CV期末專題－基於MobileNet V3的腫瘤辨識

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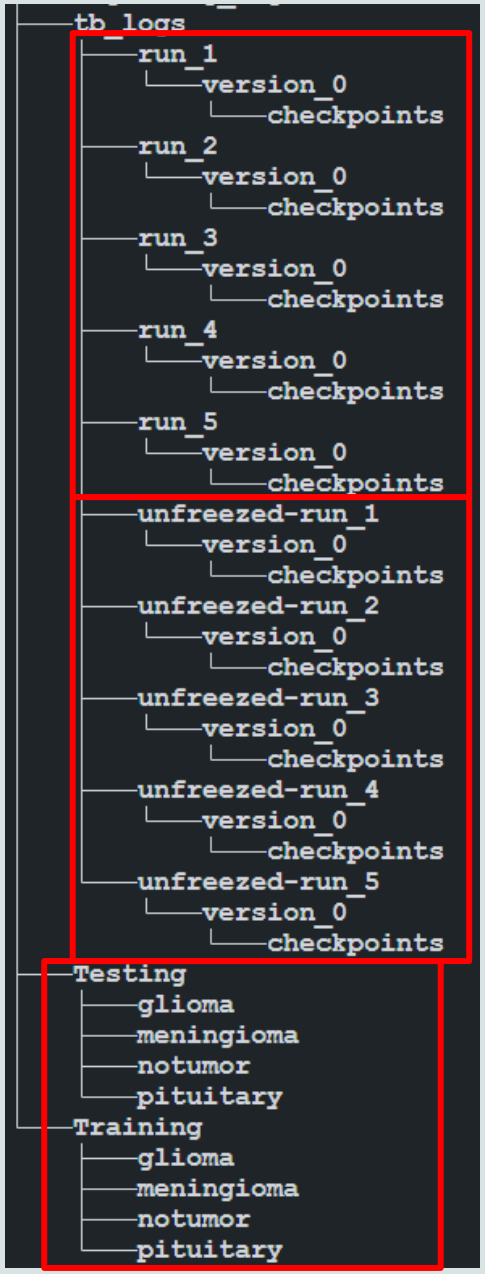
File Structure

Unfreezed run tensorboard files
+ checkpoints



Freezed run tensorboard files
+ checkpoints

Dataset

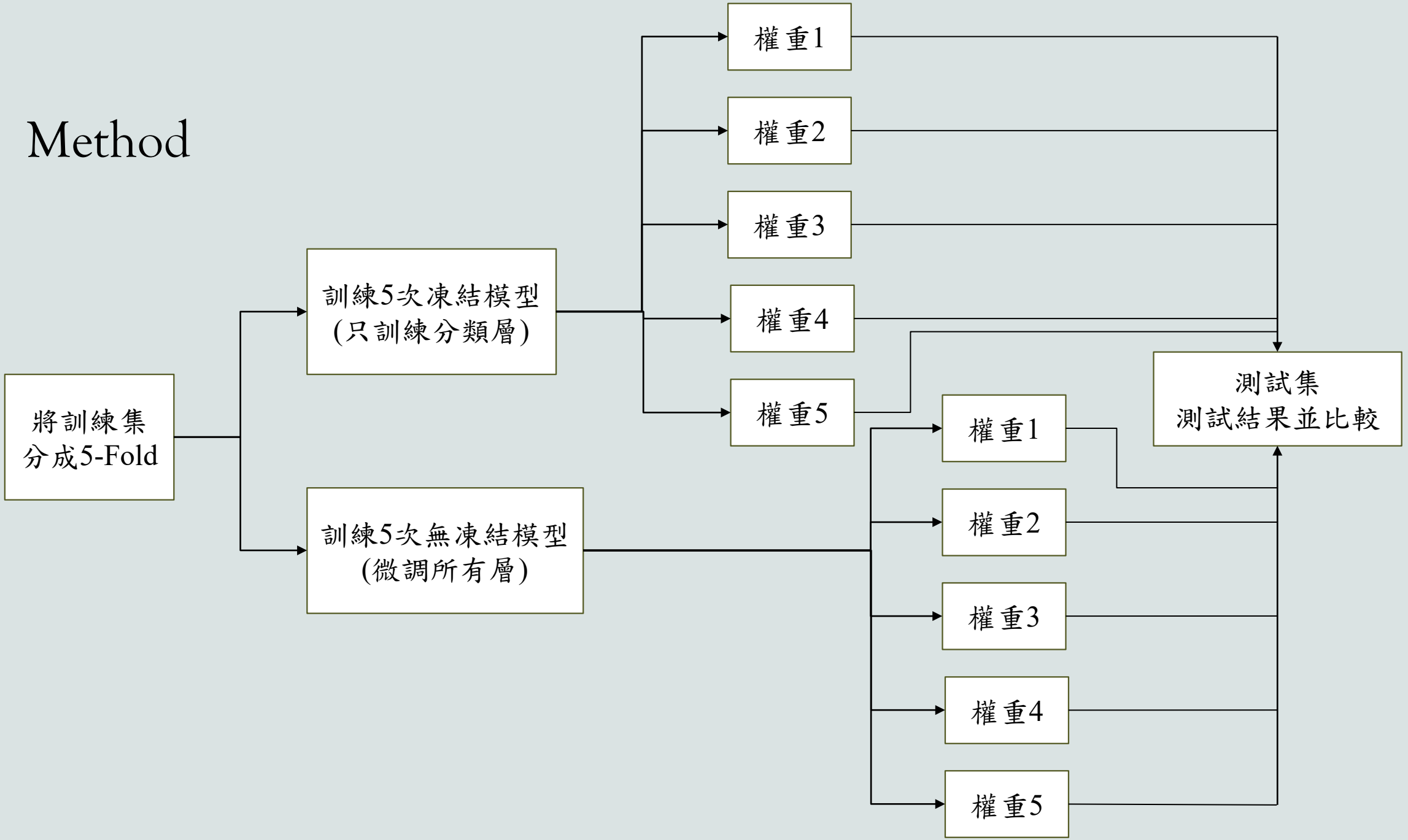
Introduction

- 由於手機的CNN模型有其設計理念以及實作上的差異，普通較簡單的CNN模型在沒有為行動裝置最佳化的前提下在行動裝置執行的效果未必能夠比得上更為複雜一些，但專門為行動裝置設計的模型。
- 本project希望能夠
  - 在醫學影像資料集中使用一個對手機比較友善的模型來得到相對優良的準確率的PoC，以增加移植到手機上的可行性。
  - 探討在特徵選取部分凍結權重與否對模型準確度的影響

Method

- 目標資料集：Kaggle上的Brain Tumor MRI Dataset
- 本實驗使用了MobileNetV3模型，並試著使用預訓練好的權重，並根據以下規則訓練：
  - 因沒有驗證集，本實驗將訓練集做5-Fold(6 epochs each)，作為訓練集與驗證集
  - 設計出兩個相同的模型，唯一的差別在於是否凍結特徵提取層的權重
  - 各訓練5次，並儲存模型每個Fold最好的validation loss checkpoint
  - 取出Loss與accuracy比較成果

Method


將訓練集
分成5-Fold
訓練5次凍結模型
(只訓練分類層)
訓練5次無凍結模型
(微調所有層)
權重1
權重2
權重3
權重4
權重5
權重1
權重2
權重3
權重4
權重5
測試集
測試結果並比較

Results

- Test loss and accuracy

Run	Test loss	Test accuracy
1	0.1618	0.9382
2	0.1660	0.9328
3	0.1602	0.9359
4	0.1649	0.9389
5	0.1572	0.9397

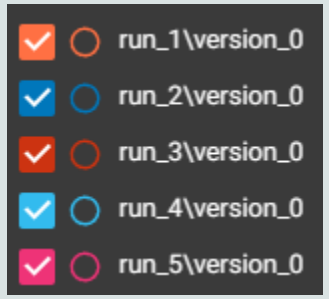
Freezed

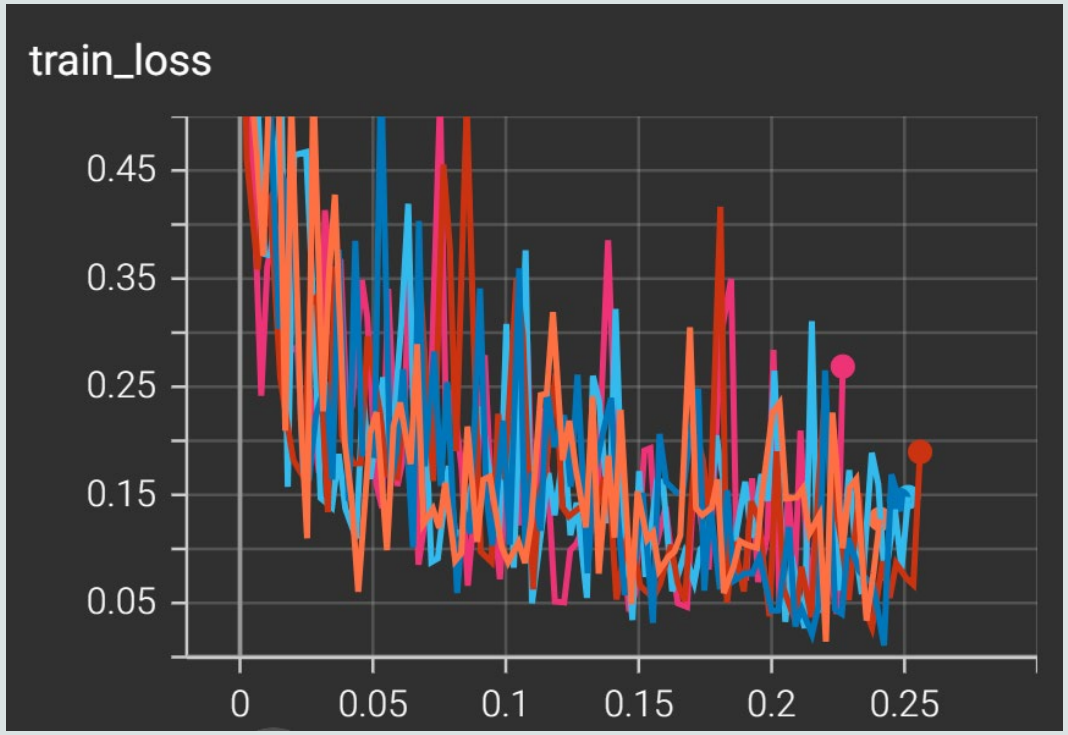
Run	Test loss	Test accuracy
1	0.0369	0.9939
2	0.0211	0.9924
3	0.0166	0.9962
4	0.0564	0.9870
5	0.0224	0.9901

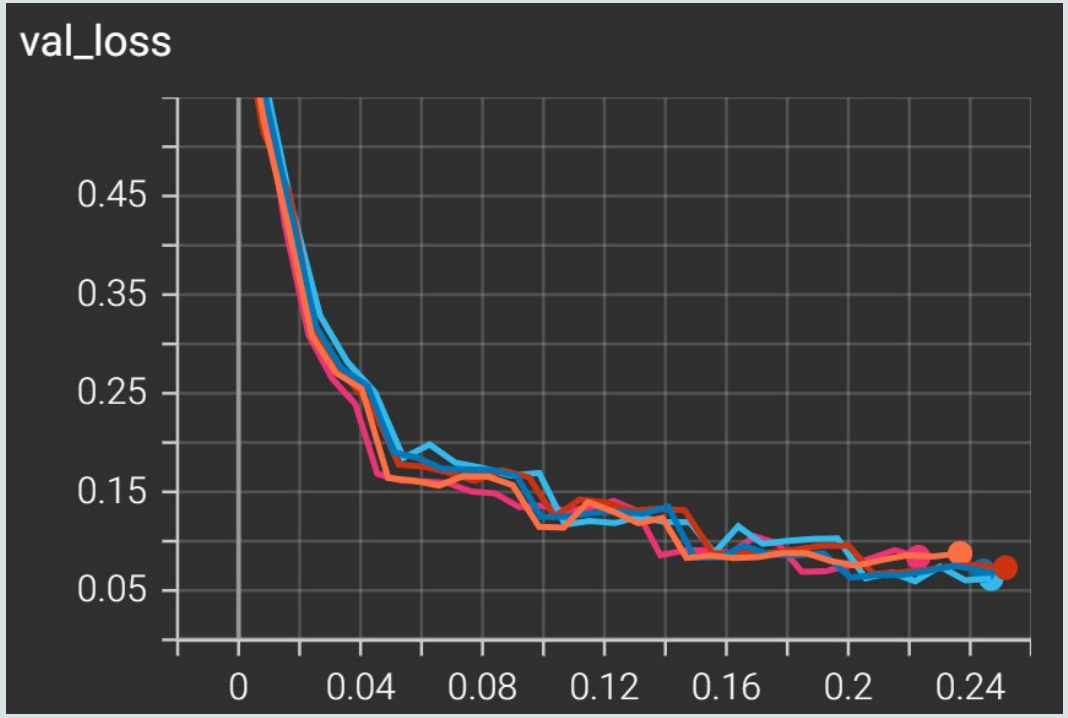
Unfreezed

Result (freezed)

- Train loss and validation loss

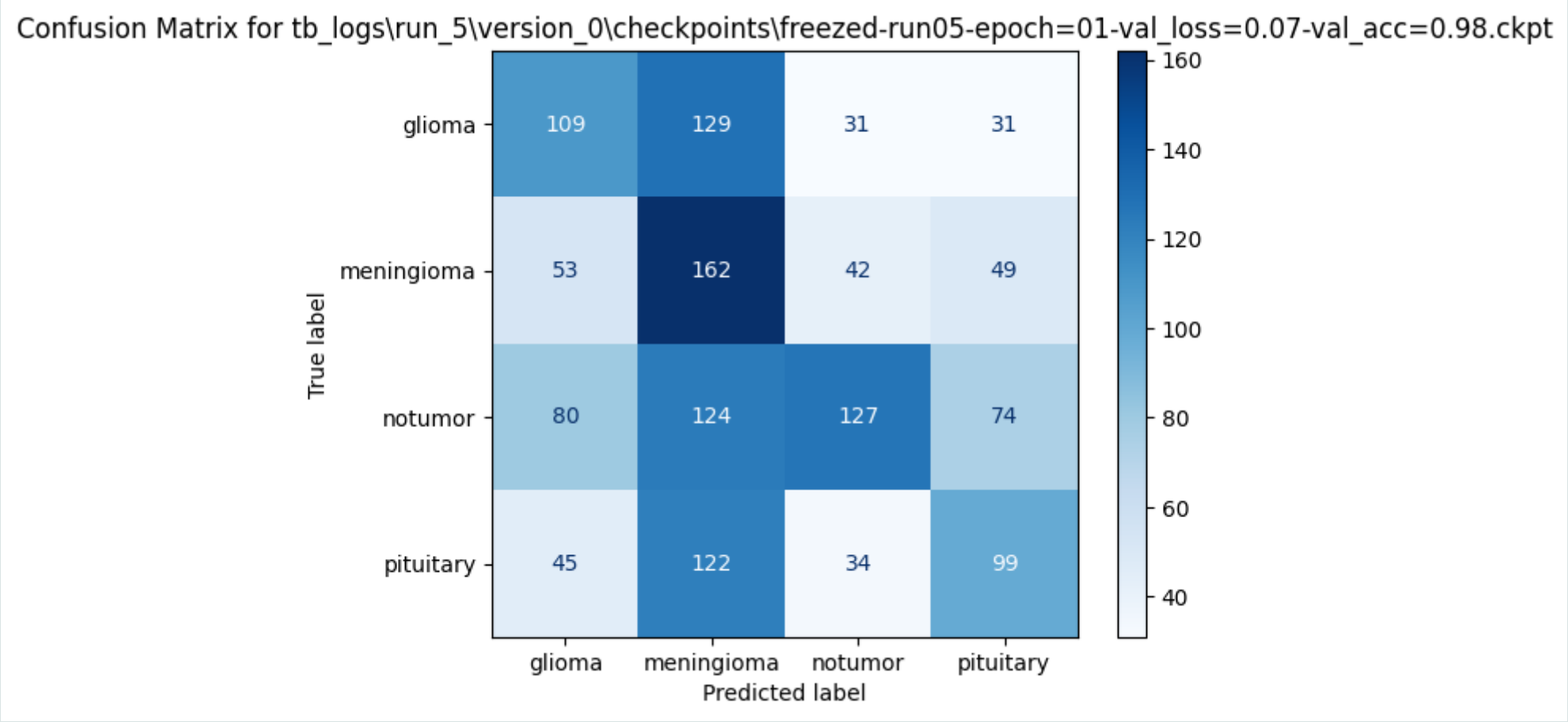






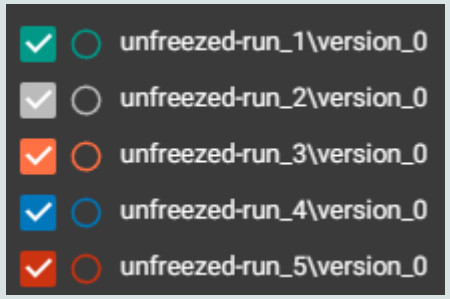
Results (freezed)

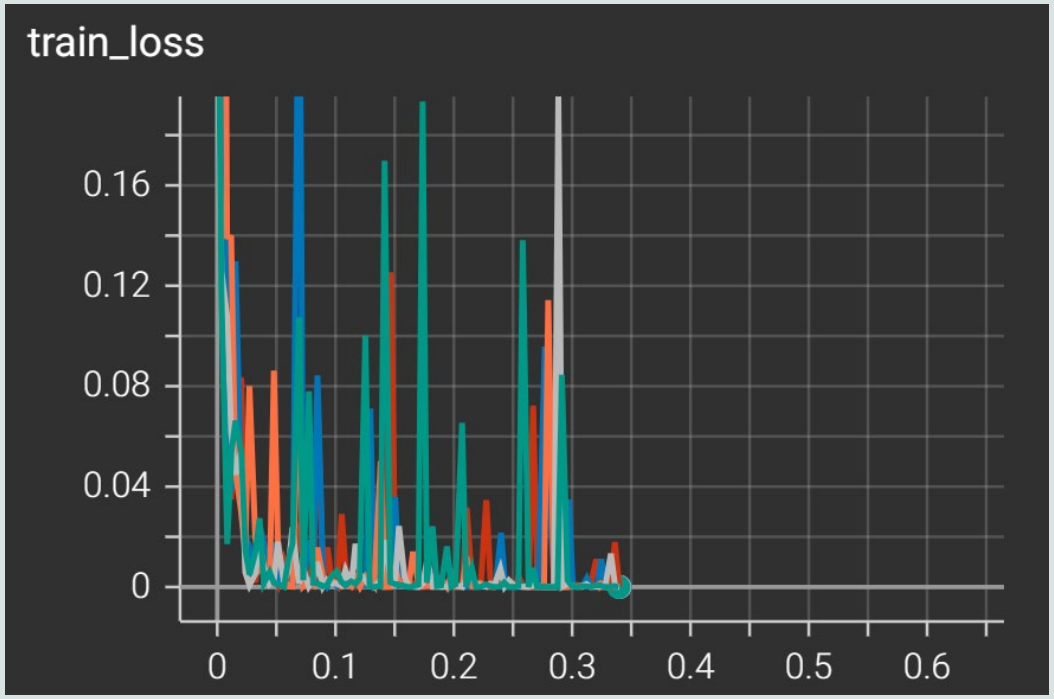
- Best Confusion Matrix (run 5)

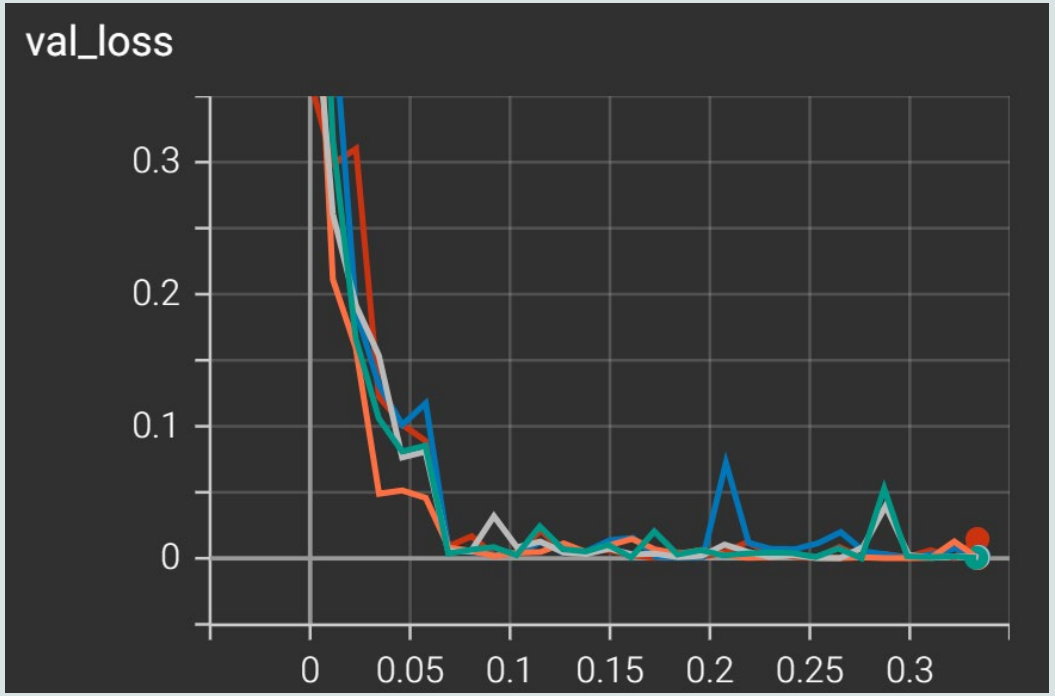


Result (freezed)

- Train loss and validation loss

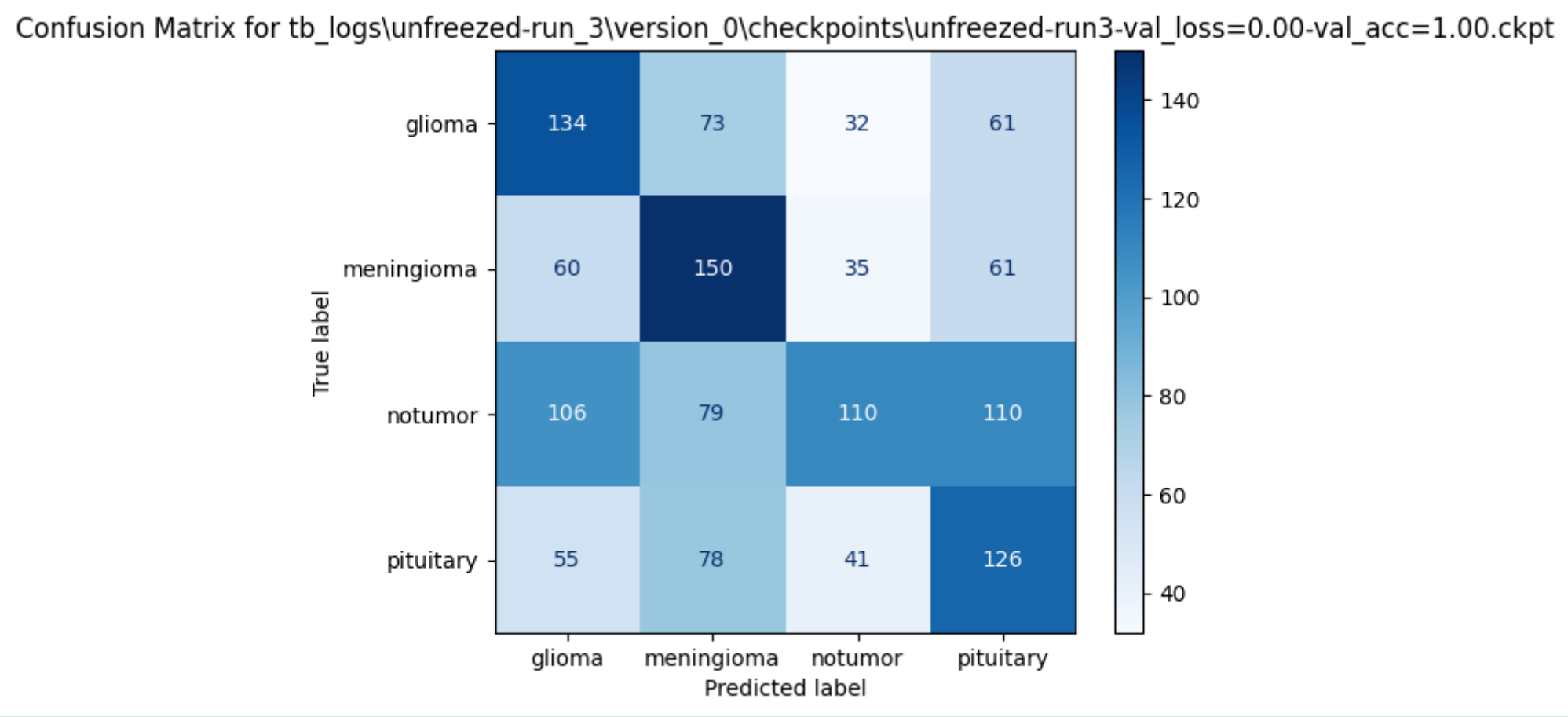






Results (unfreezed)

- Best Confusion Matrix (run 3)



Link

- https://github.com/ImjustWritingCode/Computer-Vision-2024-Final.git