

Parking Lot Classifier

Objectives:

The goal is to train a binary classifier that classifies whether a given aerial image contains a parking lot or not. We want the model to have test accuracy of at least 85%. We decided to use transfer learning with CNN model since we don't have that much time to train CNN from scratch.

Data set collection:

The data set we collected from was really imbalanced because there aren't many parking lot images. At the end, we balanced out the two classes and we have around 230 training images and 70 testing images. The validation set are random split from 20% of the training set.

We first applied some data augmentations on the data set, rescaled the data to 1/255, and resized the data to (224, 224) to fit our model input size.

Model:

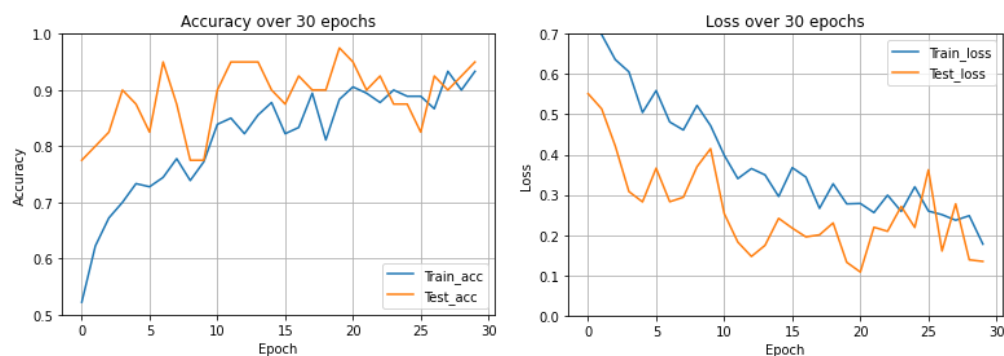
We use VGG16 with pre-trained weights from ImageNet, because this model deals with similar classification problem with our task. We dropped the top 3 fully connected layers and add our own layers as shown below:

Flatten → Dropout(0.5) → Dense(256,relu) → Dropout(0.5) → Dense(1, sigmoid)

We also fine-tuned the top two layers of the VGG16. We trained with batch size of 10 with Adam optimizer with learning rate of 0.0001 and for 30 epochs.

Result:

The training accuracy and validation accuracy grows at around the same rate, which means there isn't much overfitting and the model performs quite well at around 90% training and validation accuracy.



The test accuracy is 86%.