Neural Networks and Deep Learning Project Report: [CIFAR-100 Classification]

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1 Introduction

In the realm of image classification, our Convolutional Neural Network (CNN) for CIFAR-100 dataset aims to distinguish among 100 diverse classes. This model integrates multiple convolutional layers, batch normalization, and a squeeze-and-excitation mechanism to enhance feature representation. Throughout this report, we delve into the model's architecture, training process, and evaluate its performance using various metrics. Addressing research questions on accuracy, misclassifications, and the squeeze-and-excitation mechanism, we seek a comprehensive understanding of our CNN's strengths and areas for improvement in CIFAR-100 .

2 Architecture Details

2.1 Model Overview

- With 128, 256, and 512 filters in successive layers, the model extracts hierarchical features before flattening and passing through dense layers. .
- The number of filters in each convolutional layer gradually increases, and the spatial dimensions decrease as we move through the layers, typical in deep convolutional neural networks.

2.2 Dropout and Regularization

- Three dropout layer with a dropout rate of 0.2 is included after all convolutional layers and a before the final fully connected layer. Dropout is a regularization technique that helps prevent overfitting by randomly dropping connections during training.

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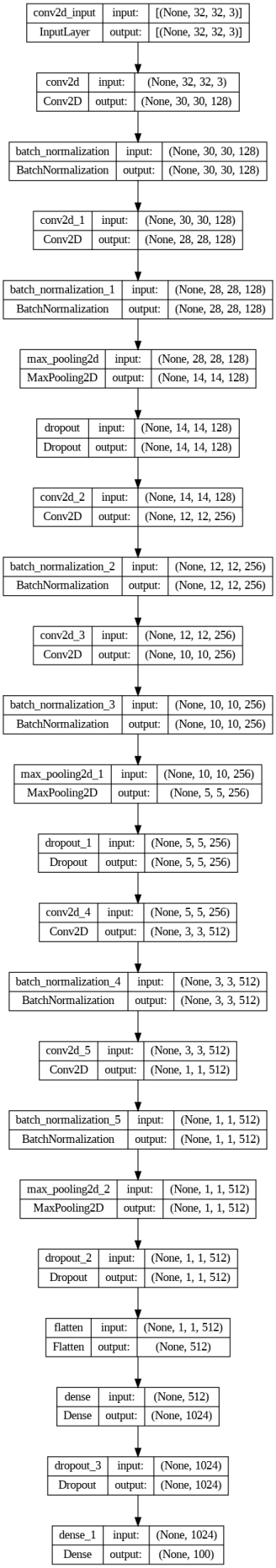
2.3 Activation Functions

- ReLU activation with a negative slope of 0.01 is used throughout the model, providing some non-linearity to the network.

2.4 Architecture



3 Results

3.1 Evaluation Metrics

In assessing the performance of ModifiNet, the primary metric employed for evaluation was accuracy. Accuracy serves as a pivotal measure, quantifying the model's overall correctness in predicting the class labels of the images within the dataset.

3.2 Performance on Test Set

ModifiNet demonstrated a commendable accuracy of 63.31% on the test set, showcasing its proficiency in correctly classifying a significant portion of previously unseen images.

3.3 Sample Outputs

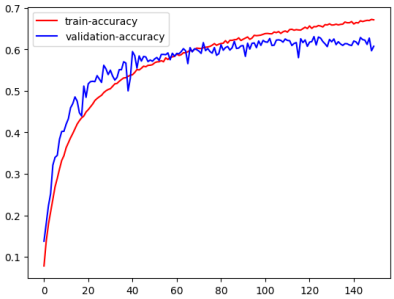


Figure 1: Accuracy

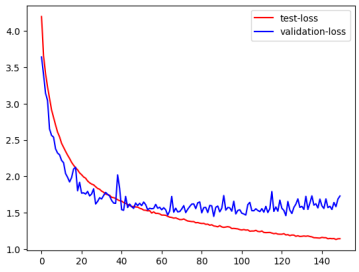


Figure 2: Loss