Observing ecology phenomenon on Flickr

Introduction

Method

Confidence score is measuring the ratio of log likelihood of being a vegetation bin or not at each time period.

$$P(scene \mid s^m, \overline{s}^n) = \frac{P(s^m, \overline{s}^n \mid scene)P(scene)}{P(s^m, \overline{s}^n)}$$

$$= \frac{\binom{m+n}{n} p^m (1-p)^n P(scene)}{P(s^m, \overline{s}^n)}$$

$$\frac{P(scene \mid s^m, \overline{s}^n)}{P(\overline{scene} \mid s^m, \overline{s}^n)} = \frac{P(scene)}{P(scene)} \left(\frac{p}{q}\right)^m \left(\frac{1-p}{1-q}\right)^n$$

Dataset

- Diversity of public sharing images

(a) Random positive images in vegetation dataset

(b) Random negative images in vegetation dataset

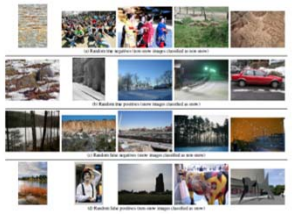
- Remove images with inaccurate time and location info

Scene classification

- Combining image features
- Snow: GIST, color histogram, tiny image, spatial color moments, spatial pyramid LBP
- Vegetation: color SIFT, color GIST
- Convolutional Neural Network

	Image features	CNN
Snow scene	80.5%	~85%
Vegetation scene	85.9%	~88%

- Sample image of snow Scene classification



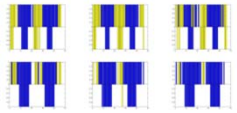
Experiments

Snow coverage

- Numbers
- Bar
- maps

Vegetation coverage

- Numbers
- Single place in 2 years



Blue: place covered by vegetation
Yellow : place without vegetation
Top: prediction
Bottom: ground truth

- North America maps in 2010

Conclusion