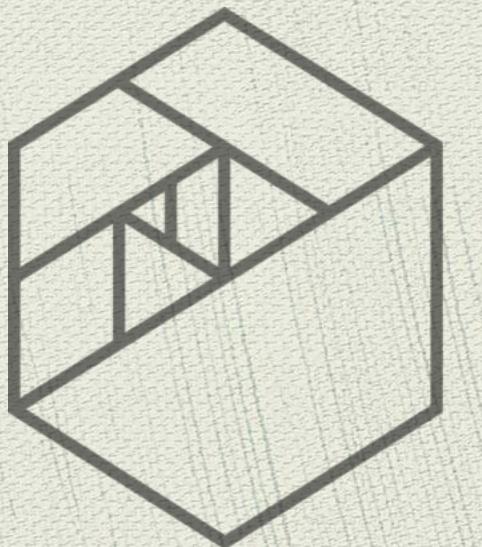


Classifying Trees from Google Street View

Utilizing Deep Learning



METIS

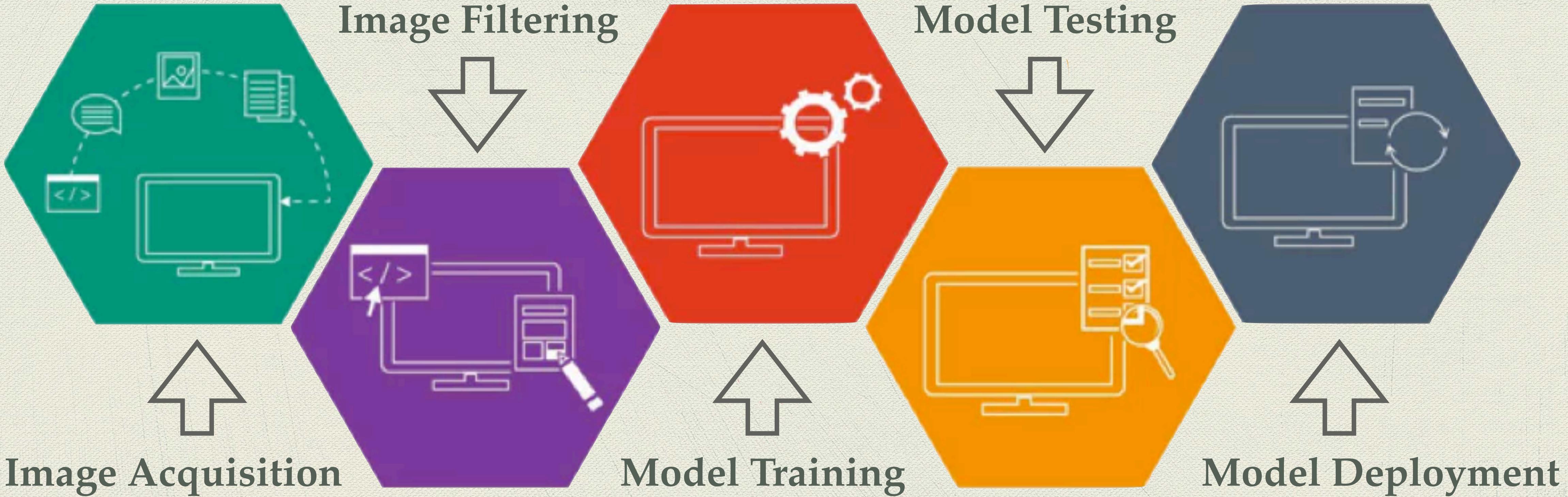
Alex Bell
December 12, 2018

Motivation

- ◆ Defining characteristic of Seattle
- ◆ Save the city time and money
- ◆ Keep database updated
- ◆ 59% of trees never verified



Project Workflow



 python™

 Keras

 amazon
web services

Data & Image Acquisition

- ◆ City of Seattle street trees database
- ◆ 12,706 street trees in 82 genus classifications
- ◆ Google Street View API



pandas
 $y_i t = \beta' x_{it} + \mu_i + \epsilon_{it}$



Google Maps APIs

Missing Trees Examples



Construction Site



Trees Removed



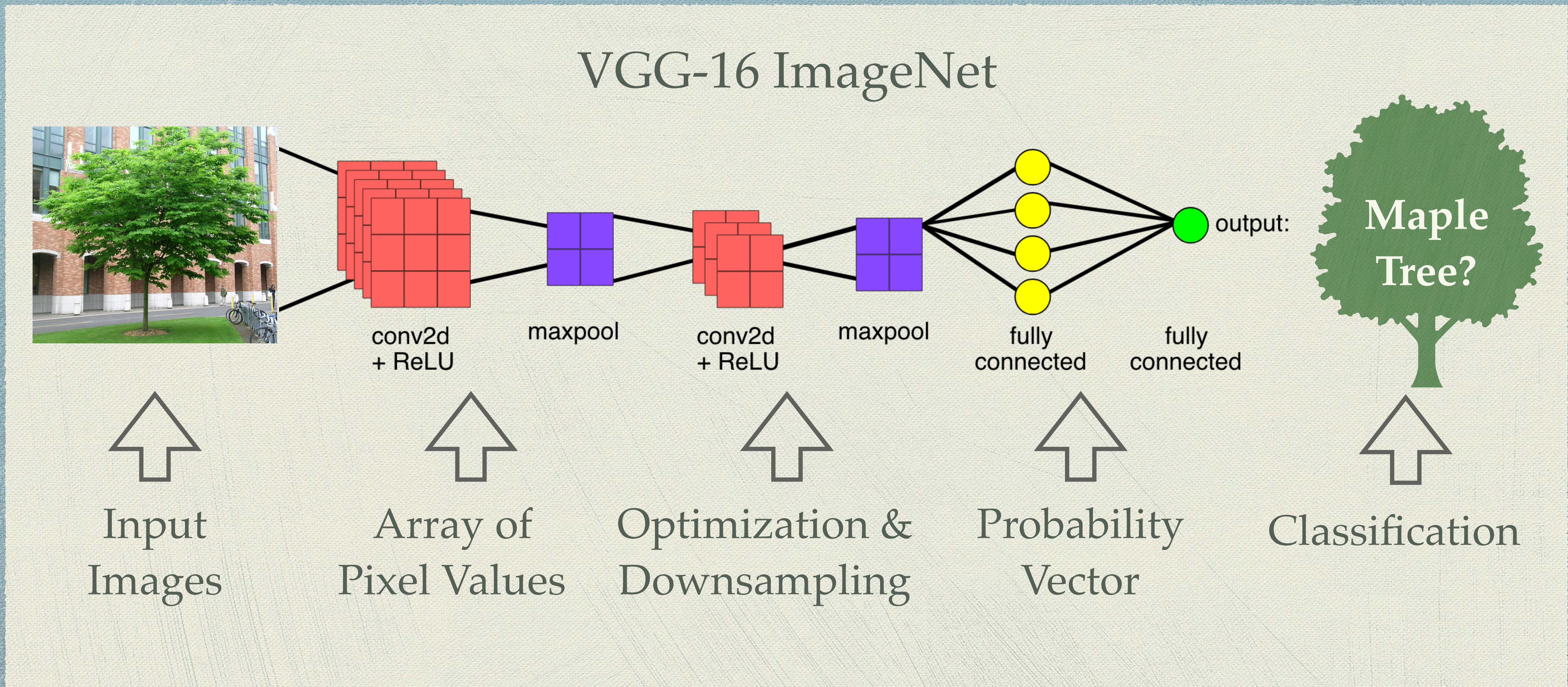
Blocked View

Neural Network #1: Places 365

- ◆ Utilized as filter
- ◆ Categorized into scenes
- ◆ Odd classifications investigated
- ◆ Removed 175 tree-less images



Convolutional Neural Network



Results: Accuracy 56%

My Predictions



56%

Majority Class



18%

Random Guess



1.2%

0

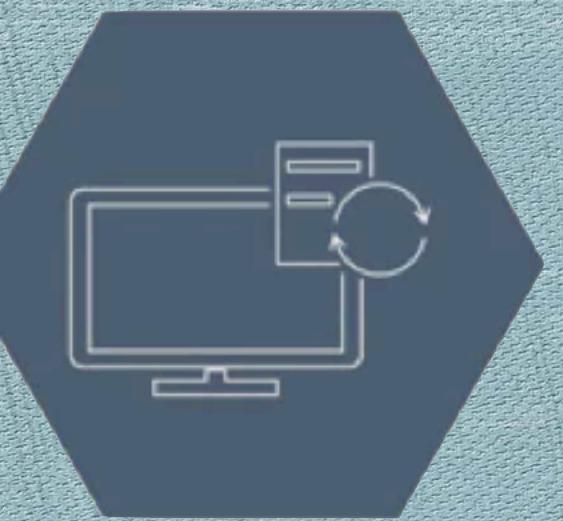
0.15

0.3

0.45

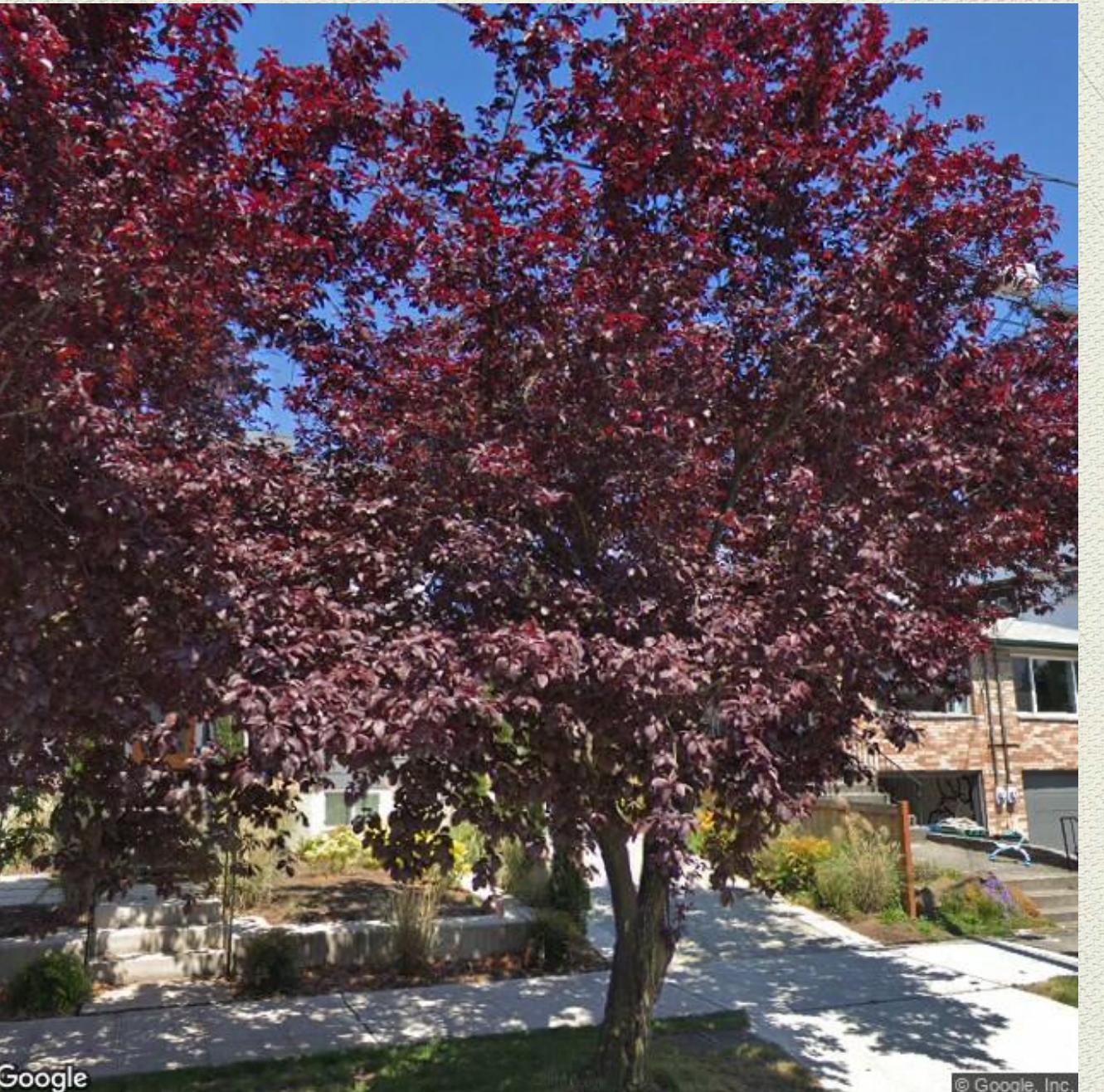
0.6

Successful Predictions



Pyramidal (Carpinus)

Capitol Hill



Cherry Plum (Prunus)

Ballard

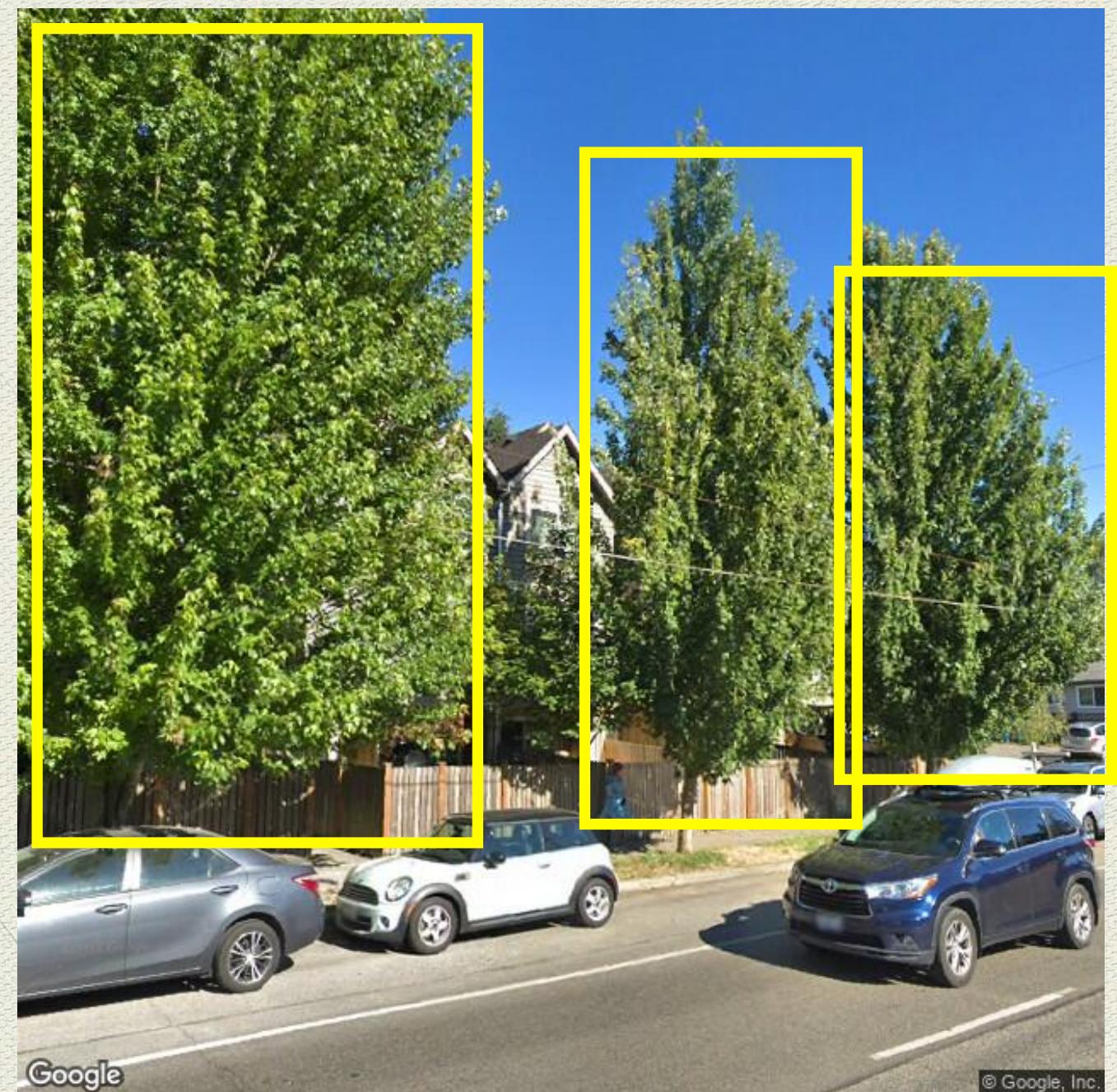


Chestnut (Aesculus)

Ravenna

Future Work

- ◆ Object localization & detection
- ◆ Classify individual species
- ◆ Create a mobile app to test images



Thank You



in/ alexwbell



github.com / datalex3



datasci.alex@gmail.com



medium.com/@alexwbell

