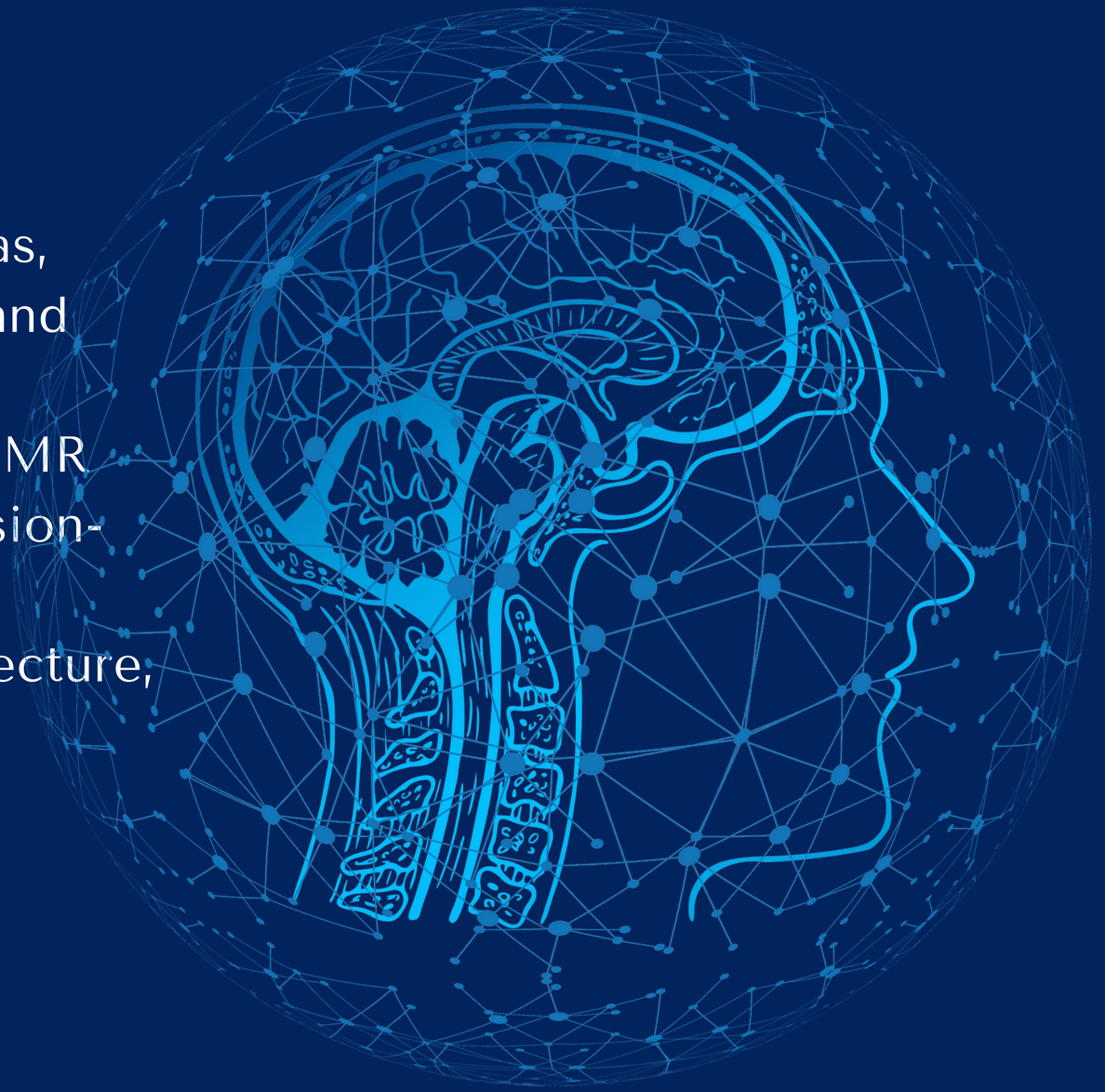
Abstract

We employed the U-Net model, leveraging its encoder and decoder architecture, to predict accurate masks for our dataset. Specifically, our dataset involves the segmentation of brain tumors utilizing the T1 format in MRI data."

PYTHON

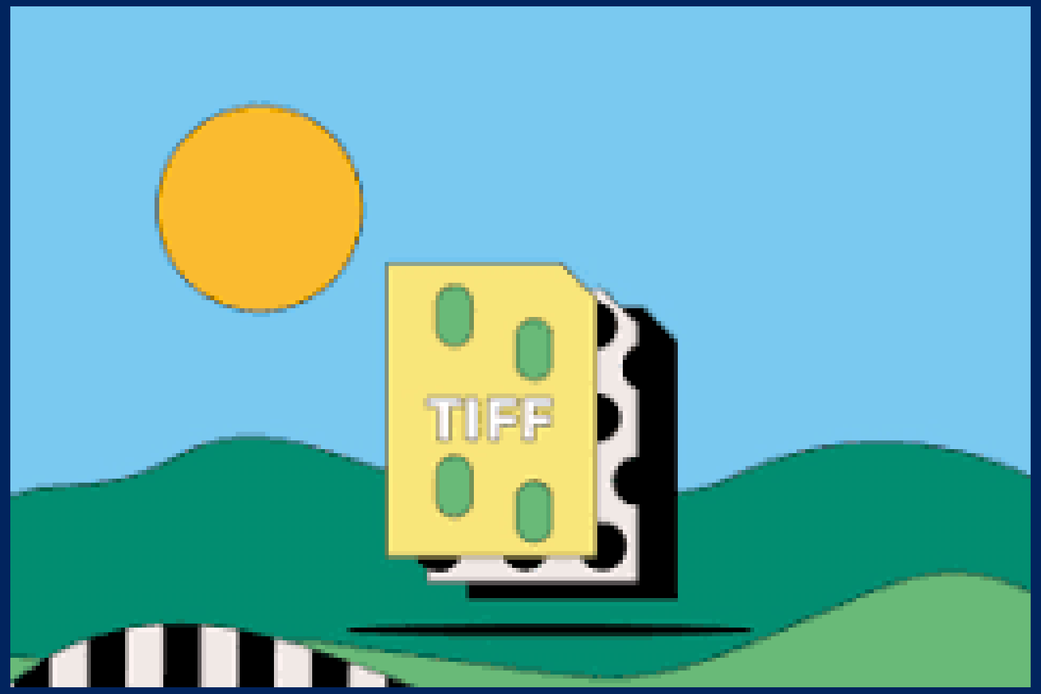
Introduction

- Brain tumors, especially lower-grade gliomas, pose significant challenges in diagnostics and treatment planning.
- Accurate tumor boundary delineation from MR images is crucial for effective clinical decision-making.
- Deep learning techniques, and UNet architecture, offer avenues for tumor delineation.



What is Tiff format?

A TIFF, which stands for Tag Image File Format, is a computer file used to store raster graphics and image information. TIFFs are a handy way to store high-quality images before editing if you want to avoid lossy file formats.



Data Preprocessing

01

set the image and mask width and height 256

02

make images in rbg and mask in grey scale

03

divide data on batch size 32

04

normalize the data to be from 1 and 0

Data Augmentation

01

Rotation

02

Shiftting

03

Zooming

04

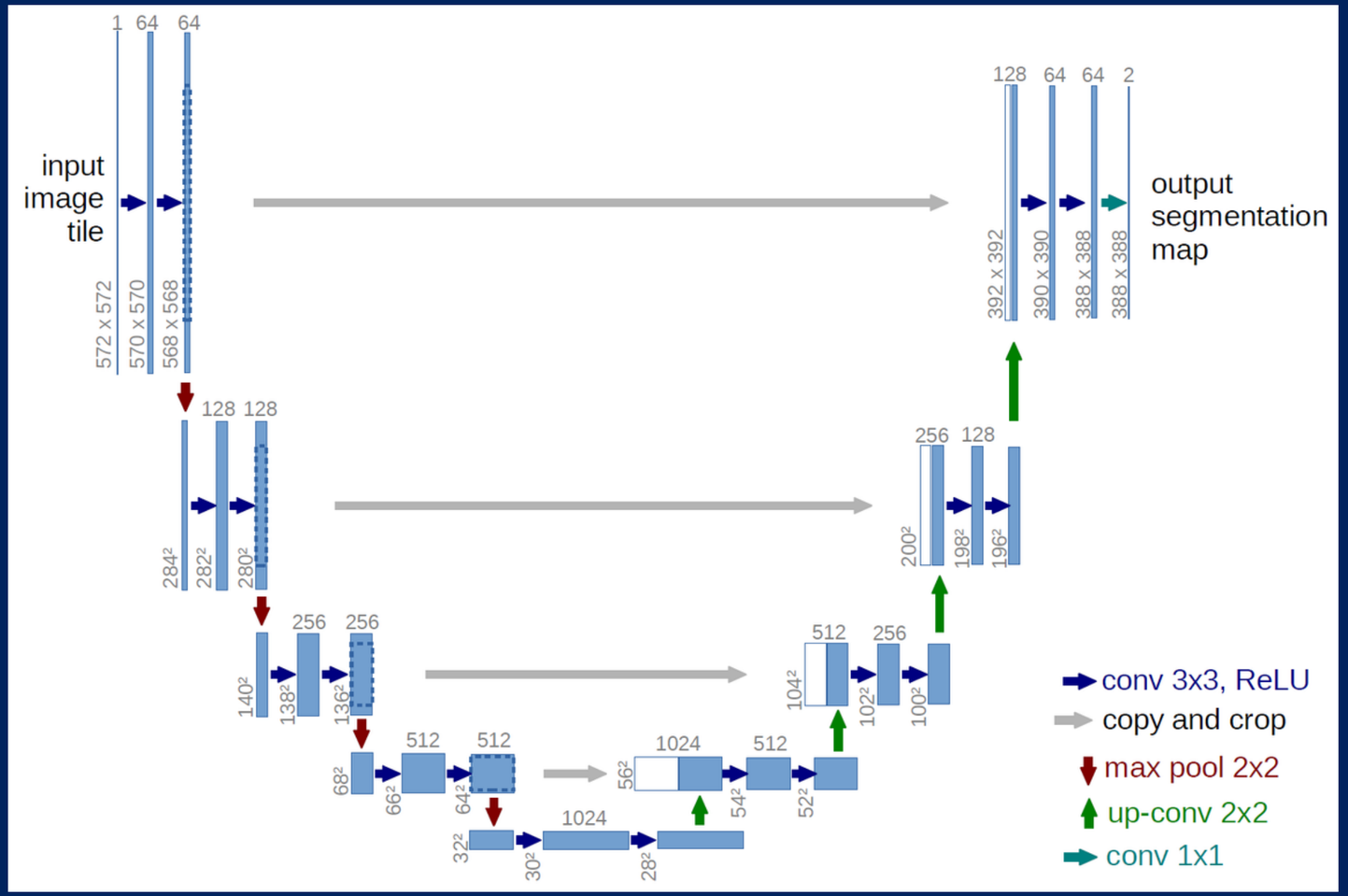
Flibbing

Model Architecture

- Our model has 5 encoders and 4 decoders
- each encoder and decoder contain Conv2D and activation function ‘relu’ and batch normalization and max pooling
- and learning rate 1e-4 using decay learning rate
- loss dice coef loss
- optimizer Adam
- epoch 150

What is U-net?

U-Net is a popular deep-learning architecture for semantic segmentation. Originally developed for medical images, it had great success in this field. But, that was only the beginning! From satellite images to handwritten characters, the architecture has improved performance on a range of data types.



Metrics and loss Used

We employed three scores, namely accuracy score, Dice score, and IoU score, to comprehensively evaluate and measure performance in our analysis.

We used the Dice score loss for calculating the loss for each epoch and for enhancing the weights at each epoch.

road map of building model

01

Load Images

02

Data Preprocessing

03

Data Visualization

04

Split data into training and testing sets

05

Data Augmntation

06

build model Architecture

07

Train Modle

08

Evaluate the model with test data

09

Save weightsodel

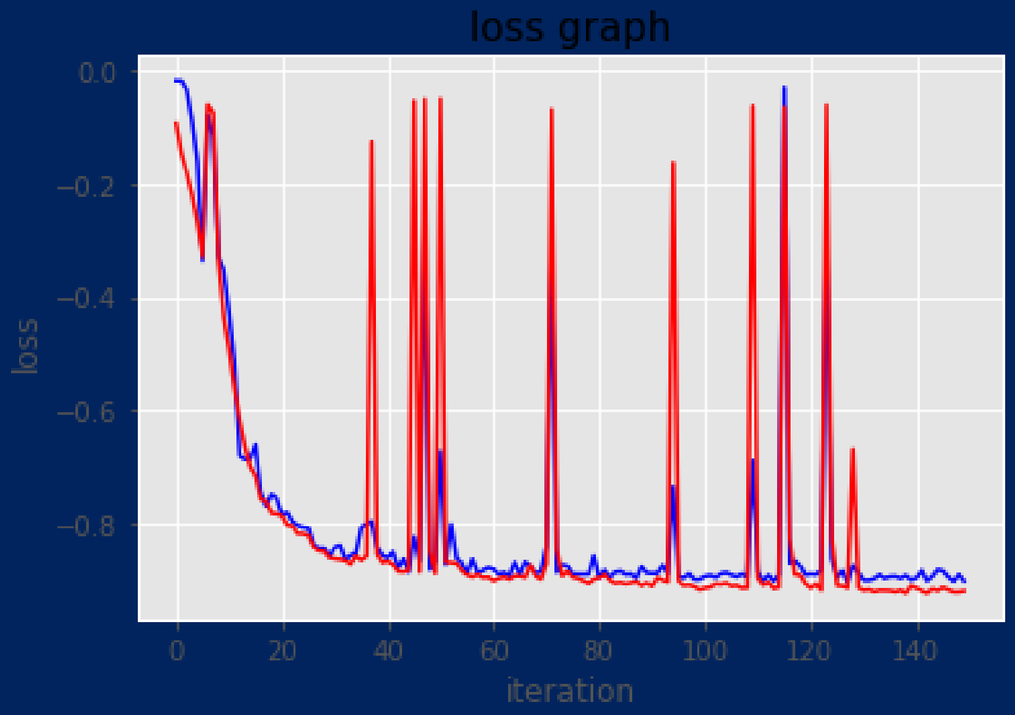
Train Scores

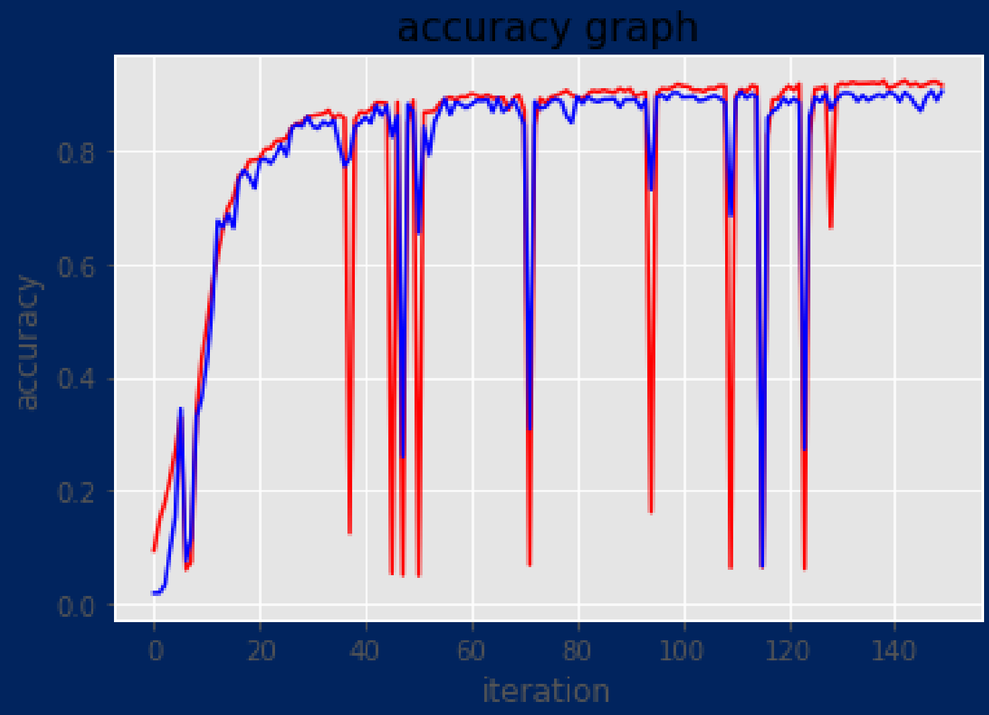
model	accuracy	Dice coef	iou	Dice coef loss
U-net	99.8	91.69	85.26	-0.9209

Test Scores

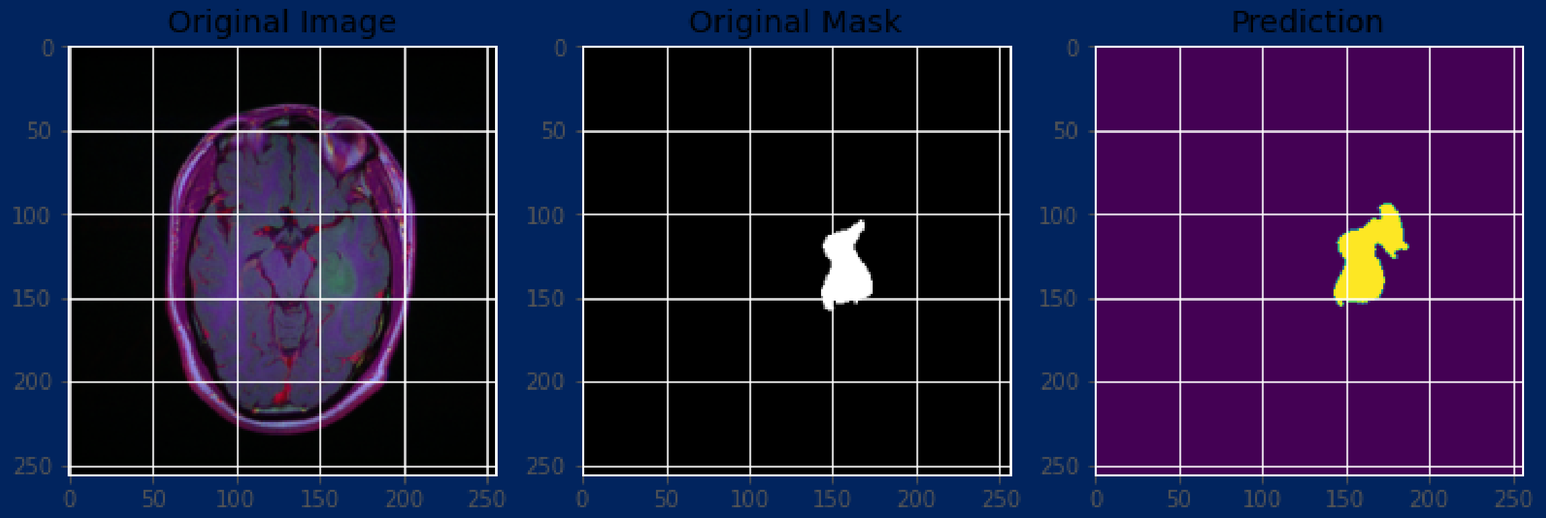
model	accuracy	Dice coef	iou	Dice coef loss
U-net	99.84	90.67	83.14	-0.903

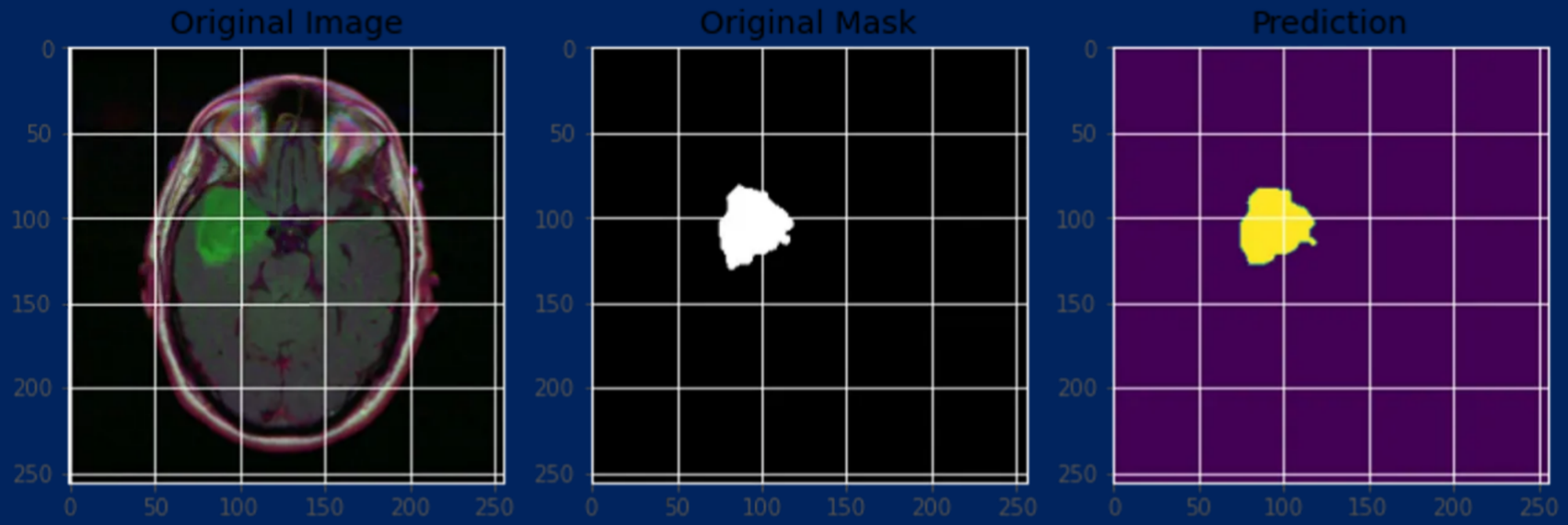
Graphs of history epochs





some of Predictions





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