

Insights Document for Task 3

Objective: Use a CNN to classify synthetic histopathological images into two categories: Class 0 (healthy tissue) and Class 1 (cancerous tissue).

Observations:

1. Model Performance:

- **Training Accuracy:** Improved steadily over 10 epochs, reaching high values.
- **Validation Accuracy:** Remained closely aligned with training accuracy, indicating minimal overfitting.
- **Test Accuracy:** The model achieved a high level of accuracy, confirming its ability to generalize well.

2. Loss Trends:

- Both training and validation loss decreased consistently, suggesting effective learning.
- No significant divergence between training and validation loss, which supports model robustness.

3. Classification Report:

- High precision and recall values for both classes indicate the model's reliability in detecting cancerous tissue.
- Balanced F1-scores show consistent performance across classes.

4. Potential Improvements:

- **Hyperparameter Tuning:** Adjust epochs, batch size, or CNN architecture to explore further improvements.
- **Data Augmentation:** Increase diversity in training data to improve generalization.
- **Transfer Learning:** Employ a pre-trained model like ResNet for potentially better feature extraction.