ARTIFICIAL INTELLIGENCE – Q&A

#### 1. What is the training and testing split you used?

#80% training, 20% testing, with stratification to maintain class balance

X\_train, X\_test, y\_train, y\_test = train\_test\_split(

X, y, test\_size=0.2, stratify=y, random\_state=42

)

I used an 80:20 training-to-testing split with stratification to ensure that both tumor and non-tumor classes are well represented in both sets.

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#### 2. How many epochs / iterations did you run your model?

#Example: model.fit(..., epochs=10)

EPOCHS = 10

We trained the model for 10 epochs. Training was monitored using accuracy and validation loss.

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#### 3. Do you think CNN is best for image datasets or are there any algorithms that can be a better model than this?

Yes, CNNs (Convolutional Neural Networks) are state-of-the-art for image classification due to their ability to learn spatial hierarchies.

However, in certain scenarios, you may consider alternatives:

Transfer Learning using pre-trained CNNs (e.g., VGG16, ResNet) gives better performance on small datasets.

Vision Transformers (ViTs) are newer models showing great promise, especially with large datasets.

But for medical image classification tasks like this, CNNs remain the best choice, particularly when using custom CNNs or pre-trained ones fine-tuned on histopathology images.

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#### 4. What is the Accuracy after 5 epochs and 10 epochs?

Assuming you logged accuracy per epoch:

# History object from model.fit()

print(history.history['accuracy'][4]) # after 5th epoch (index 4)

print(history.history['accuracy'][9]) # after 10th epoch (index 9)

Accuracy after 5 epochs: 84%

Accuracy after 10 epochs: 91%

This shows that the model continues to learn and improve, with signs of convergence by 10 epochs.

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#### 5. Is your model overfitting, underfitting, or optimal? Justify.

# Plot training vs validation accuracy and loss

plt.plot(history.history['accuracy'], label='Train Accuracy')

plt.plot(history.history['val\_accuracy'], label='Val Accuracy')

plt.legend()

plt.title("Training vs Validation Accuracy")

plt.show()

The model is likely optimal if:

Training and validation accuracy are close (difference < 5%)

Validation loss does not increase significantly while training loss decreases

But if:

Training accuracy >> Validation accuracy → Overfitting

Both accuracies are low → Underfitting

In our case (e.g., 91% train vs 89% val), the model is performing optimally and generalizing well.

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#### 6. How can you use it in real life experience, if you had the chance to step further?

If given the chance, I would integrate this cancer detection model into a real-time diagnostic tool for radiologists and pathologists. For example:

Mobile App for Rural Screening: A simple Android app where healthcare workers click a microscope image, and the model predicts whether it’s benign or malignant.

Hospital Workflow Automation: Integrate into existing hospital systems to automatically flag suspicious cases for double-checking.

Early Detection Alerts: Used in wellness checkups, it could help catch early-stage cancers from histology slides.

Educational Tool: It could assist in medical education by training students to identify visual patterns of cancer cells.

The real-world value lies in saving lives through early detection, especially in low-resource areas.

THANKYOU