



Zoom to Location:

Place Types

Required Amenities:

Only places visited in the last

Show Legend

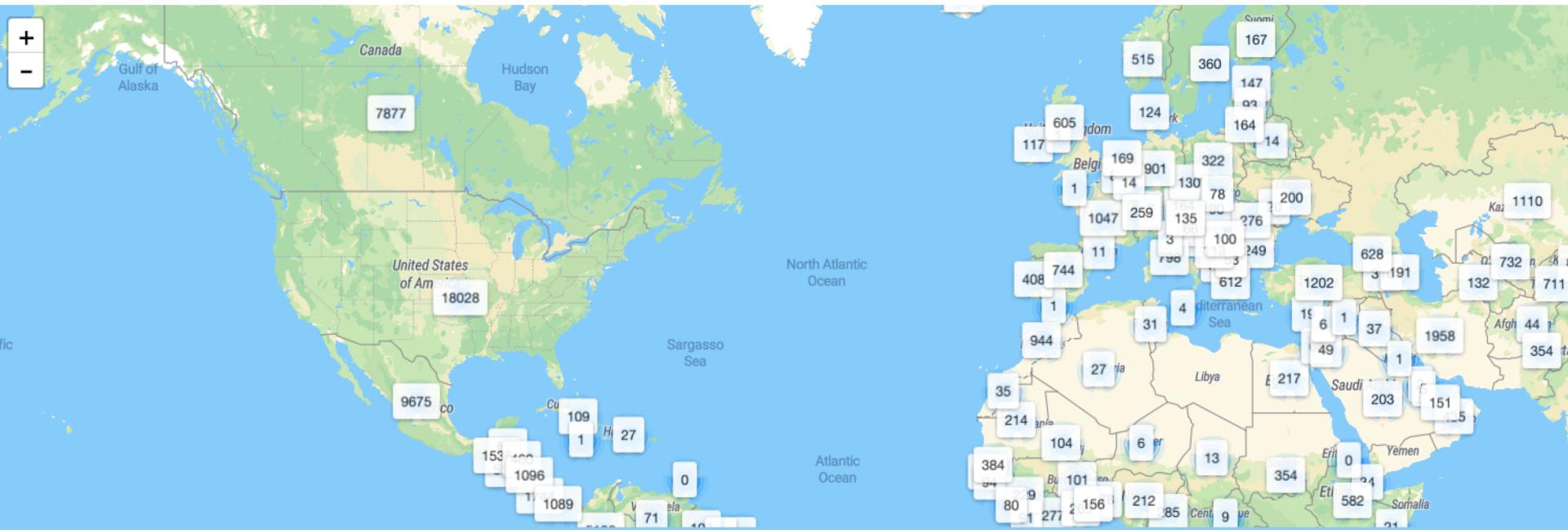
country, city or GPS coordinates

go

29 selected ▾

None selected ▾

None selected ▾



Improved curation of iOverlander with machine learning approaches

Paul Tanger, Ph.D.
August 28, 2020

iOverlander: user contributed camping sites (and more)

[Main Menu](#) [Map](#) [Filter](#)

National Parks

Grand Lake

Lake Granby

Granby

Fraser

Winter Park

Arapaho & Roosevelt National Forests Pawnee National Grassland

Maps

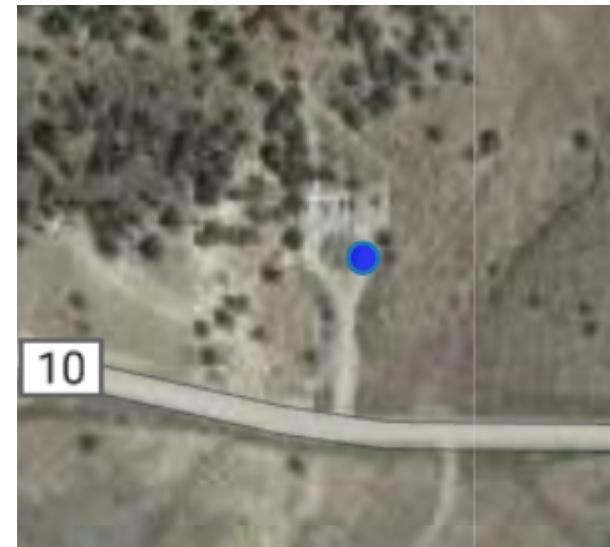
Legal

[Map](#) [Place Details](#)

Ridgway Area Trails trailhead (RAT)
Informal Campsite
Open: YES
GPS: N 38.17434, W 107.73242
Altitude: 0 m
Contributed By: [Paul](#)
Distance: 352.4 km
Last Visited: 6/21/2019
Description:
Parking area for Ridgway area trailhead is BLM and stayed overnite and saw a couple others doing the same. There is a portapottie. Closed Dec-April 1. Quiet.

Place Website: <http://>

Amenities:



Column

Location
Name

Category
Description

Latitude
Longitude
Altitude
Date verified

Open
Electricity

Wifi

Kitchen

Parking

Restaurant

Showers

Water

Toilets

Big rig friendly

Tent friendly

Pet friendly

Sanitation dump station

Outdoor gear

Groceries

Artesian goods

Bakery

Rarity in this area

Repairs vehicles

Repairs motorcycles

Repairs bicycles

Sells parts

Recycles batteries

Recycles oil

Bio fuel

Electric vehicle charging

Composting sawdust

Recycling center

zip_code

State

Focus on two categories of data

What type of place are you adding?

-  Established Campground
-  Informal Campsite
-  Wild Camping
-  Hotel
-  Hostel
-  Fuel Station
-  Propane
-  Mechanic and Parts
-  Water
-  Sanitation Dump Station
-  Short-term Parking
-  Eco-Friendly

Category Description:

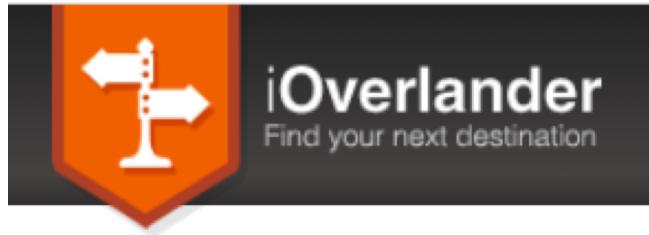
Campgrounds that advertise camping, irrespective of amenities provided.

-  Established Campground
-  Informal Campsite
-  Wild Camping
-  Hotel

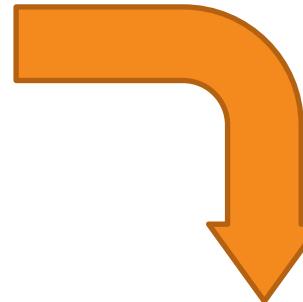
Category Description:

A camping spot not linked to a business or institution irrespective of amenities or formal permissions.

Data overview



- [Google Maps APIs](#)
- [Google Maps Android API](#)
- [Google Maps SDK for iOS](#)
- [Google Maps JavaScript API](#)
- [Google Places API for Android](#)
- [Google Places API for iOS](#)
- [Google Maps Roads API](#)
- [▼ More](#)



Reverse geocode to get State



Obtain static satellite image
(augment by rotate too)



After cleaning, 8,378 sites in the US

Example images

label: Wild Camping



label: Wild Camping



label: Wild Camping



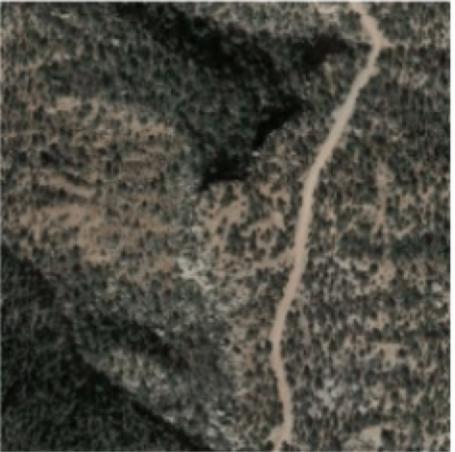
label: Established Campground



label: Established Campground



label: Wild Camping



label: Wild Camping



label: Established Campground



Summary of recommendations

Classification of satellite images of sites
to curate site categories

Utilize site description text to auto
suggest category for user

Supervised image classification with CNN



~ 8m trainable params



Established
campground

Wild
camping

Model development, validation

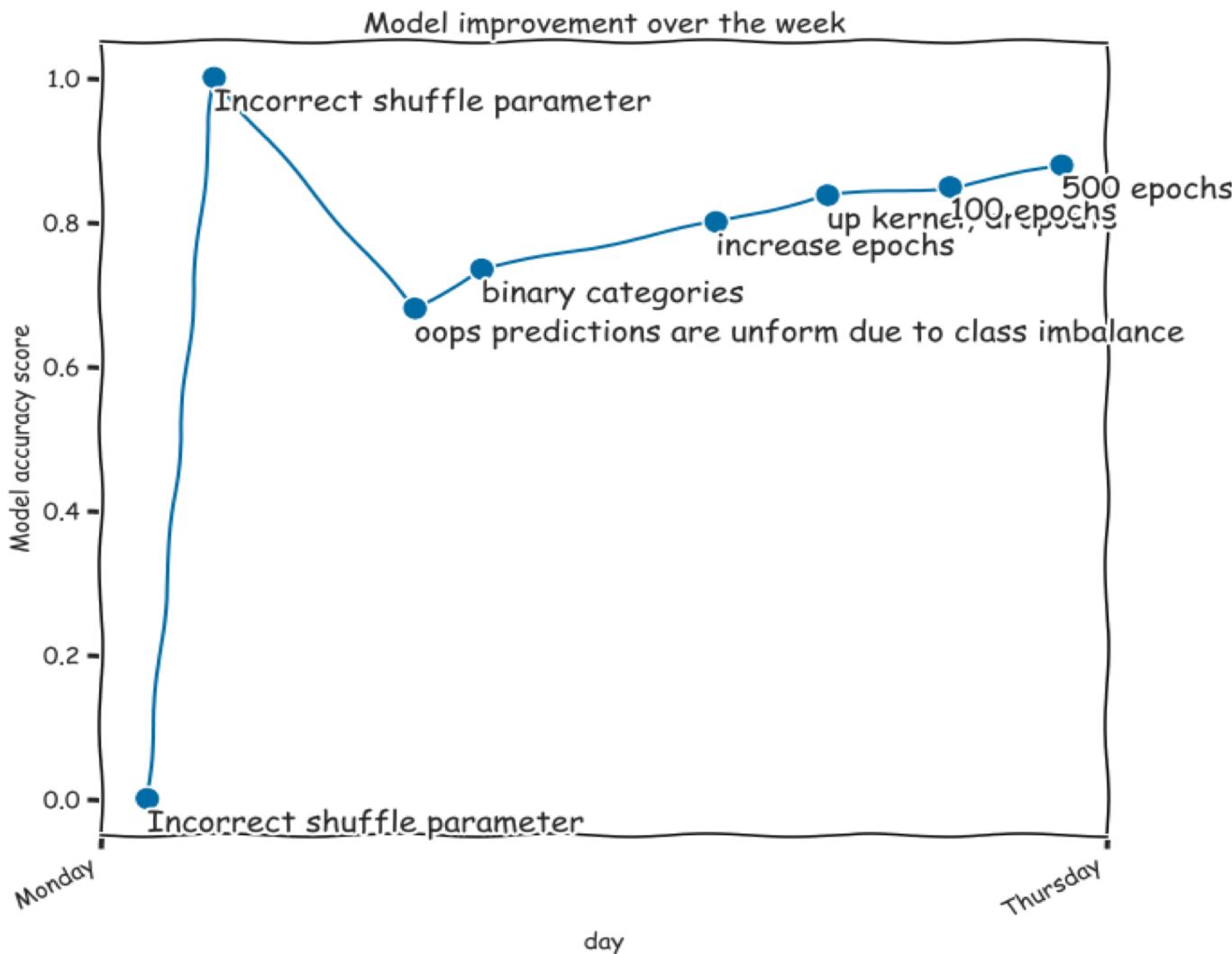
Subset of states:

AZ,
CA,
CO
OR
UT,
WA

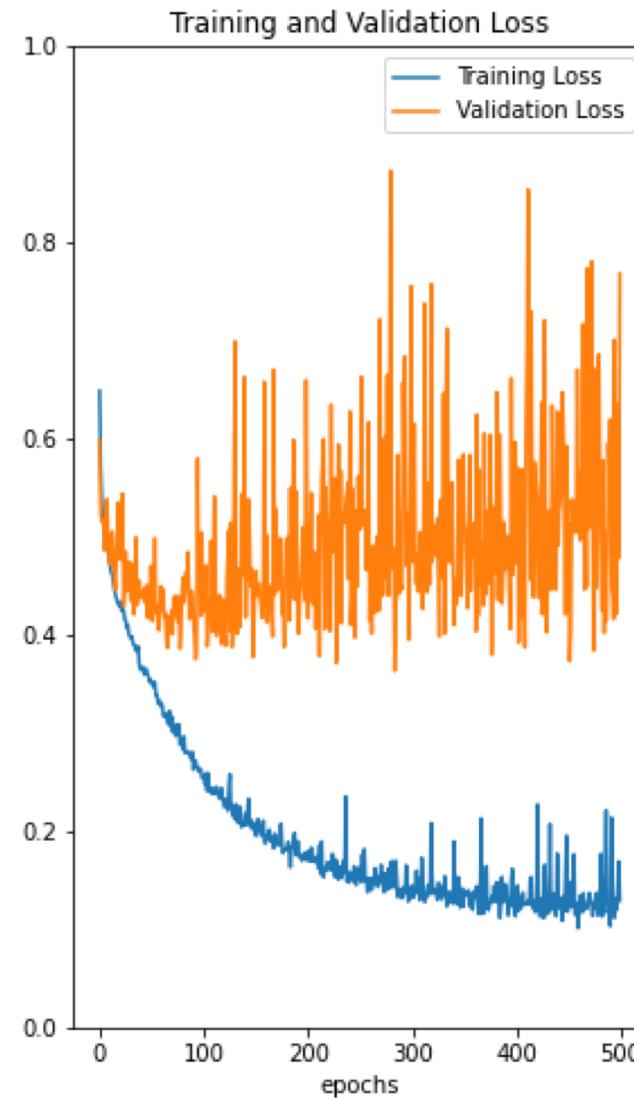
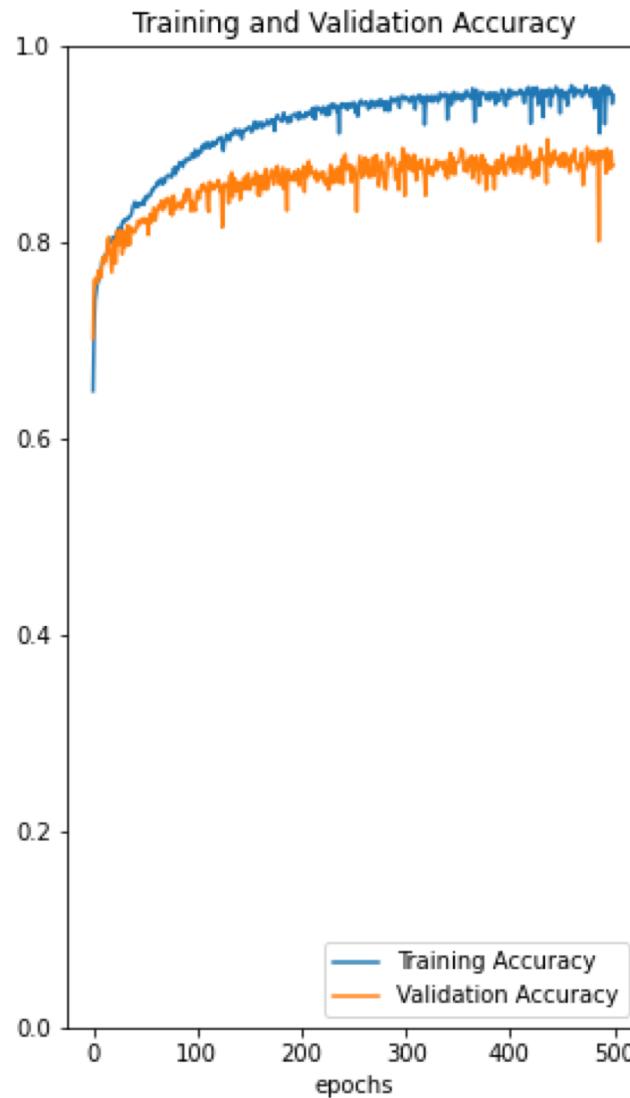
(4,058 total)

Class balance summary:

	percent
Established Campground	35%
Wild Camping	65%

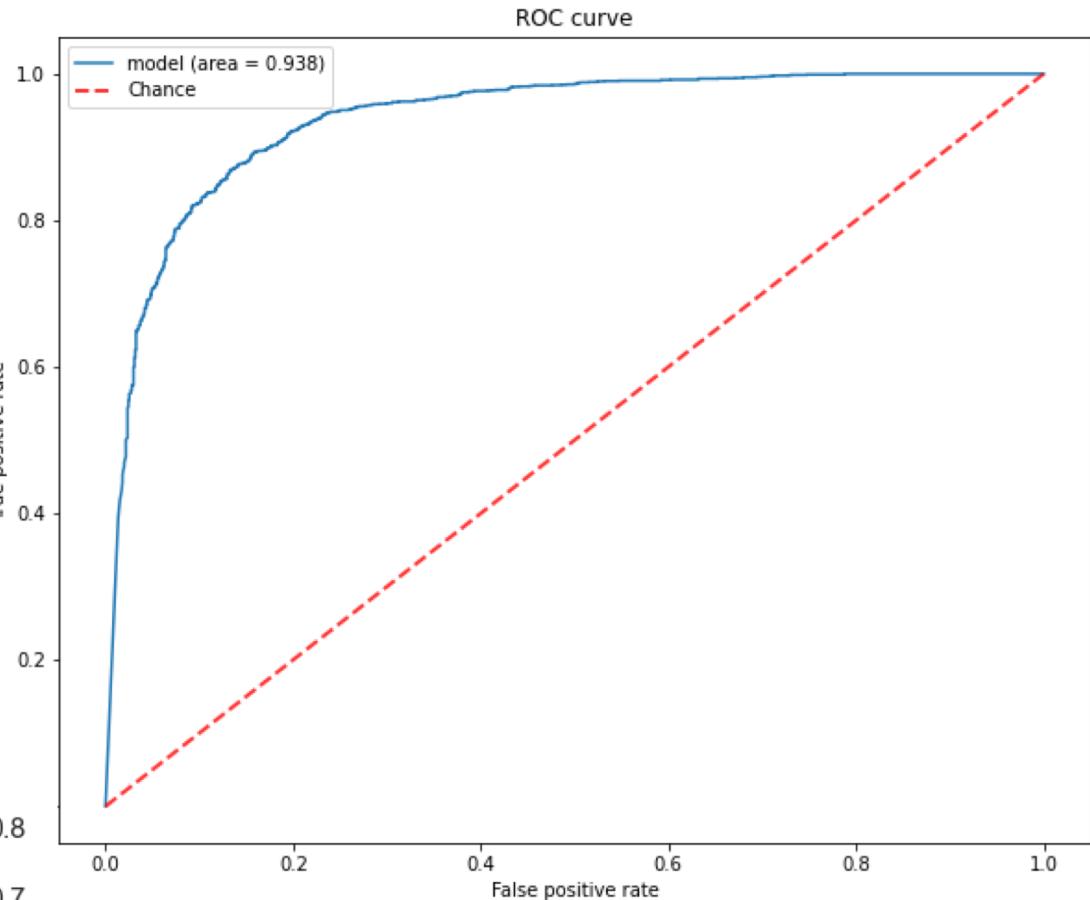
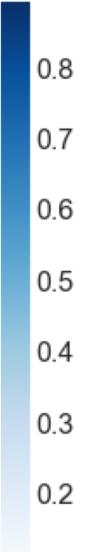
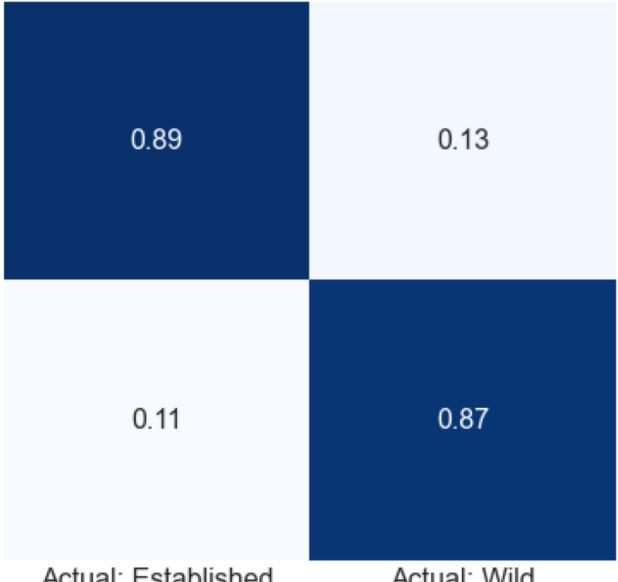


Model development, validation

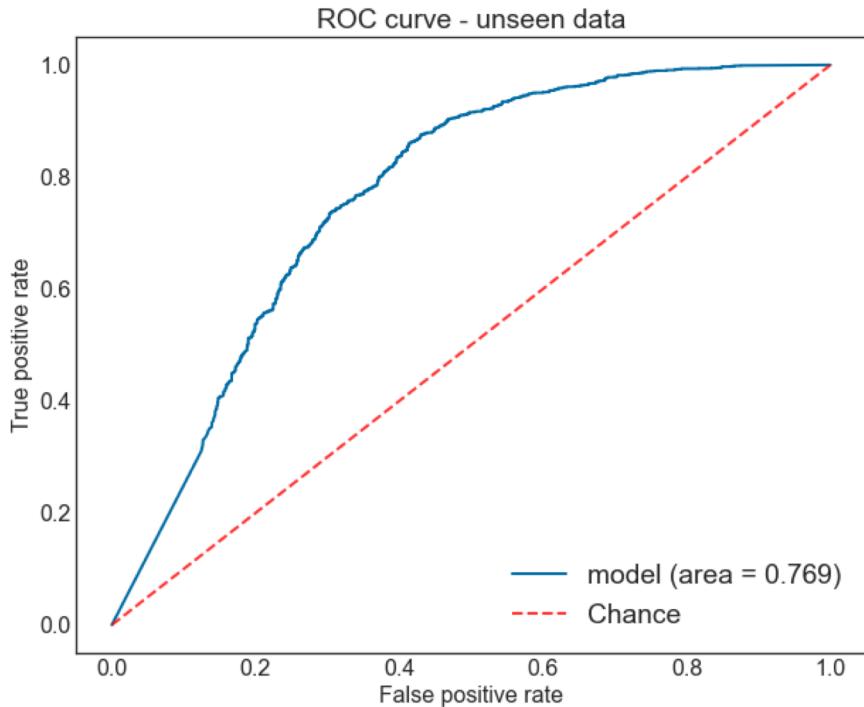


Model performance

Actual: Established Predict: Established



Test on unseen data

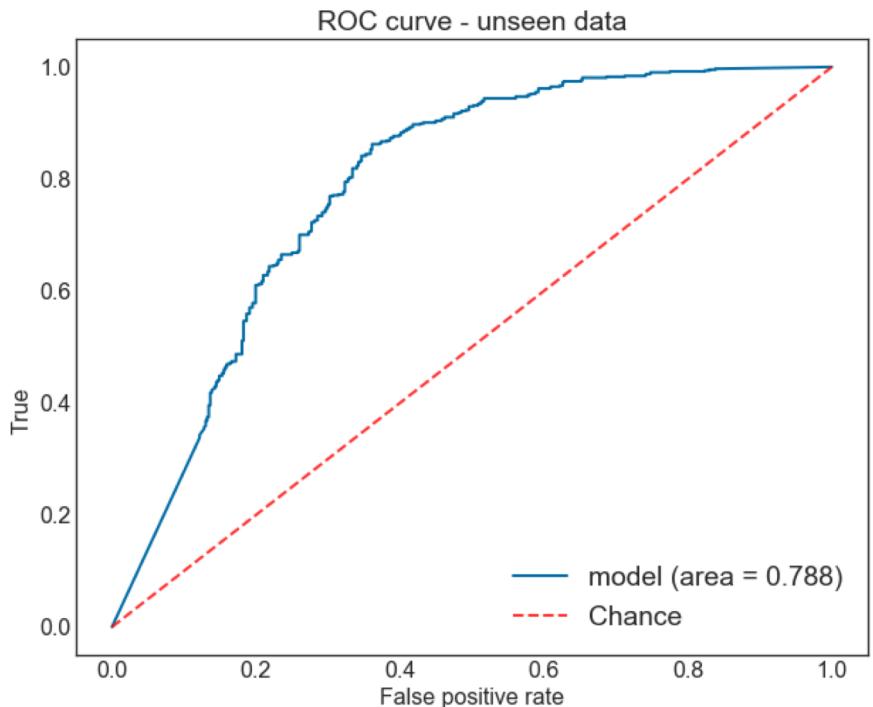


ID, MT, NM

	percent
Established Campground	47%
Wild Camping	53%

	percent
Established Campground	43%
Wild Camping	57%

ID

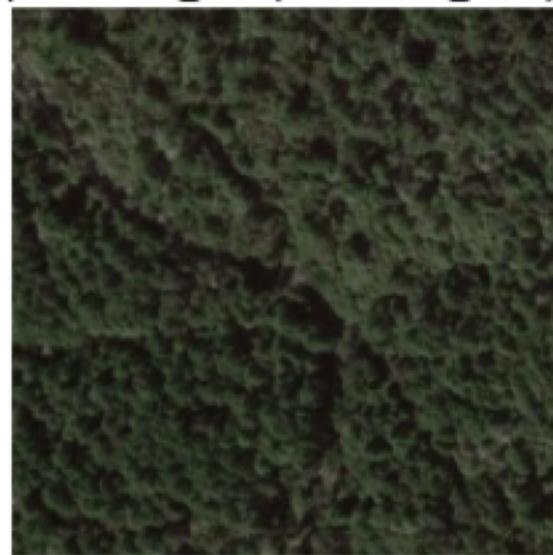


Could the category labels be improved?

pred: est_camp, act: wild_camp



pred: wild_camp, act: est_camp



pred: wild_camp, act: est_camp



Unsupervised Natural language processing of site descriptions for topics (categories?)

Free with two vault toilets,
nothing else exists. Campsite fires
are required to be in some sort of
metal container. Perhaps ~10 sites
for car camping.

This is a very small campground
for cars and RVs. Paved lot right by
the ocean with toilets (a bit scary),
and a picnic site. Maximum stay is
3 nights and fees were \$23/night.
There appears to be a camp host
across the road.



K means topic clusters

Three categories seem to split “wild camping” well

cluster name?	category	Percent of all sites in this cluster	top words
roadside spot	Wild Camping	73 %	parking, place, night, quiet, area, lot, nice, camping, park, free, good, overnight, great, near, spot, street, big, just, view, river
wild campground	Wild Camping	89 %	road, spot, forest, spots, dirt, nice, just, service, good, small, river, right, camping, quiet, creek, site, camp, gravel, great, little
est campground	Established Campground	95 %	campground, sites, water, nice, showers, park, night, lake, toilets, site, rv, clean, free, tent, tables, pit, picnic, hot, camping, available

Summary of recommendations

Classification of satellite images of sites
to curate site categories

Utilize site description text to auto
suggest category for user

-  Established Campground
-  Informal Campsite
-  Wild Camping
-  Hotel

Category Description:

A camping spot not linked to a business or institution irrespective of amenities or formal permissions.

Future improvement plans

- Clean training data
- Try sobel transformation
- Include additional binary cols
 - Such as “bathrooms” etc
- Utilize NLP topics to aid image classification
- Multiclassification
- Train with additional sat images
- Implement class weights
- NLP with higher level tokens than words
- Examine F1 scores
- More dropouts in model?



Extra

Model: "sequential"

Layer (type)	Output Shape	Param #
<hr/>		
rescaling (Rescaling)	(None, 256, 256, 3)	0
random_flip (RandomFlip)	(None, 256, 256, 3)	0
random_rotation (RandomRotation)	(None, 256, 256, 3)	0
random_zoom (RandomZoom)	(None, 256, 256, 3)	0
conv2d (Conv2D)	(None, 256, 256, 32)	416
max_pooling2d (MaxPooling2D)	(None, 128, 128, 32)	0
conv2d_1 (Conv2D)	(None, 128, 128, 64)	8256
max_pooling2d_1 (MaxPooling2D)	(None, 64, 64, 64)	0
conv2d_2 (Conv2D)	(None, 64, 64, 96)	24672
max_pooling2d_2 (MaxPooling2D)	(None, 32, 32, 96)	0
conv2d_3 (Conv2D)	(None, 32, 32, 128)	49280
max_pooling2d_3 (MaxPooling2D)	(None, 16, 16, 128)	0
flatten (Flatten)	(None, 32768)	0
dense (Dense)	(None, 256)	8388864
dropout (Dropout)	(None, 256)	0
dense_1 (Dense)	(None, 1)	257
<hr/>		
Total params: 8,471,745		
Trainable params: 8,471,745		
Non-trainable params: 0		

More on conf matrix, recall etc
