Novel vs Pre-Trained Deep Learning Models for Classification of Landscape Images

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Abstract

The abstract paragraph should be indented ½ inch (3 picas) on both the left- and right-hand margins. Use 10 point type, with a vertical spacing (leading) of 11 points. The word **Abstract** must be centered, bold, and in point size 12. Two line spaces precede the abstract. The abstract must be limited to one paragraph.

1 Project Description

1.1 Project motivation and goals

We aim to to build a multiclass classifiation model on a datasset containing images of six different classes of natural scenes. A primary goal of our project will be to build and train our own deep learning model on this dataset, and compare its classification performance on the test set to that of several pre-trained models that are refined on our specific training data. In addition to the deep learning models we will train a couple of elementary statistical learning models like Random Forest or SVMs to provide a measure of baseline performance (i.e. assess whether more complex deep learning techniques are justified). Lastly, we have the option to explore model performance after we introduce noise patterns to the original images. We will discuss the results of the model comparison and what further work could be done or explored.

1.2 Dataset

We source the dataset of images of natural spaces from kaggle.com.

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

The original dataset was provided by Intel to `https://datahack.analyticsvidhya.com` for a Image classification Challenge. The data set consists of around 25,000 images of size 150 by 150 pixels distributed into six classes. The images are classified as either a building, forest, glacier, mountain, sea, or a street. Furthermore, the data set comes pre-segmented into balanced training, test, and prediction subsets. Where the training set contains roughly 14k images with each class containing between 2000 and 2500 images.

1.3 Software/Programming Language

We will use python and standard machine learning libraries for analysis and model building. These libraries include:

1. Scikit-learn
2. Tensorflow

34th Conference on Neural Information Processing Systems (NeurIPS 2020), Vancouver, Canada.

3. Pandas

4. numpy

2 Papers to read

3 Teammate and work division

By the due date for the milestone report we will have a complete background describing the problem we are solvings. A summary of some of the important materials covered in the papers listed above. We will also have determined the methods we will be implementing, and have started on the implementation of said methods.

By the due date of the final report we will have built and trained our own deep learning model on this dataset. We will also have trained a Random forest and SVM to provide a baseline measurement for performance. Lastly we will have introduced noise patterns to the original images and see how that influences our models performance.