Designing Near-Perfect Multiclass Image Classifier for Drone Technology

Kundan Chaudhary

02-13-2020

Why Are Drones Important?

Saving Lives

Disaster Relief

Nature Conservation

Introduction

Goal: Design a near-perfect multi-class image classifier

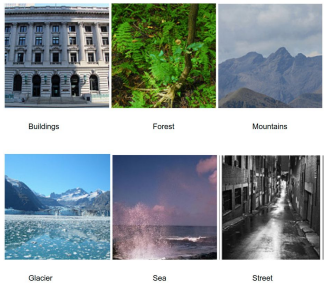
Objectives:

- Extract relevant image features
- Identify best classification model
- Tune model parameters to boost classification accuracy

Approach

Metrics: Accuracy

Data Preprocessing → Feature Extraction → Modeling → Data Visualization



Texture
Haralick

Color
Color Histogram

Shape
Hu Moments

scikit learn

K Keras

matplotlib

Model Comparison

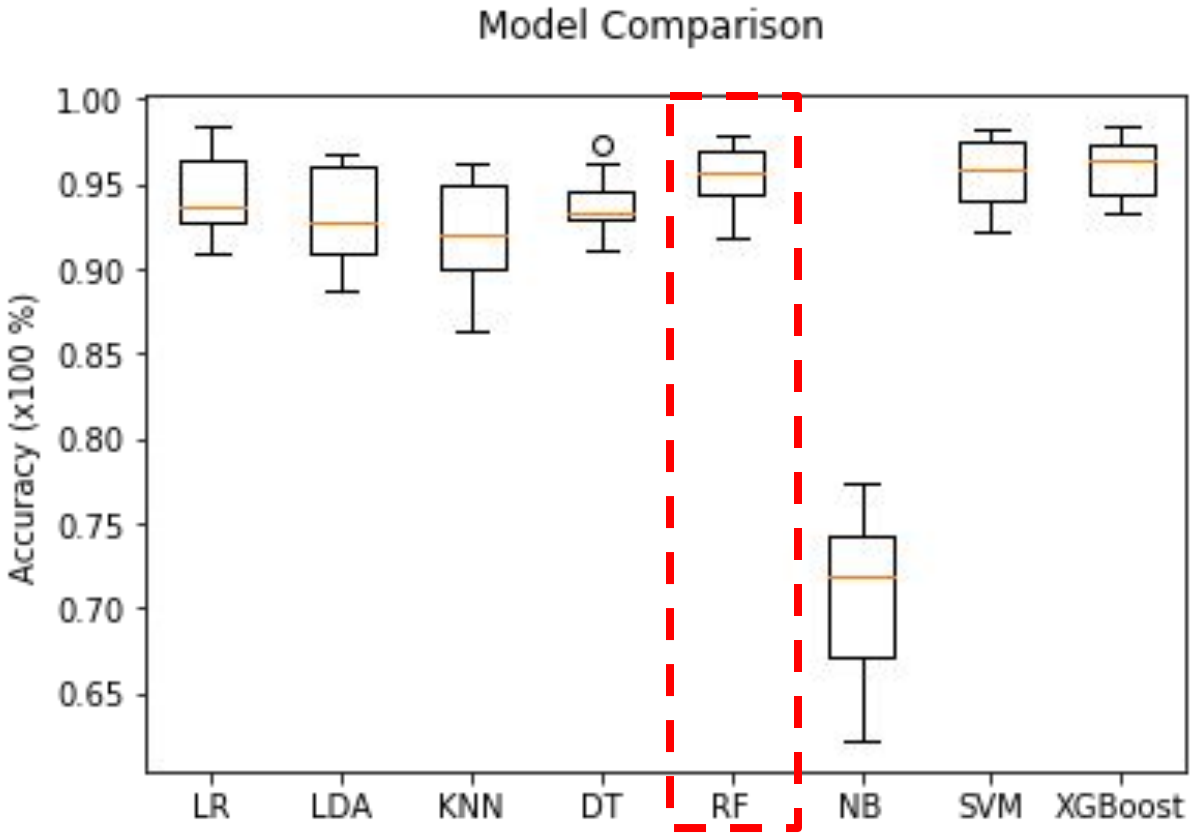
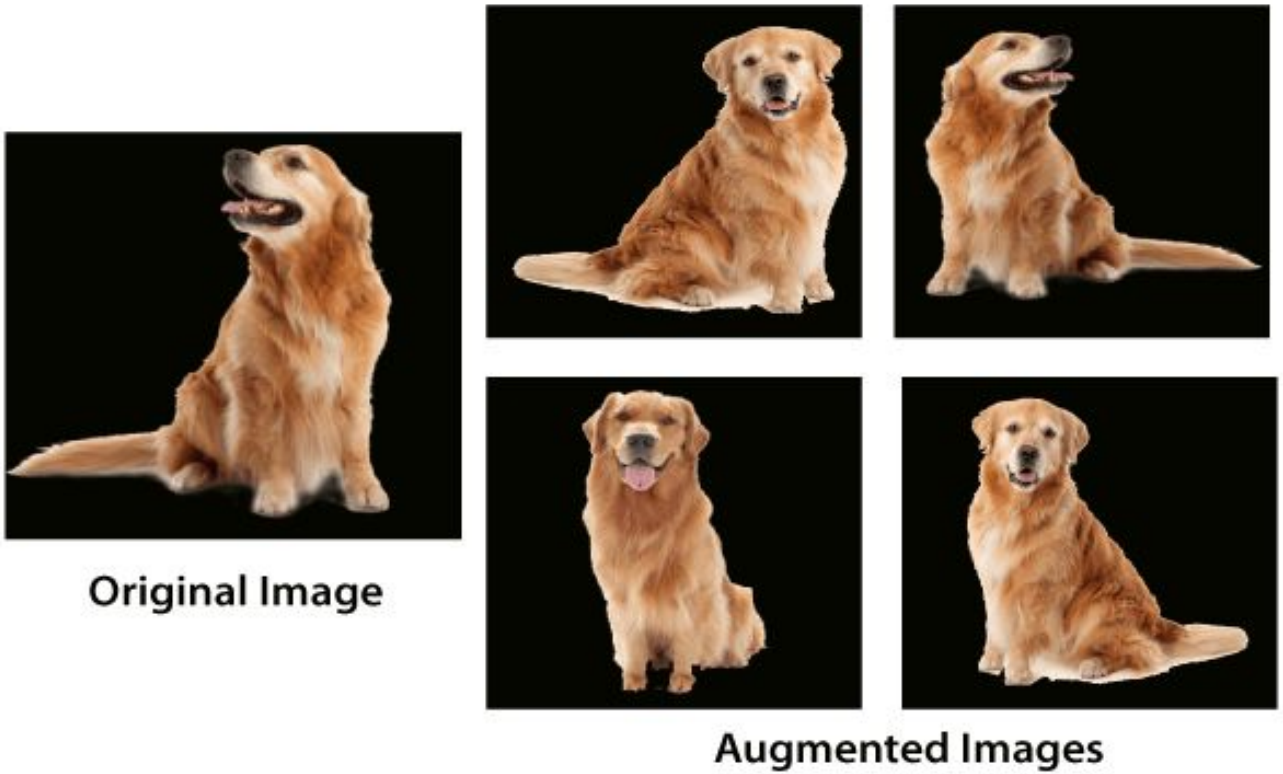


Image Augmentation



Confusion Matrix For Binary Classification

Classifier: **Random Forest**

Accuracy:

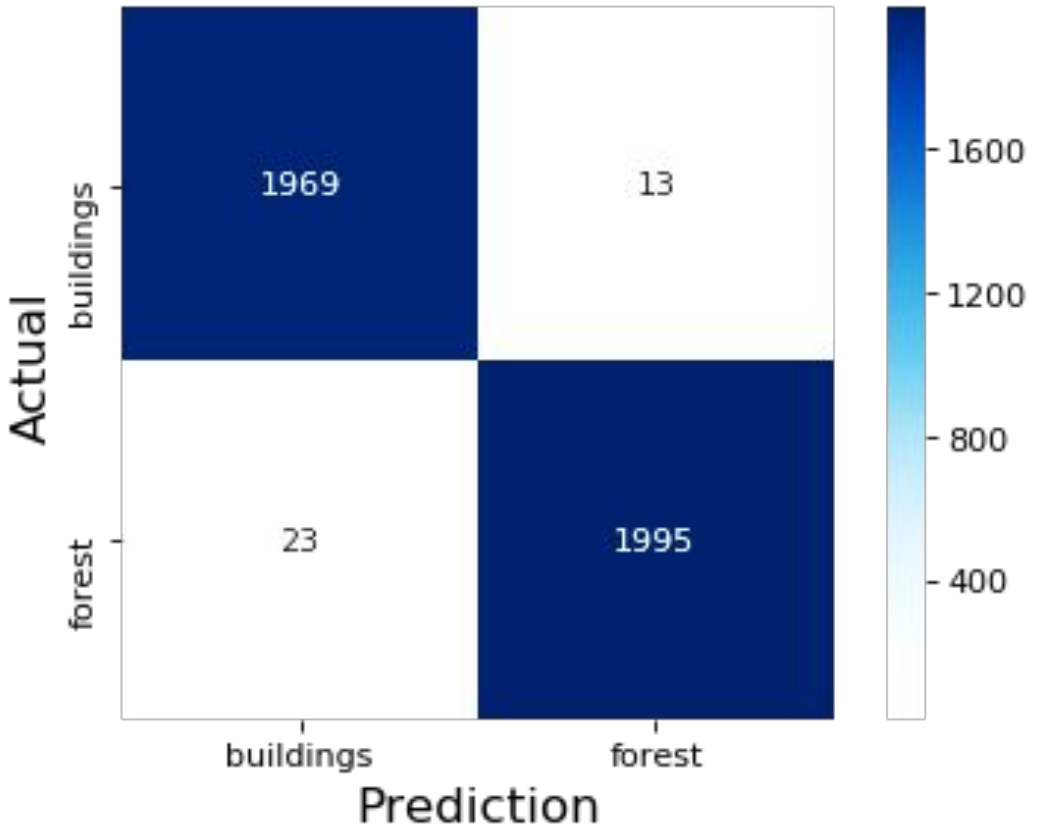
95%

↓ *Image Augmentation*

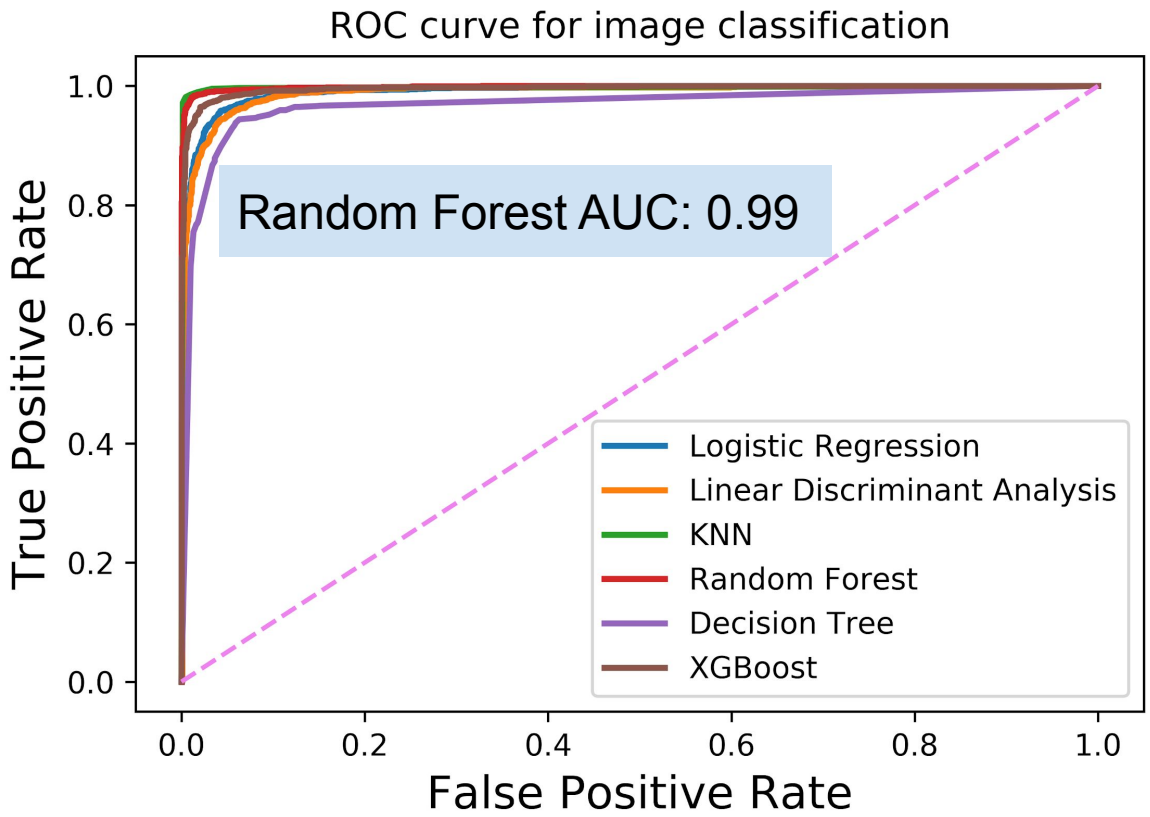
98%

↓ *Ensemble Method*

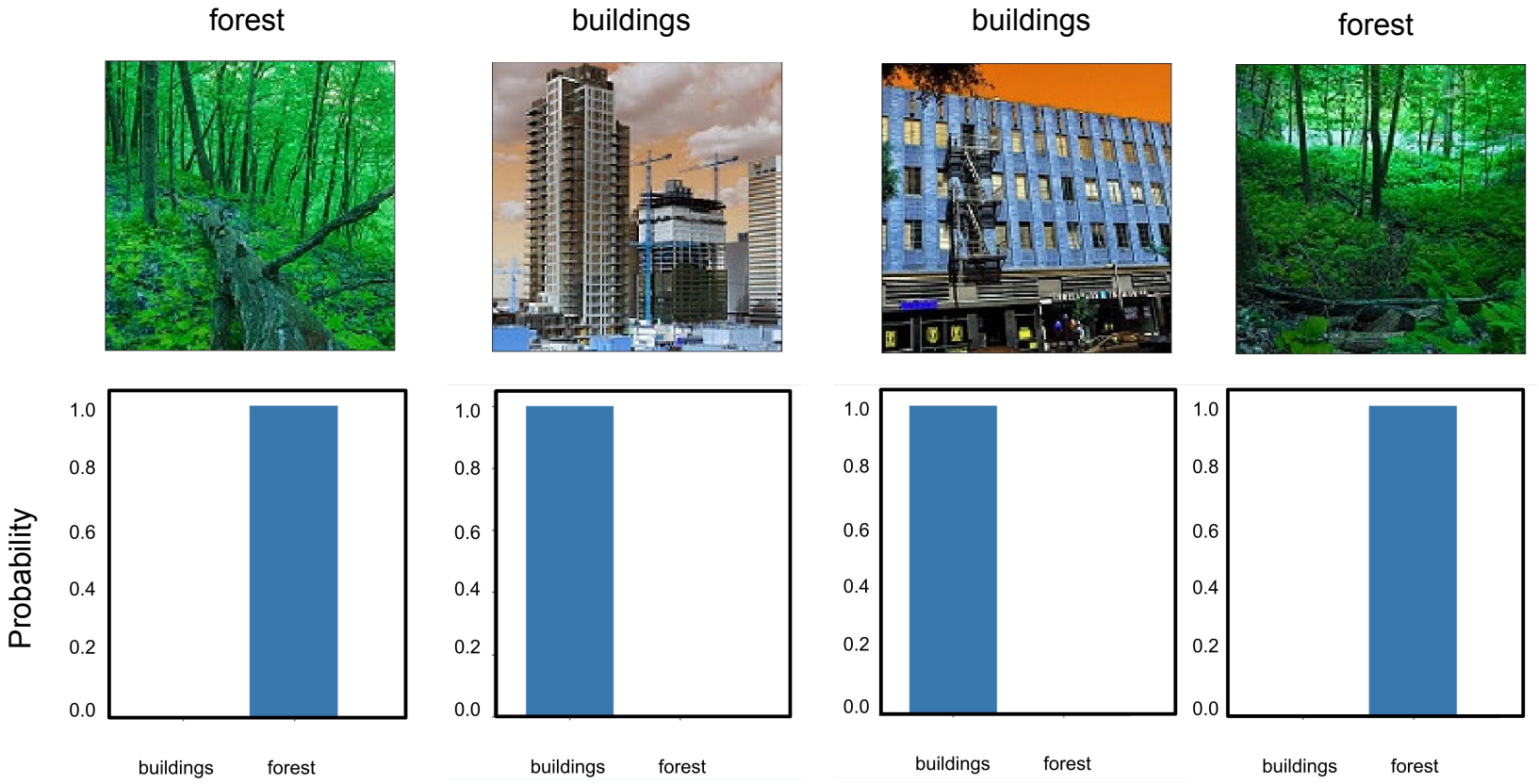
99%



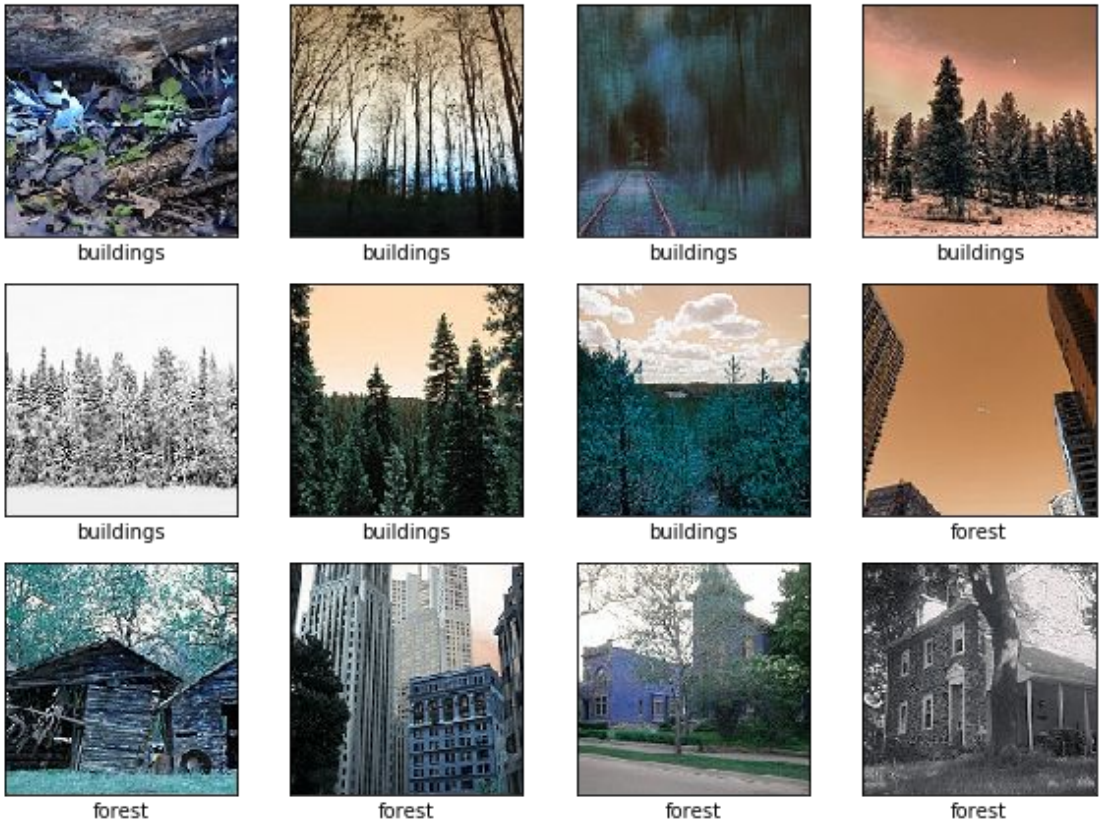
ROC Curve For Binary Classification



Correctly Labeled Images



Mislabeled Images



Confusion Matrix For Multi Classification

Accuracy:

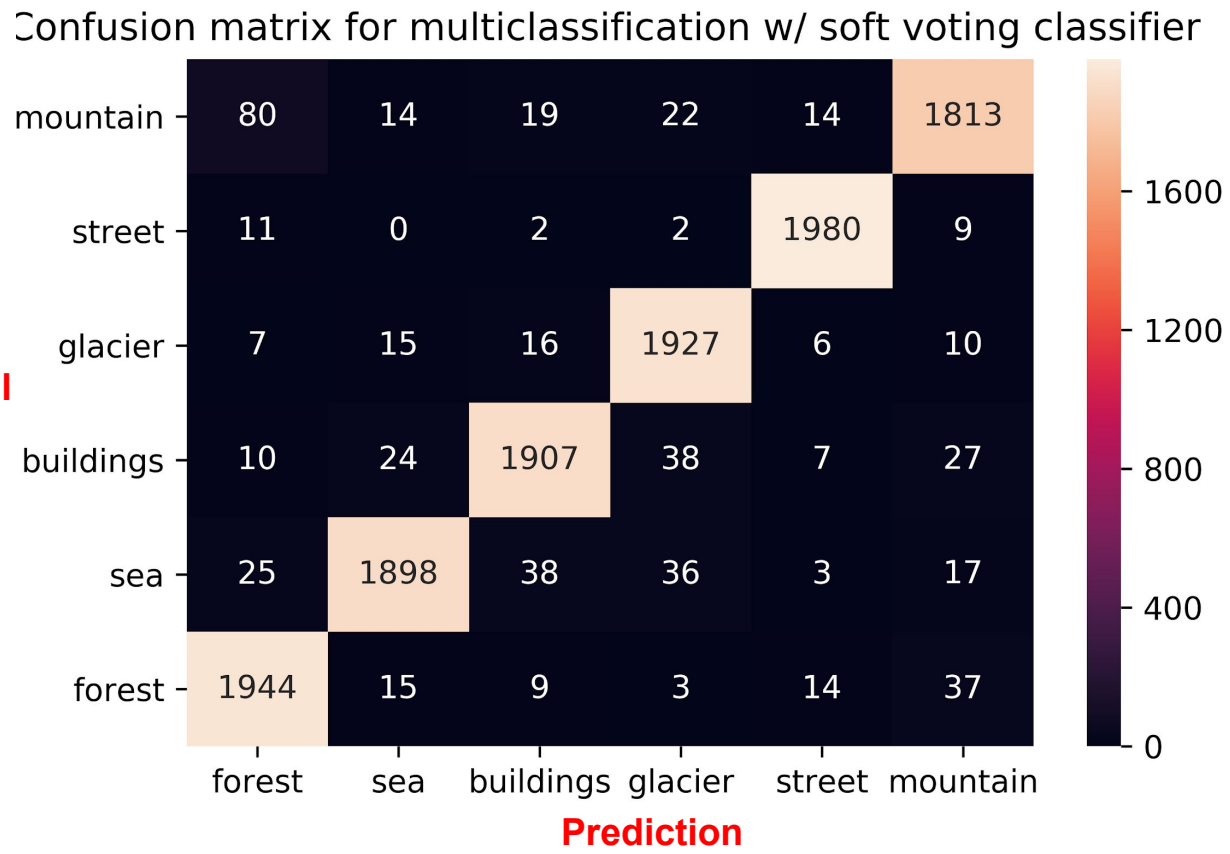
69%

Image Augmentation

92%

Ensemble Method

96%



Summary & Future Outlook

Multi-Classification Accuracy

69%

Image Augmentation

92%

Ensemble Method

96%

Face Detection

Future Outlook

> Extend the dataset with:
>> more classes
>> more images

> Fine tune CNN to improve accuracy