Project 3

Submission and evaluation

Plan for today

- What you need to do next Wednesday
- Files to submit
- How we evaluate your result (60%)
- Presentation (40%)
- Spring 2016 project review (Yuting)

What you need to do next Wednesday

- You will be given 2000 new images for testing (no label)
- Run your feature.R (feature.py or feature.m)
  - Recommend you do feature selection (dimension reduction) here
- Prepare your Train.R before class
  - Your model is trained by training features
  - Base and advanced model
  - Training model could take more than 30 mins
  - Include any tuning step (grid search) in here
- Run Test.R to give prediction directly
  - Two predictions
  - 0 for dog and 1 for fried chicken
- Time limit 30 mins
- Presentation

What you need to submit

- Feature.R (Feature.py)
  - Input: raw images
  - Output: final features in Feature_eval.RData
- Feature_eval.RData
  - Two Rdata file is acceptable
- Train.R
  - Input: feature in RData and training labels
  - Output: two model object
- Test.R
  - Input: feature and model object in R
  - Output: prediction (0 and 1)
- Github repo
  - Windows or Mac machine
  - R version (3.2.4 for me)
  - Packages: version, how you install it

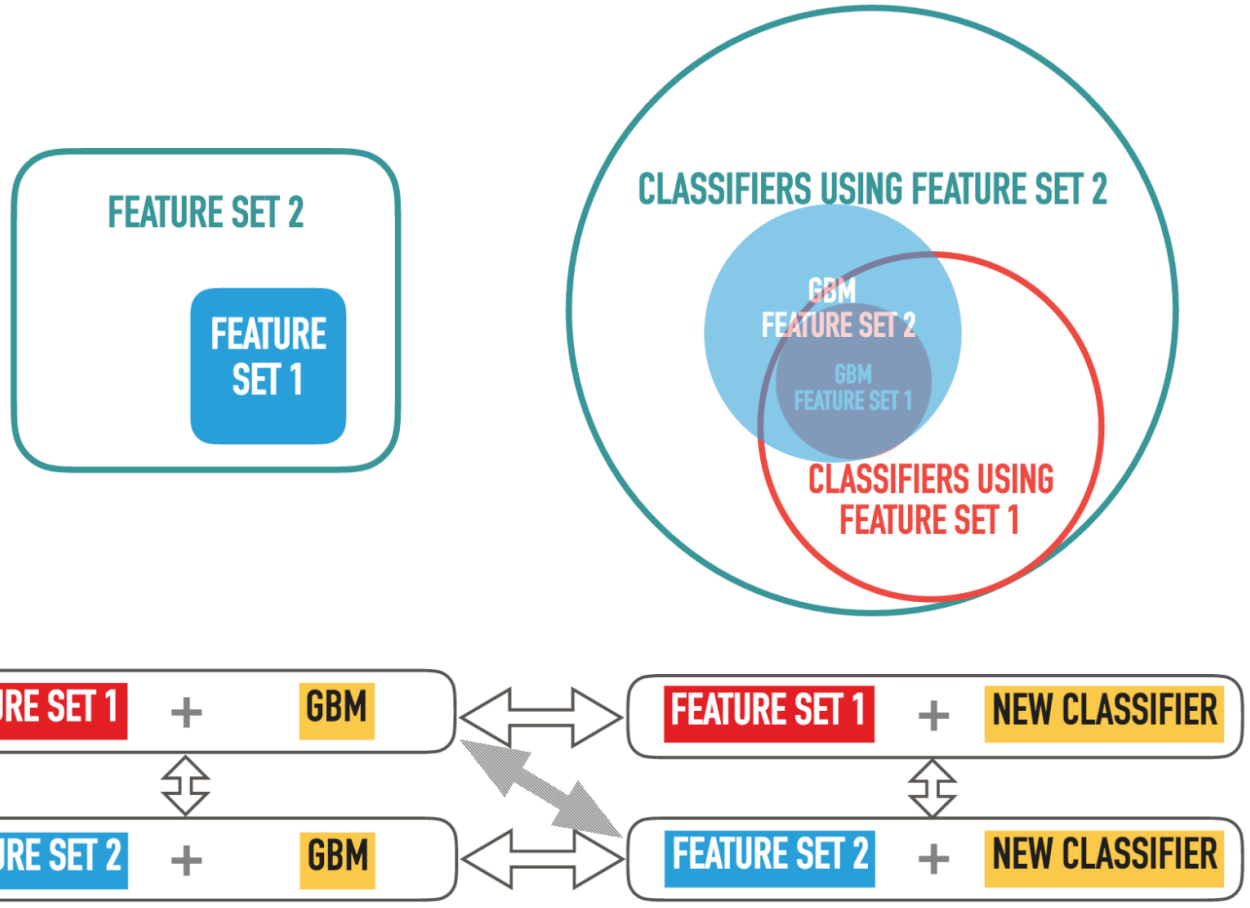
How we evaluate your result

- You can find skeleton code here:
  - https://github.com/TZstatsADS/ADS_Teaching/blob/master/Spring2016/Tutorials/wk8-evaluation.R
- Run 5-fold cross validation on test image:
  - Re-train your base & adv model 5 times each with 1600 images
  - Test your accuracy with test label (only we have)
  - Compare our result with your claimed result (Whether you overfit)
  - Record your training time

Presentation

- Methodology
- Interpretation of the features

Methodology

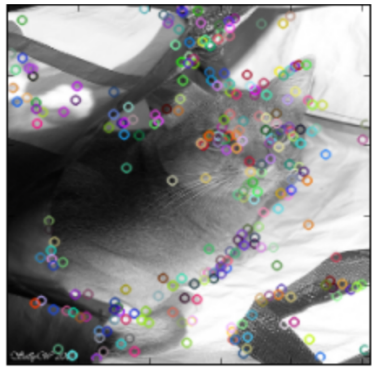


Feature	Classifier	Accuracy (cv= 10)
RGB	Linear SVM C=1	60.3%
SIFT 1000 words Iteration = 10	Linear SVM C=1	68%
SIFT 2000 word, iteration = 10	Linear SVM C=1	71%
SIFT 2000 word, iteration = 30	Linear SVM C=1	74%
SIFT 2000 words iteration = 30	SVM chi2 kernel C = 1 Gamma = 1	79%

Feature	Classifier	Accuracy
RGB	Linear SVM C=1	60.3%
SIFT 2000 words iteration = 30	SVM chi2 kernel C = 1 Gamma = 1	79%
Deep feature Layer 1	Linear SVM C = 1	73%
Deep feature Layer 2	Linear SVM C = 1	81% (5 min)
Deep feature Layer 2	SGD classifier	80.5% (10 sec)

Color feature:
RGB

Feature: SIFT



Deep features

Feature
Selection

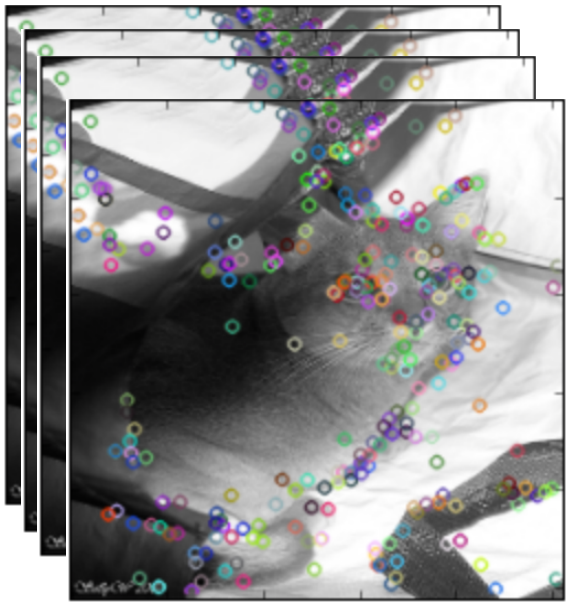
Random
forest

Linear
SVM

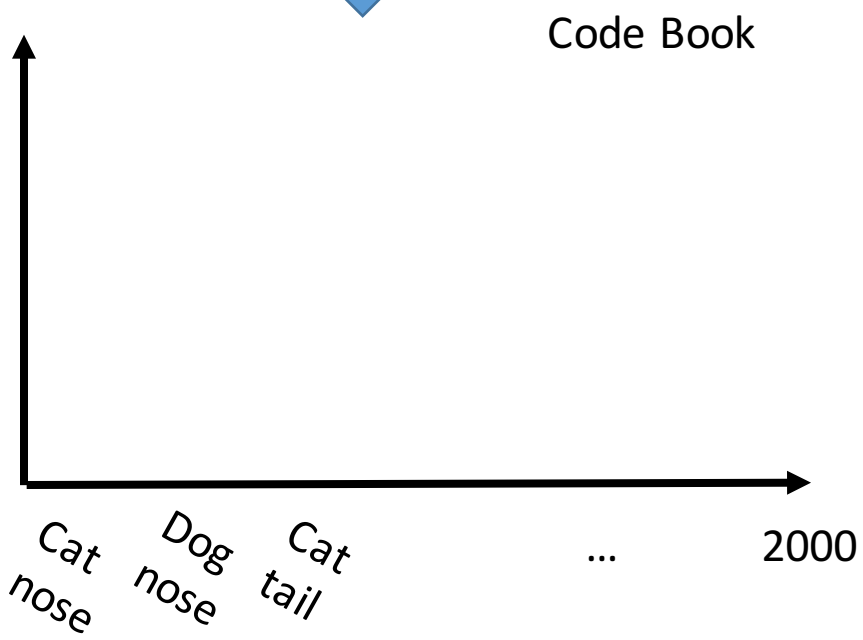
10 fold
CV:
87%

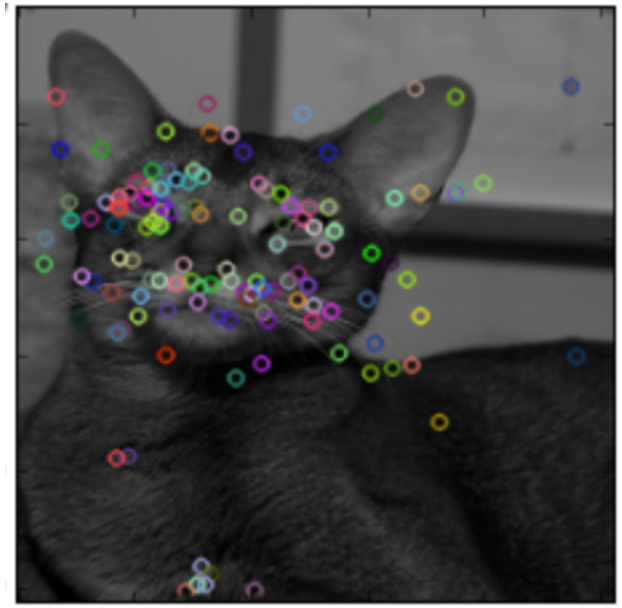
Interpretation of the features

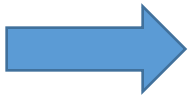
SIFT

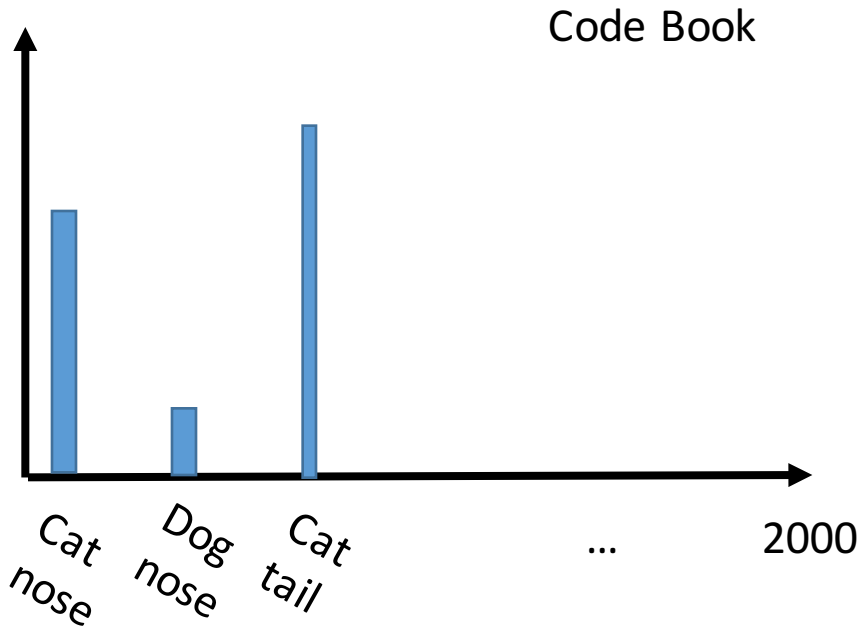


K-means with
2000 centroids



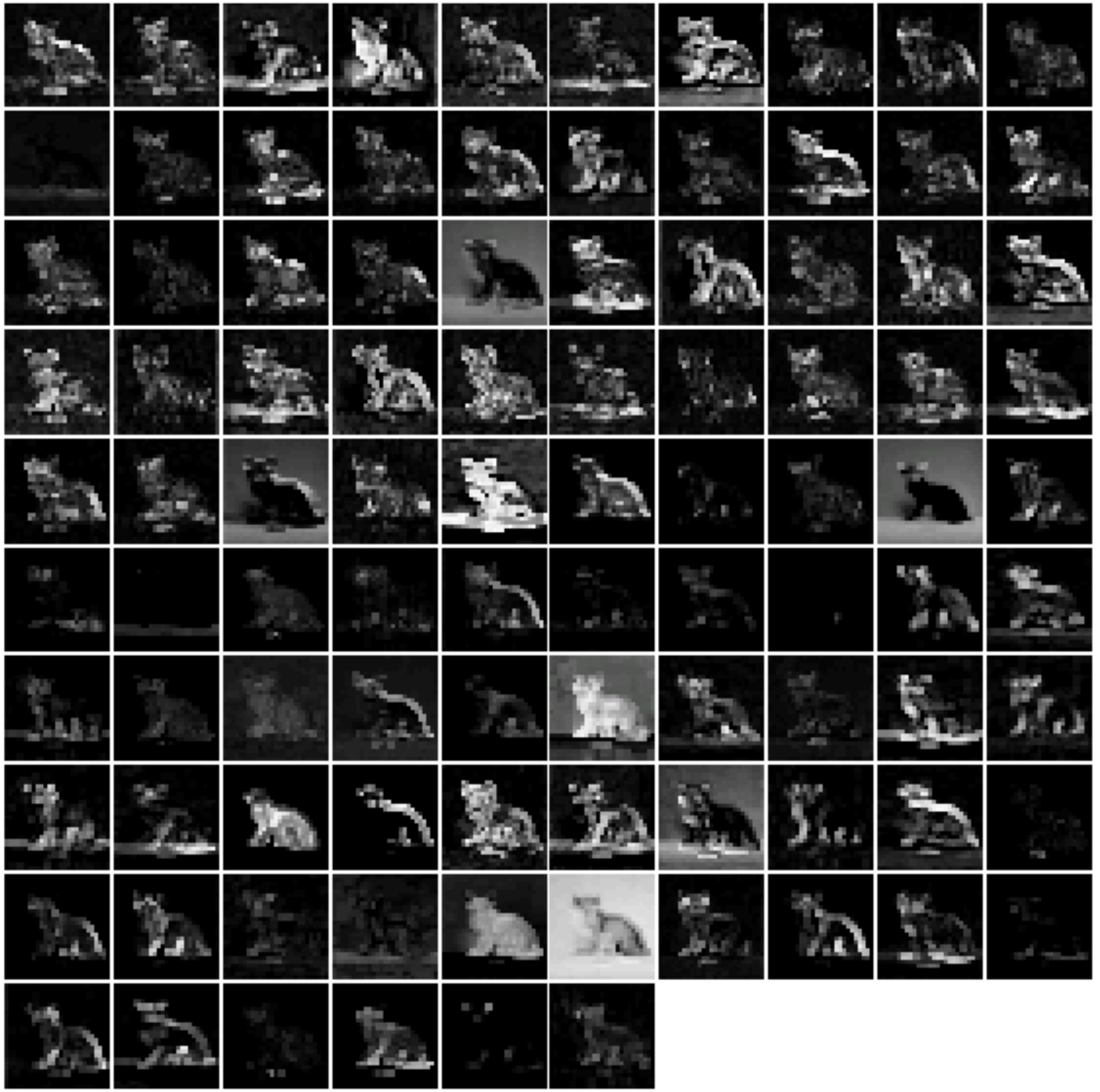





Code Book
Cat nose
Dog nose
Cat tail
...
2000

First layer

96 kernels



Shape

Spring 2016 project review

- Link:
  - https://github.com/TZstatsADS/ADS_Teaching/blob/master/Spring2016/Tutorials/wk10_summary_proj3.pdf