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EE 428
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Homework 3

Summary:

The first step is to download the dataset. The dataset had three directories. Each directory was loaded into a numpy array using the sorted folders. It is important that each of the numpy arrays has the same order. I then convert the height array to float32 and divide by the maximum height value.

Using sklearn.model_selection.train_test_split each array was split into training and test splits with 10 percent test split.

A classification CNN was created using keras. The model is compiled with adam with a .0004 learning rate, a binary cross entropy loss function and the accuracy metric. Then the model was trained and had an accuracy around 87 percent.

The regression CNN is similar but uses a linear activation instead of sigmoid. It uses a mean absolute error and was trained on images and height array for the labels.

CHAT GPT 4-0 reminded how to do subplots for step 11 and 14.

Discussion Questions:

For the classifier the training and testing accuracy are both around 87 percent. This would suggest neither underfitting nor overfitting. Also the visual examination looks pretty good comparing ground truth to predictions. To improve accuracy maybe a more complex architecture or even more conv2D layers. I would assume more epochs would lead to overfitting.

The regression CNN had similar test and training MAE which presents that there is no overfitting. If we were underfitting the MAE of training and testing would be higher. I think also more layers may improve performance but could lead to overfitting to that specific data with an increase in epochs.