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The purpose of this project is to design and train a Convolutional Neural Network (CNN) model to attempt to classify the Pictures dataset.

Our plan for the upcoming III, IV, and V team submissions are as follows:

For Step III, each team member will select three to four model architectures described in Chapter 14 of the textbook to build and train on the dataset. We will closely follow the model architecture during this step; changes to the architecture will be reserved for future work. The upcoming Step III report will discuss our experiences and results for these models.

Using our experiences with training these architectures, we will select a “best” model to proceed to Step IV with. We will make our decision using a combination of accuracy/F1-score, time and hardware resources required, and model complexity.

During Step IV, we will focus on testing various ways to improve our model accuracy, using the tools we learned in Lab 6. During this step we will also modify the model architecture we selected to look for possible ways to improve the model in either accuracy or resource efficiency. Examples of modifications to the architecture may include but are not limited to adding more convolution and pooling layers, changing convolution kernel sizes, changing the length of skip connections, and tweaking the number of units in the ending dense layer(s). Our experiences and results with these tools and architecture tweaks will be discussed in Step IV.

Once we enter into Step V, we will conclude our work by selecting the optimal combination of architectures, layers, and tools and training a model based on this combination on the full train, test, and valid dataset. We will submit this model, compile our final report, and prepare for the end-of-project presentation.

We propose to train the following models for Step III, with each model listed after the team member who will train it:
Ze Hong Wu: VGGNet, ResNet, XCeption, DenseNet
Ying Jie Mei: AlexNet, GoogLeNet, EfficientNet

We propose to experiment with the following tools for Step IV, with each tool listed after the team member who will test it:
Ze Hong Wu: Activation Functions, Gradient Clipping
Ying Jie Mei: Optimizer, Regularization, Dropout, Early Stopping

Since possible architecture changes depend on which model we select after Step III, we are unable to provide a detailed list of proposed model changes. We will discuss these changes in more detail in the Step III report when we have selected a model.