**EE 562 Assignment 4**

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1. **Neural Network**

* How many trainable parameters are in the model? It is printed in the terminal.

There are 346373 parameters in this model

* What is the best training accuracy?
  + Best training Accuracy: 75.768 percent
* What is the best validation accuracy?
  + Best validation accuracy is 76.2800 percent
* According to the training and validation accuracies, does the model overfit your training data?
  + The comparison of training and validation accuracies suggests that the model shows minimal overfitting to the training data. With validation accuracy nearly matching the training accuracy, this implies effective generalization of the model to new, unseen data.

1. **Simple Convolution Neural Network**

* How many trainable parameters are in the model? It is printed in the terminal.
* There are 8064 parameters in this model
* What is the best training accuracy?
  + Best training accuracy is 83.520 percent
* What is the best validation accuracy? Is it better than the ones in previous questions?
  + Best validation accuracy is 82.6800 percent
  + Yes
* According to the training and validation accuracies, does the model overfit your training data?
  + The comparison of training and validation accuracies indicates that the model exhibits minimal overfitting to the training data. Given that the validation accuracy is slightly higher than the training accuracy, it suggests that the model effectively generalizes to unseen data.

1. **Color Normalization**

* How many trainable parameters are in the model? It is printed in the terminal.
  + There are 8069 parameters in this model
* What is the best training accuracy?
  + Best training Accuracy: 88.352 percent
* What is the best validation accuracy? Is it better than the ones in previous questions?
  + Best validation accuracy is 85.3200 percent
  + Yes
* According to the training and validation accuracies, does the model overfit your training data?
  + In this instance, where the validation accuracy is marginally lower than the training accuracy, it indicates potential overfitting of the model to the training data. This implies that the model may be memorizing the training examples instead of learning to generalize from the underlying patterns.

1. **Deep Convolutional Neural Network**

* How many trainable parameters are in the model? It is printed in the terminal.
  + There are 29077 parameters in this model
* What is the best training accuracy?
  + Best training Accuracy: 88.6 percent
* What is the best validation accuracy? Is it better than the ones in previous questions?
  + Best validation accuracy is 87.640 percent
  + Yes
* According to the training and validation accuracies, does the model overfit your training data?
  + The observation that the validation accuracy is slightly below the training accuracy points to a degree of overfitting in the model. This discrepancy suggests that the model's ability to perform on unseen data is not quite on par with its performance on the training set, indicating challenges in generalizing effectively.

1. **Data Augmentation**

* How many trainable parameters are in the model? It is printed in the terminal.
  + There are 29077 parameters in this model
* What is the best training accuracy?
  + Best training Accuracy: 86.86864 percent
* What is the best validation accuracy? Is it better than the ones in previous questions?
  + Best validation accuracy is 88.5200 percent
  + Yes
* According to the training and validation accuracies, does the model overfit your training data?
  + The fact that validation accuracy is marginally lower than training accuracy hints at a potential overfitting issue. Overfitting happens when a model learns the specifics and noise of the training data too well, compromising its ability to generalize to new data. Here, the slight discrepancy between training and validation accuracies points to a minor degree of overfitting.