# Matlab 7: Commonly Used Datasets for Pattern Recognition

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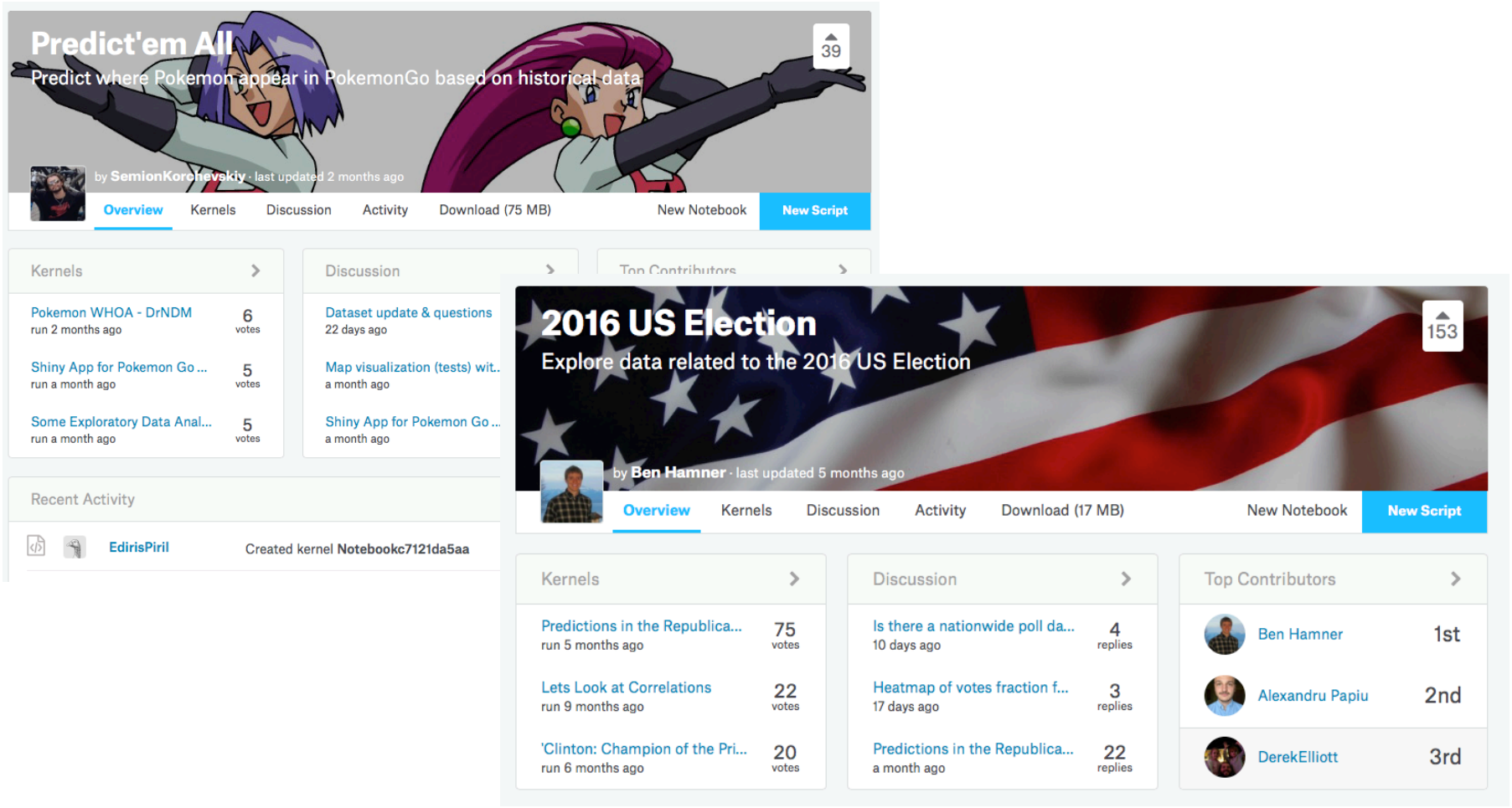
Slides are based on the materials from Prof. Roger Jang

# Datasets

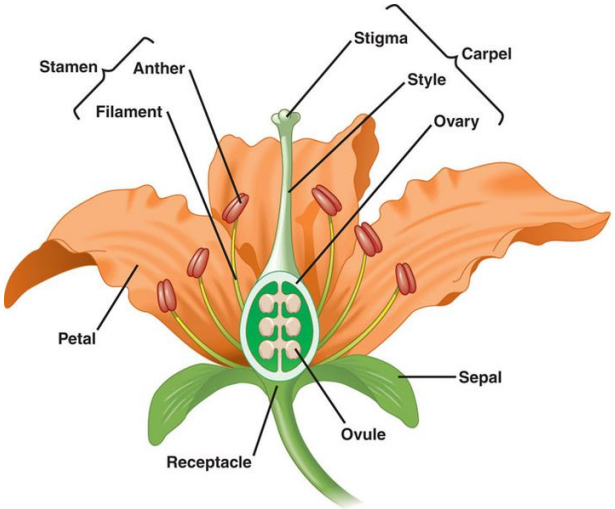
- There are numerous datasets for testing machine learning algorithms:
  - Kaggle
  - UCI Machine Learning Repository
  - Image net
  - MNIST handwritten digit database
  - Labeled Faces in the Wild
  - Some conferences have dataset tracks
  - Many many more can be found via Google…

# Kaggle Dataset



# UCI Dataset: Iris

- Source
  - R.A. Fisher, 1936
- Goal
  - Predict the types of iris in Hawaii
- Problem sizes
  - 150 instances, 3 classes
  - 4 attributes (features)
    - sepal length
    - sepal width
    - petal length
    - petal width




# UCI Dataset: Wine

- Source
  - Institute of Pharmaceutical and Food Analysis and Technologies, Via Brigata Salerno, 16147 Genoa, Italy
- Goal
  - Using 13 chemical constituents to determine the origin of wines
- Problem size
  - 178 instances, 3 classes, 13 attributes

# UCI Dataset: Abalone

- Source
  - Dept. of Primary Industry and Fisheries, Tasmania, Australia
- Goal
  - Predict the age of abalone
- Problem sizes
  - 4177 instances, 29 classes
  - 8 attributes (features): sex, length, diameter, height, whole weight, shucked weight, viscera weight, shell weight
  - 1 output: rings (+1.5 gives the age in years)

# UCI Dataset: Mushroom

- Source
  - Mushroom records drawn from The Audubon Society Field Guide to North American Mushrooms (1981)
- Goal
  - To determine a mushroom is poisonous or edible
- Problem size
  - 8124 instances, 2 classes, 22 attributes

# UCI Dataset: Liver Disorder

- Source
  - BUPA Medical Research Ltd.
- Goal
  - Use variables from blood tests and alcohol consumption to see if liver disorder exists
- Problem size
  - 345 instances, 2 classes, 6 attributes (the first five are results from blood tests, the last one is alcohol consumption per day)

# UCI Dataset: Credit Screening

- Source
  - Chiharu Sano, csano@bonnie.ICS.UCI.EDU
- Goal
  - Determine people who are granted credit
- Problem size
  - 125 instances, 2 classes, 15 attributes

# UCI Dataset: House Price Prediction

- Source
  - CMU StatLib Library
- Goal
  - Predict house price near Boston
- Problem Size
  - 506 instances, 13 attributes

# How to Acquire/Visualize the Datasets?

- Acquire the datasets
  - prData.m for acquiring PR data
  - dcData.m for acquiring DC data
- Visualize the datasets, for example:

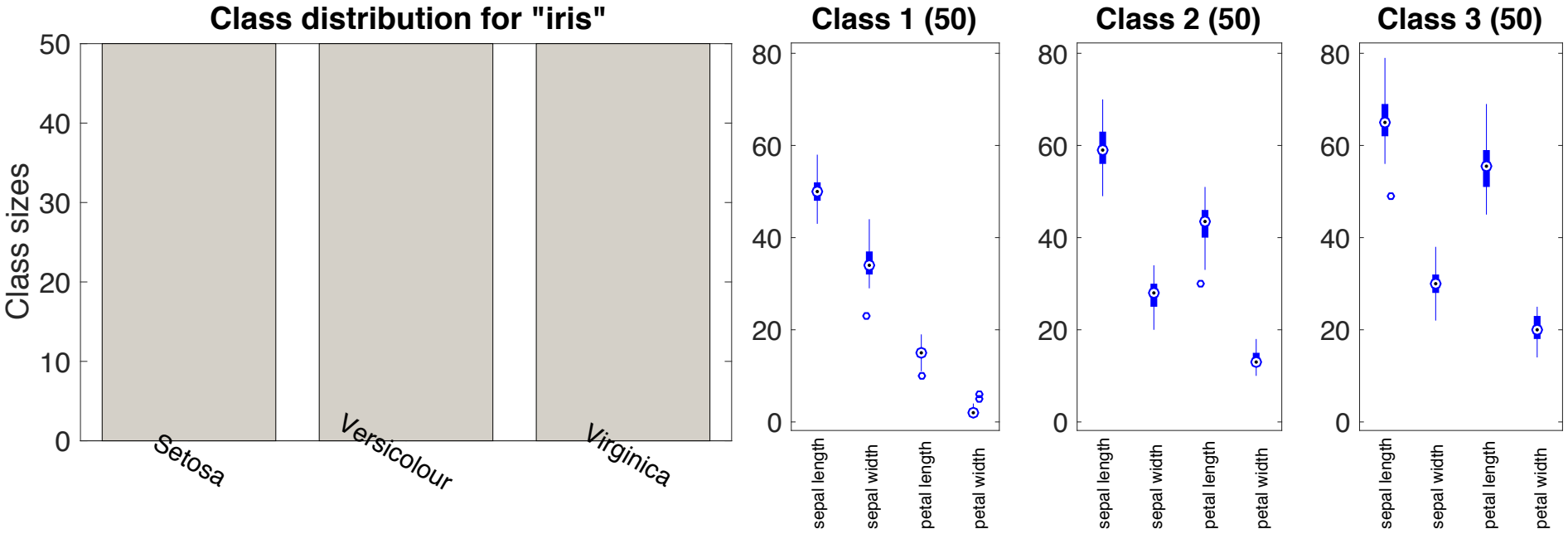
```
>> ds=prData('iris')

ds =
     dataName: 'iris'
    inputName: {'sepal length'  'sepal width'  'petal length'  'petal width'}
   outputName: {'Setosa'  'Versicolour'  'Virginica'}
        input: [4x150 double]
       output: [1x150 double]
```

# Iris Data Visualization

```
ds=prData('iris');
classSize=dsClassSize(ds, 1);
```

```
ds=prData('iris');
dsDistPlot(ds);
```

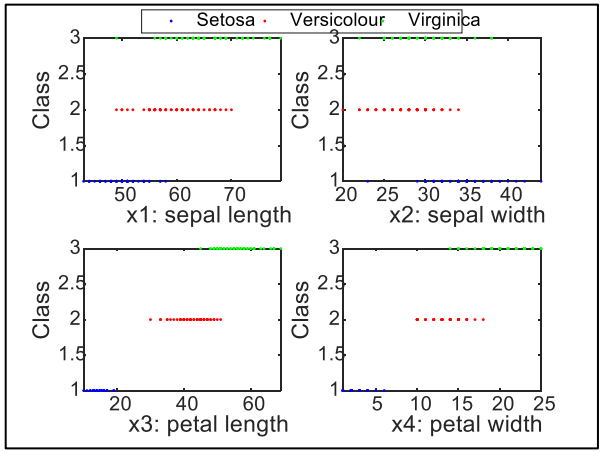


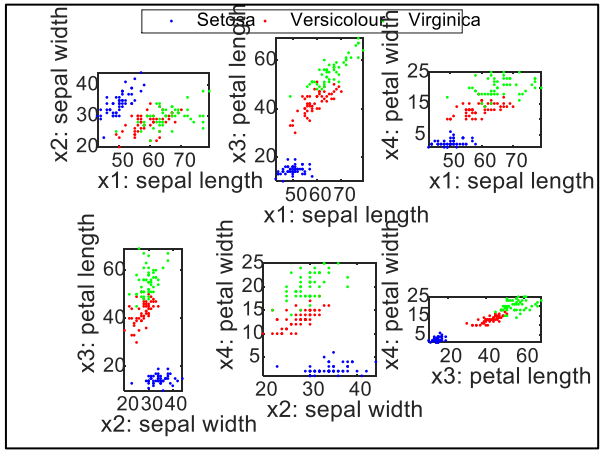
# Iris Data Visualization (cont.)

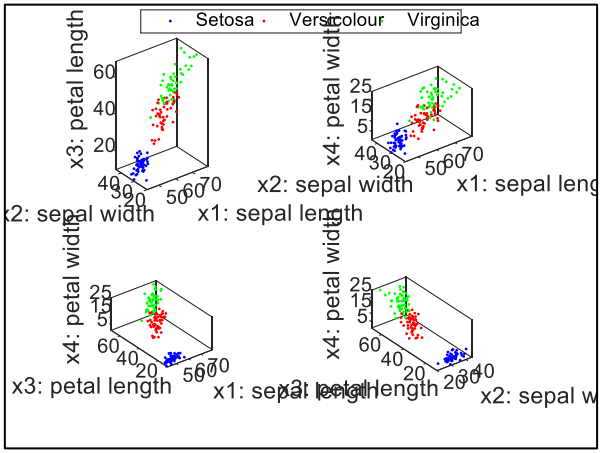
```
ds = prData('iris');
dsProjPlot1(ds);
```

```
ds = prData('iris');
dsProjPlot2(ds);
```

```
ds = prData('iris');
dsProjPlot3(ds);
```



# List of Visualization Functions

- classClassSize(DS): Compute the size of each class
- dsProjPlot1(DS): Plot the classes w.r.t. the projected 1D features
- dsProjPlot2(DS): Plot the classes w.r.t. the projected 2D features
- dsProjPlot3(DS): Plot the classes w.r.t. the projected 3D features
- dsFormatCheck(DS): Check the format of the dataset
- dsNameAdd(DS): Add names to the inputs and outputs of a given dataset
- dsRangePlot(DS): Plot the range of each input of a given dataset
- dsDistPlot(DS): Plot the distributions of inputs over different classes of a given dataset
- dsScatterPlot(DS): Scatter plot of a dataset in a 2D space
- dsScatterPlot3(DS): Scatter plot of a dataset in a 3D space

- More details can be found at https://goo.gl/77kb3v

# Matlab #6 Homework (M6)

1. (1%) Use K-means algorithm with K=3 to classify the Iris dataset with all four features (4 dimensions). Plot a figure to visualize the sample data and the classifications due to K-means and the ground-truth. Please submit two files: your .m file and an eps.

# Questions?