Deep Learning Project: ACL Tear Classification using Axial MRI Slices

Project Overview

This project focuses on classifying ACL tears from axial MRI slices using deep learning techniques. By leveraging pre-trained models and custom architectures, the goal is to accurately identify ACL tears for medical diagnosis.

Dataset

- **Input**: Axial MRI slices of the knee.
- **Classes**: Normal, ACL Tear.
- **Training**: Stratified split ensuring balanced representation of ACL tears across splits.

Model Architecture

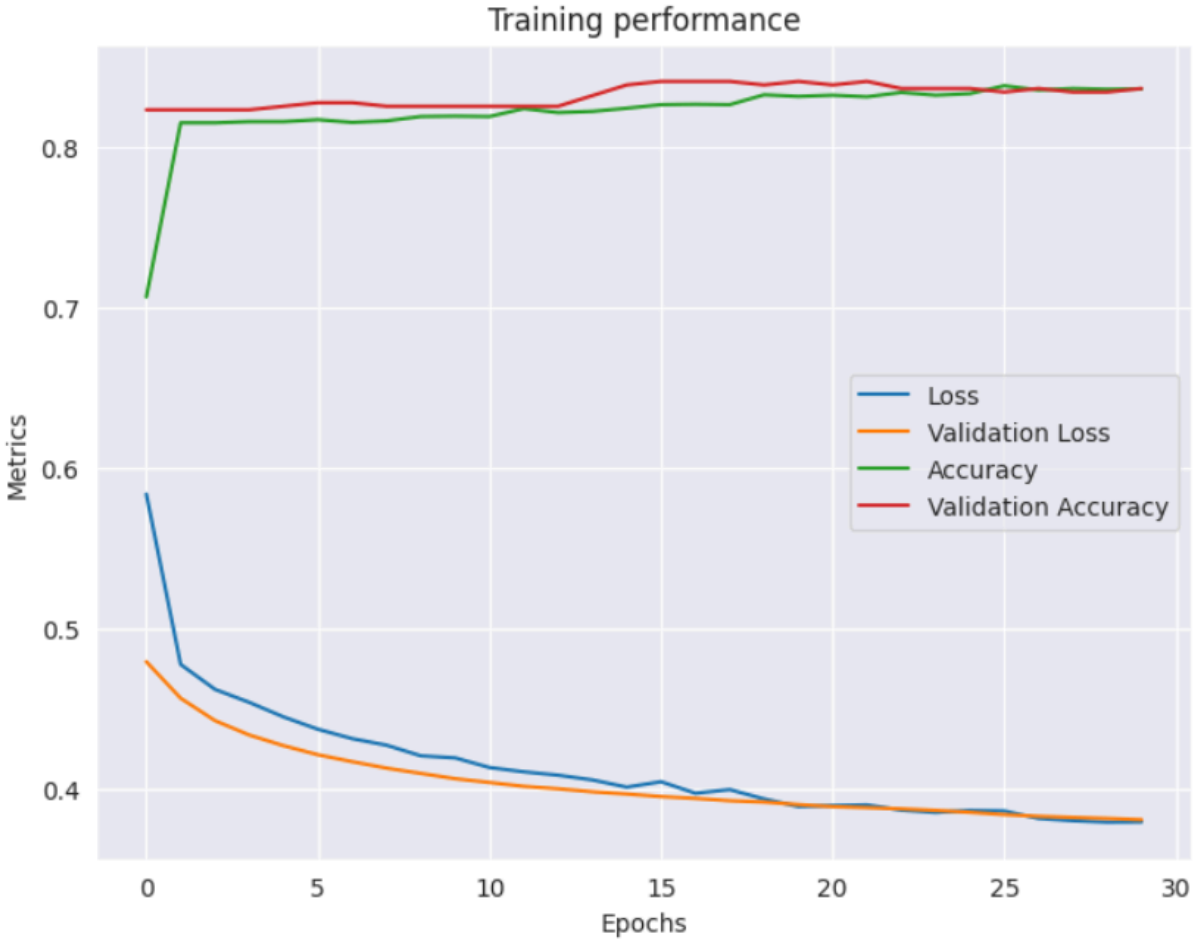
- Utilizes advanced convolutional neural networks such as InceptionV3, InceptionResNetV2, and EfficientNetB0 for feature extraction.
- Custom layers including GlobalMaxPooling2D and Dense layers are added for fine-tuning and classification.

Training

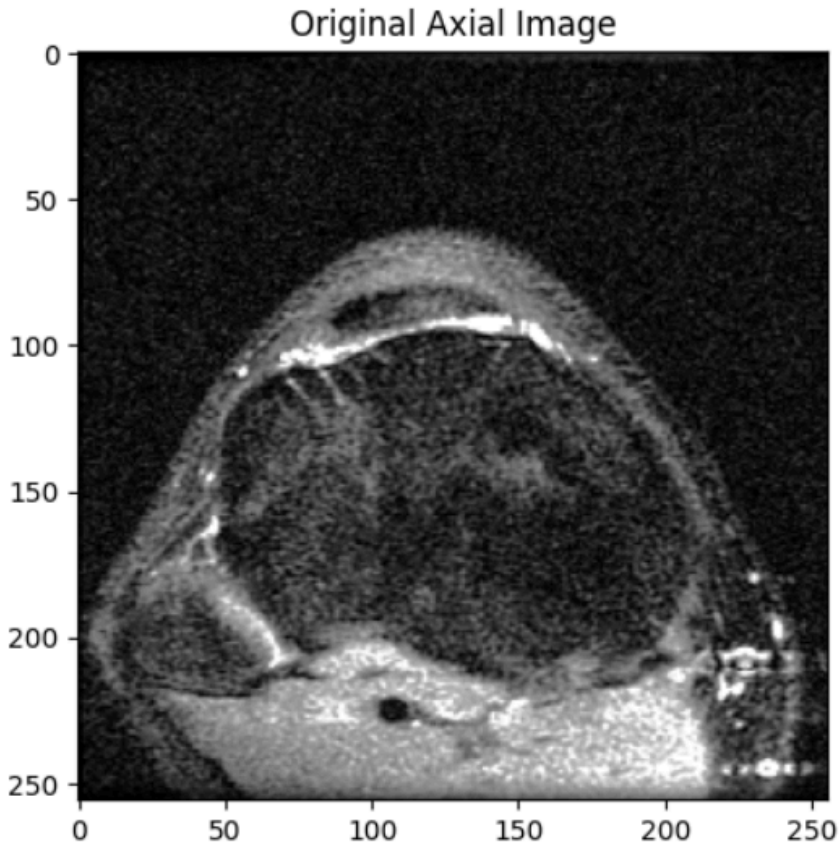
- The models are trained using a binary classification setup with Adam optimizer and learning rate scheduling.

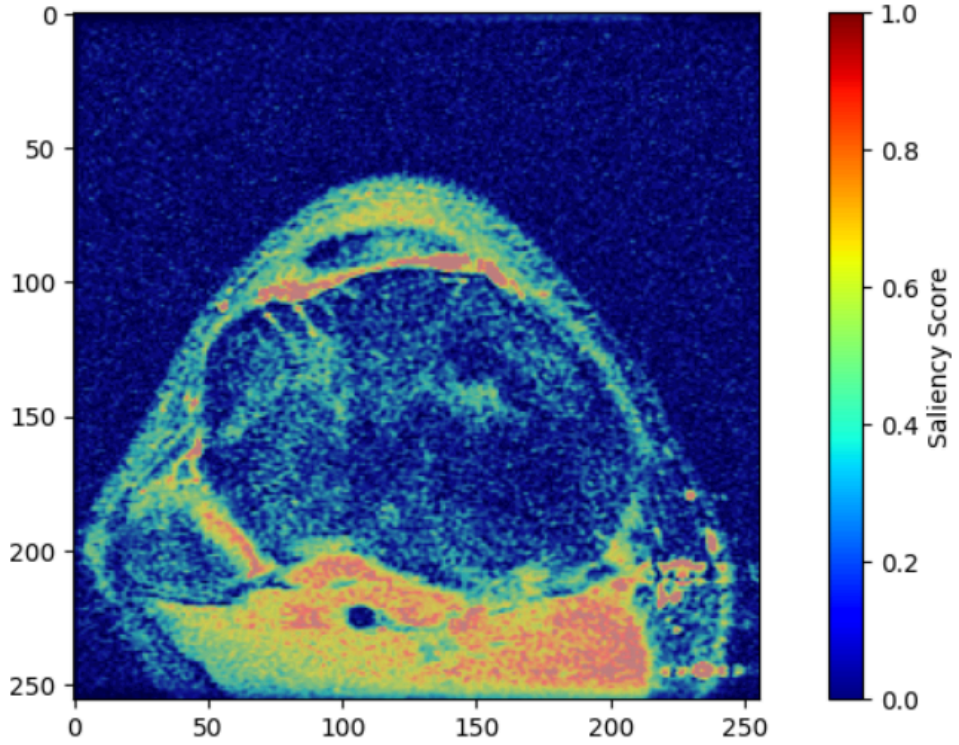
Results

Modified Efficient Net:



Modified Efficient Net Saliency:


Original Axial Image
0
50
100
150
200
250


0
50
100
150
200
250
1.0
0.8
0.6
0.4
0.2
0.0
Saliency Score