Intel Landscape Discussion

Intel provided the landscape scenery dataset for an image classification challenge, which includes 14k train images, 4k test, and 7k in predictions. The model was trained on the train images and refined using test, while the final model drew from the 7k prediction images on demand to predict on an unseen image which type of landscape it would be. Landscapes included; buildings, forest, glacier, mountain, sea, street.

Source: https://www.kaggle.com/puneet6060/intel-image-classification

Model

Taking the means of all the heights and widths, the images had already been set to 150x150x3 but needed to be rescaled which was done using tensorflow's ImageDataGenerator. The generator also randomised slight shifts in the x and y axis, as well as a zoom amount – and handled the filling of blank space using the nearest pixel. This was used to artificially expand the dataset, so that the neural network could take into consideration different types of landscape scenes.

The model itself used a mix of Dense, Convolutional, MaxPool, and Flatten layers; layers used relu activation, with softmax being used on the end classification layer – along with an adam optimizer. The filter amounts were changed to enhance the model's predictive capabilities. EarlyStopping was also used to prevent overfitting, and batch_size was used as the dataset was quite large.

Results

The training process was quite efficient and did not take too much time for such a large set of high-resolution images on a high-end computer (2.5 hours). It did not much overfit to the training set either.

Altogether, the model could correctly predict images at about an 80% precision, particularly excelling when classifying buildings and forests (over 92% precision), but slightly lacked in glaciers, seas and streets. It seemed to confuse glaciers with mountains and streets with buildings. Forests in particular – most likely due to their distinct greenish colour – excelled in all areas; precision, recall and f1-score.

When predicting on a completely unseen-before PRED set, the model seemed to match the metrics quite well – correctly predicting the scenes most of the time.