Final Project Proposal: Intel Image Classification

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Introduction

We hope to predict the type of scenery from images from this project.This project has many real world applications like enhancing user experience in apps like photo-sharing platforms and travel services, and support content-based image retrieval for more intuitive searches. This technology also aids in environmental monitoring, geographic studies, and autonomous systems by helping machines understand and respond to their surroundings. Additionally, it benefits fields like tourism and real estate by assessing scenic quality.

Dataset

The dataset for our final project will be the Intel Image Classification Dataset from Kaggle: https://www.kaggle.com/datasets/puneet6060/intel-image-classification

Description

This dataset comprises approximately 25,000 images, each with a resolution of 150x150 pixels, divided into six categories: Buildings, Forest, Glacier, Mountain, Sea, and Street. The data is organized into separate zip files for training, testing, and prediction, with around 14,000 images in the training set, 3,000 in the test set, and 7,000 for prediction. It was originally published on https://datahack.analyticsvidhya.com by Intel as part of an image classification challenge.

In our training set, each feature has roughly 2,300 examples. In our test set, each feature has 500 examples. The prediction set does not have labels as this is meant to be hidden for the challenge. We will not use the prediction set for our project.

Example Images

Potentially Useful Image Features **- Zane**

1. Edge detection: To identify structural elements in buildings, tree lines in forests, or horizon lines in sea/mountain scenes.

2. Color histograms: To capture the color distribution, which can help distinguish between classes (e.g., blue for sea/glacier, green for forests).
3. HOG (Histogram of Oriented Gradients): To capture object shapes and structures, particularly useful for identifying man-made structures like buildings and streets.
4. CNN-based features: Using pre-trained convolutional neural networks to extract high-level features from the images.

These features, combined with advanced machine learning techniques such as Convolutional Neural Networks (CNNs), could provide a robust foundation for accurately classifying the diverse range of natural scenes in this dataset.