Skin Cancer Classification

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Project Objective

To develop a machine learning model that can accurately classify new lesions as benign or malignant, based on a dataset of previously diagnosed lesions. This model will be used to assist pathologists in making diagnoses, with the goal of improving patient outcomes.

Specific Aims:

- To develop a model that can achieve a high accuracy of classifying new lesions.
- To identify the features of lesions that are most important for the model to consider.

Potential Impact:

- This project has the potential to significantly improve the accuracy and efficiency of lesion diagnosis. This, in turn, could lead to earlier detection of malignant lesions, which could improve patient outcomes.

Introduction

In this project we addresses the critical need for precise skin cancer detection, specifically distinguishing between benign and malignant lesions. Using advanced machine learning, we aim to develop a reliable tool, incorporating techniques like ResNet50, to assist healthcare professionals in early and accurate diagnosis. By merging technology and dermatology, the project aspires to contribute to more effective and efficient skin cancer detection, fostering improved patient care.

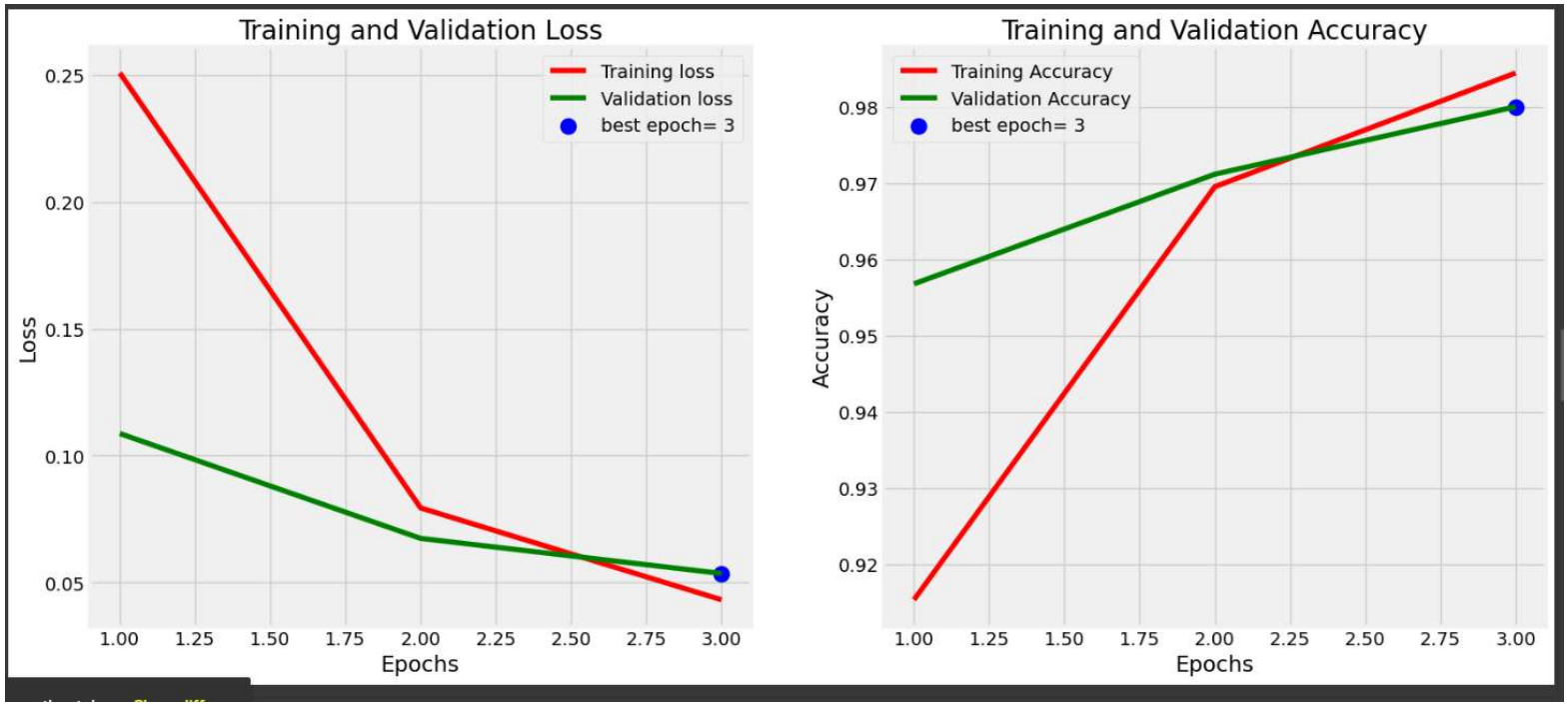
Model: Resnet50

ResNet50 is a convolutional neural network (CNN) architecture that has been widely used for image classification tasks. It is a deep learning model that was first introduced in the paper "Deep Residual Learning for Image Recognition" by Kaiming, Xiangyu, Shaoqing, and Jian. (2015). ResNet50 is a 50-layer deep CNN that has been shown to be very effective for image classification tasks, achieving state-of-the-art results on the ImageNet dataset.

Methodology

1. **Data Preparation :** Organize images in the specified directory, resizing them to 180x180 pixels.
2. **Data Splitting :** Split the dataset into training (80%) and validation (20%) sets.
3. **Model Definition :** Create train set and validation set
4. **Model Compilation :** Compile the model using Adam optimizer, sparse categorical cross entropy loss, and accuracy metric.
5. **Model Training :** Train the model on the training set (‘train-set’) with validation on the validation set (‘validation-set’)

Training & Validation Accuracy/Loss



Predictions

Conclusion

The skin cancer classification model exhibits promising progress after training, with accuracy increasing from 73.39% to 86.43%. Validation results also improved from 76.43% to 81.43%. While these findings indicate effective learning, further evaluation on diverse datasets and potential fine-tuning is recommended for real-world applications. The trained model provides a solid foundation for future refinement and possible deployment in clinical settings to enhance skin cancer diagnosis.

Thank You