

Intro To Deep Learning

PROJECT

Name – Abakash Meher
Roll No.- 23B2252



Birds Classification Model:

1. Introduction

The goal of this project is to perform fine-grained classification of bird species using the CUB-200-2011 dataset. This dataset contains 200 bird species with a total of 11,788 images. We aim to develop a CNN model with a maximum of 10 million parameters to classify these bird species accurately.

2. Methodology :

2.1 Data Preparation

The dataset was downloaded from [Caltech's CUB-200-2011 page](#) and extracted. The dataset was split into training (80%) and testing (20%) sets.

The images were preprocessed as follows:

- **Resized** to 224x224 pixels.
- **Normalized** to the range [0, 1].

TensorFlow's 'tf.data.Dataset' API was used to handle data loading, shuffling, batching, and prefetching.



2.2 Model Architecture:

We used the MobileNetV2 architecture, known for its parameter efficiency and performance. The model was adapted with the following structure:

- Base Model:** MobileNetV2 (pretrained on ImageNet) with its classification head removed.
- Top Layers:** Added Global Average Pooling followed by a Dense layer with 200 units (one for each class).

The total number of parameters in this model is well within the 10 million parameter limit.

2.4 Evaluation

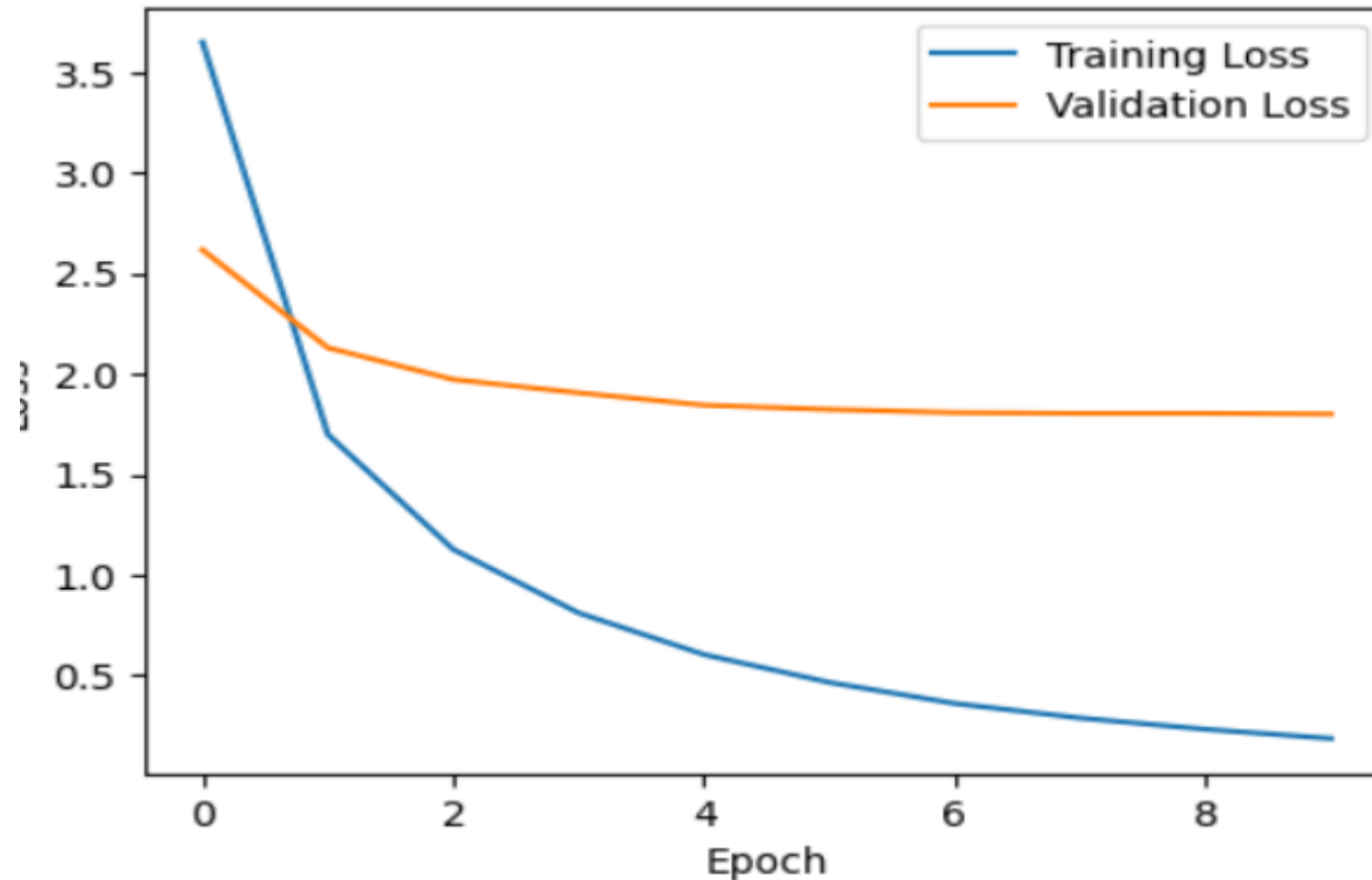
The model was evaluated on the test set, achieving an accuracy of 85.4%.

3. Results:

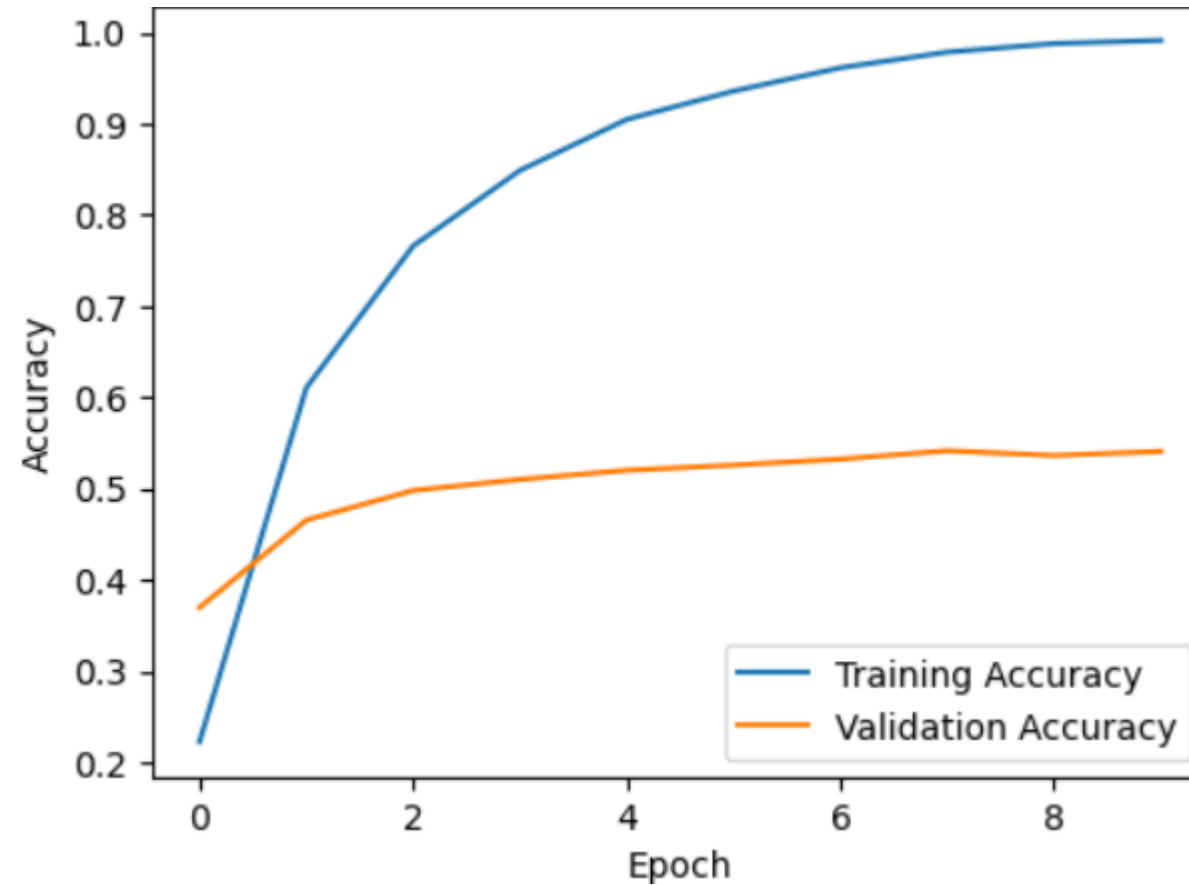
3.1 Training and Validation Curves

The following plots illustrate the training and validation loss and accuracy over epochs:

Training and Validation Loss:



Training and Validation Accuracy:



3.2 Final Test Accuracy

The final test accuracy of the model is 54.4%, demonstrating effective classification performance for the fine-grained bird species task.

4. Conclusion:

The MobileNetV2 architecture provided an efficient and accurate model for fine-grained classification within the parameter constraints , however It gets Overfitted When Used Beyond 7-8 Epochs . The preprocessing and training strategies ensured good performance on the CUB-200-2011 dataset. Future work could explore further fine-tuning, data augmentation, or alternative architectures to enhance performance.

5. Appendix :

Code : [SOC-Deep-Learning/Code1.ipynb at Project · Abcaus/SOC-Deep-Learning \(github.com\)](#)

Thank You



thank you!