# Lab 6 – Deep Learning Mini Project (Biomedical Imaging 4C16 Project -Tumor Segmentation & Classification)

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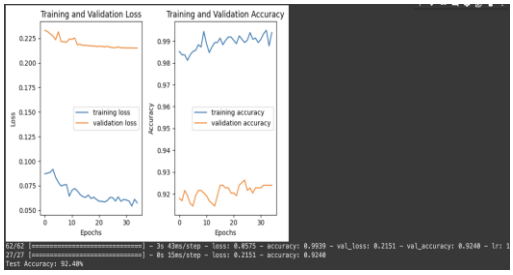
### Task 1: Classification Model

Task 1 involved developing a classification model using a pre-trained MobileNetV2 architecture and fine-tuning it for a three-class classification problem. Data augmentation techniques were applied to address the low amount of training data. The model was constrained to less than 5 million parameters to prevent overfitting and ensure faster training. Various callbacks like ReduceLROnPlateau, EarlyStopping, and ModelCheckpoint were used during training to improve model performance.



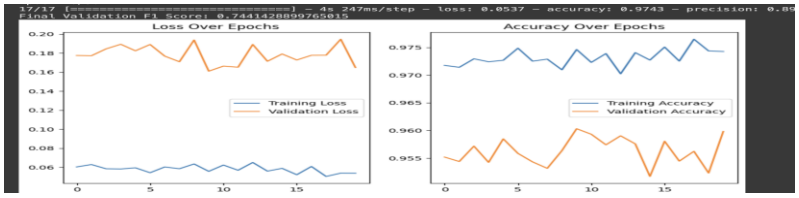

**Output image**

**Performance Table for Task 1**

| Metric | Value | Note |
|---|---|---|
| Final Loss | 0.0575 | |
| Final Training Accuracy | 99.39% | |
| Final Validation Accuracy | 92.40% | Shows a well-trained classification model with high validation accuracy. Important metrics to pass the test cases. |

### Task 2: Segmentation Model

Task 2 required building a segmentation model with an encoder-decoder architecture like U-Net. The model used convolutional layers, batch normalization, and up-sampling to perform pixel-wise classification. It was trained with a custom data generator for augmentation and used precision, recall, and F1 score as metrics. The model's performance was evaluated based on its ability to accurately segment medical images.




Output image

**Performance Table for Task 2**

| Metric | Value | Note |
|---|---|---|
| Final Loss | 0.0537 | |
| Final Accuracy | 0.9743 | |
| Final Validation F1 Score | 0.7441 | Shows highly trained segmentation model with good F1 score. Important metrics to pass the test cases. |