3-Class classification (k = 15, weights = 'uniform')

Machine Learning Lab

EE382V Activity Sensing and Recognition

UT Austin • Dept. Electrical and Computer Engineering • Fall 2016

Summary + Critique Homework

"The ideas of opportunistic sensing and socially aware computing seems not to be a new idea"

"Although it's fair to say that the world is now more connected than ever, it doesn't take into account the growing concerns of privacy"

"not much stress is given on the algorithms and techniques which will bring about how complex activity recognition and socially aware computing"

"The themes discussed here, specifically around context awareness, is of particular interest to the hardware design community"

Today

Evaluating Classifier Performance

  Split Train / Test

  Cross-Validation

  Leave-One-Out

  User Dependency

Lab Activity

  Load and Visualize Datasets

  Train and Evaluate Classifiers

Evaluating Classifier Performance

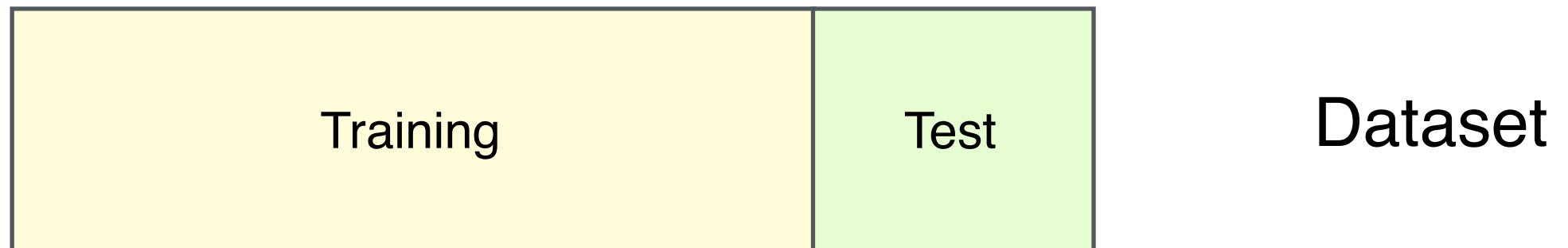# Evaluating Classifier Performance

Split Train / Test

Dataset

Evaluating Classifier Performance

Split Train / Test

Dataset

Random split into training and test sets
60% Training, 40% Test common

```
X_train, X_test, y_train, y_test = cross_validation.train_test_split(
    iris.data, iris.target, test_size=0.4, random_state=0)
```

Thoughts?
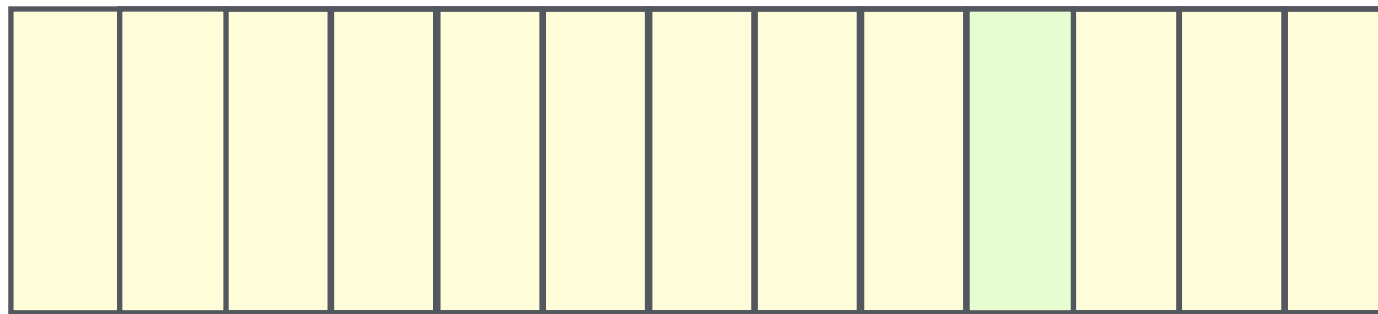
Evaluating Classifier Performance

Cross-Validation

Dataset

Evaluating Classifier Performance

Cross-Validation

Dataset

Divided into k equal "folds"

For each fold:

- Model is trained with k-1 folds
- Model is evaluated with remaining fold
- Evaluation results are averaged

```
from sklearn import metrics
scores = cross_validation.cross_val_score(clf, iris.data, iris.target,
    cv=5, scoring='f1_weighted')
```

Evaluating Classifier Performance

Leave-One-Out

Dataset

Evaluating Classifier Performance

Leave-One-Out (LOO)

Dataset

Given n instances, for each instance:

- Model is trained with n-1 instances
- Model is evaluated with remaining instance
- Evaluation results are averaged

Another way to apply LOO…

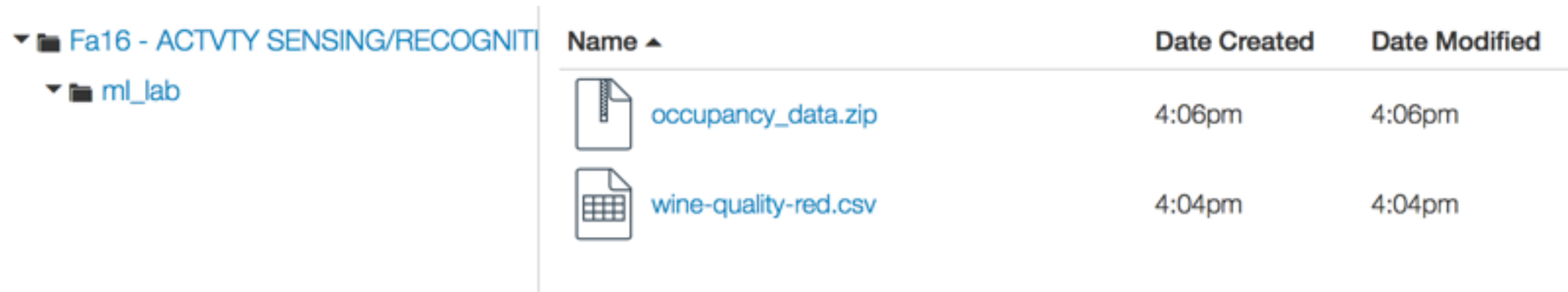# Evaluating Classifier Performance

Leave-One-Participant-Out (LOPO)

Given data for n participants, for each participant:

- Model is trained with data from n-1 participants
- Model is evaluated with data from remaining participant
- Evaluation results are averaged

What does a good result in LOPO suggest?

Let's work with data…

Name ▲	Date Created	Date Modified
occupancy_data.zip	4:06pm	4:06pm
wine-quality-red.csv	4:04pm	4:04pm

▼ ■ Fa16 - ACTVTY SENSING/RECOGNIT
  ▼ ■ ml_lab

Start with wine dataset

Get a sense of the data, visualize it

Try to predict wine quality from physicochemical parameters

Try different classifiers, using only some features, etc

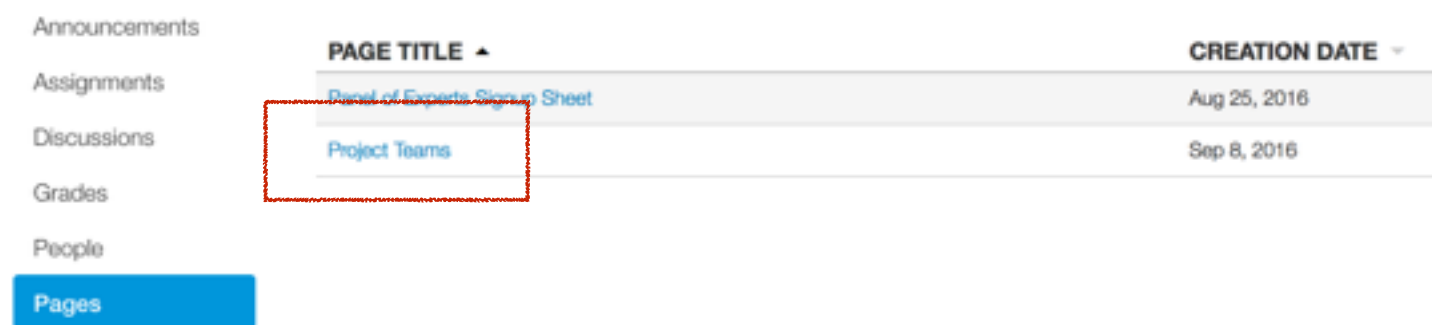http://scikit-learn.org is your friend

Repeat for Occupancy dataset

Let's see who got best results

Announcements

Post your project team/members on Canvas

If not on a team, team formation activity next week

Homework Assignment #2 will be posted soon

Datasets will be provided

You will train classifiers with the datasets

Report and discuss what you observed

Next Week

Tuesday

Pitch project ideas and form teams

If **not** on a team: propose an idea and form a team around it

If **on** a team: recruit more members (max 4)

Thursday

Guest lecture

Continue team formation activity (if needed)

Work on your project proposal with your team

As your team is formed, please add it to Canvas Page