Week 6 Quiz

Clarissa Tai - rt2822

Due Tues Oct 18th 11:59pm ET

In this quiz we'll be loading some data, training a few models and plotting their decision boundaries to visually compare how the models perform.

Instructions

Replace the Name and UNI in cell above and the notebook filename

Replace all '__' below using the instructions provided.

When completed,

1. make sure you've replaced Name and UNI in the first cell and filename
2. Kernel -> Restart & Run All to run all cells in order
3. Print Preview -> Print (Landscape Layout) -> Save to pdf
4. post pdf to GradeScope

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn import datasets
from mlxtend.plotting import plot_decision_regions

import warnings
warnings.filterwarnings('ignore') # sklearn complains about predicting on data
                                  # without column-names when trained on a dataframe
```

```
sns.set_style('darkgrid')
%matplotlib inline
```

In [2]:

```
# For this quiz we'll be using a sample of vehicle data taken from:
#   https://www.fueleconomy.gov/feg/ws/

# We'll be classifying Front-Wheel vs 4-Wheel Drive vehicles
#   by City and Highway miles per gallon (MPG)

# Column Definitions:
#  UCity - city MPG
#  UHighway - highway MPG
#  target - 0:"Front-Wheel Drive", 1:"4-Wheel or All-Wheel Drive"

df = pd.read_csv('../data/vehicle_subset_quiz6.csv')
```

In [3]:

```
# The two features we want to classify on are "UCity" and "UHighway"
# Store these two feature columns from df in X
X = df[["UCity" , "UHighway"]]

# Check to make sure that X only has 100 rows and 2 columns
assert X.shape == (100,2)

# Store the target column "target" in y
y = df.target

# Check to make sure that y is 1 dimensional with 100 elements
assert y.shape == (100,)

# Print out the number of observations per target
# Note that each class should have 50 observations.
y.value_counts()
```

Out[3]:

```
0    50
1    50
Name: target, dtype: int64
```

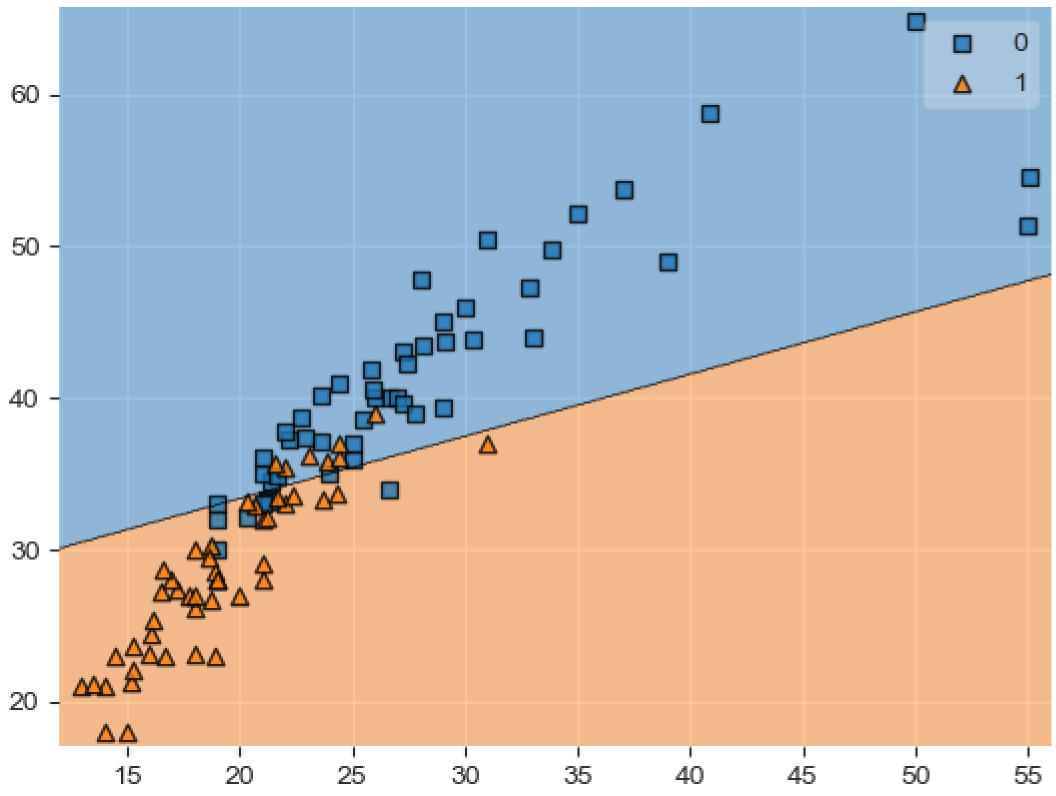
In [4]:

```
# Import LogisticRegression from sklearn.linear_model
from sklearn.linear_model import LogisticRegression

# Instantiate the LogisticRegression model with default settings
# Store the untrained model in logr
logr = LogisticRegression()
```

```
# Fit the model on on X and y
logr.fit(X, y)

# Plot the training set and trained classifier with
#   plot_decision_regions()
# NOTE: plot_decision_regions() requires numpy arrays, not pandas objects
#   use X.values, y.values to pass in numpy arrays
plot_decision_regions(X.values,y.values,logr)
```

Out[4]:

```
<AxesSubplot: >
```



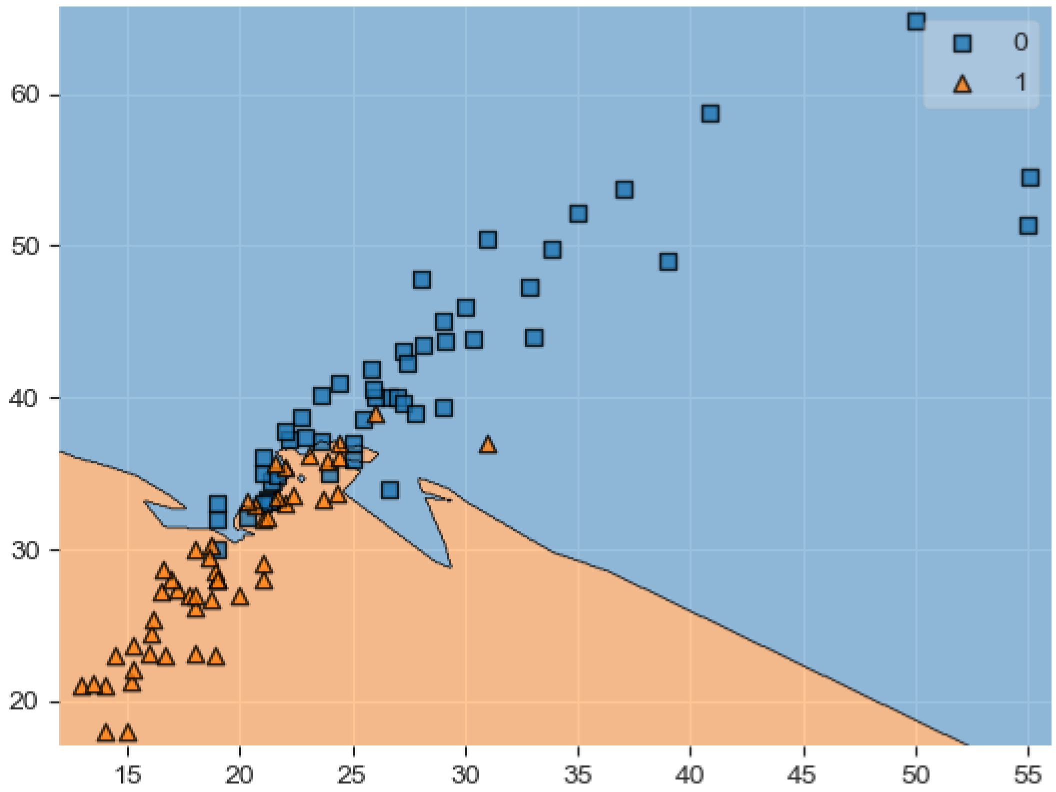
In [5]:

```
# Import KNeighborsClassifier from sklearn.neighbors
from sklearn.neighbors import KNeighborsClassifier

# Instantiate the KNeighborsClassifier model with default settings
#   and fit on X and y
# Store the trained model in knn
```

```
knn = KNeighborsClassifier().fit(X,y)

# Plot the training set and trained classifier with plot_decision_regions()
plot_decision_regions(X.values,y.values,knn)
```

Out[5]:

```
<AxesSubplot: >
```

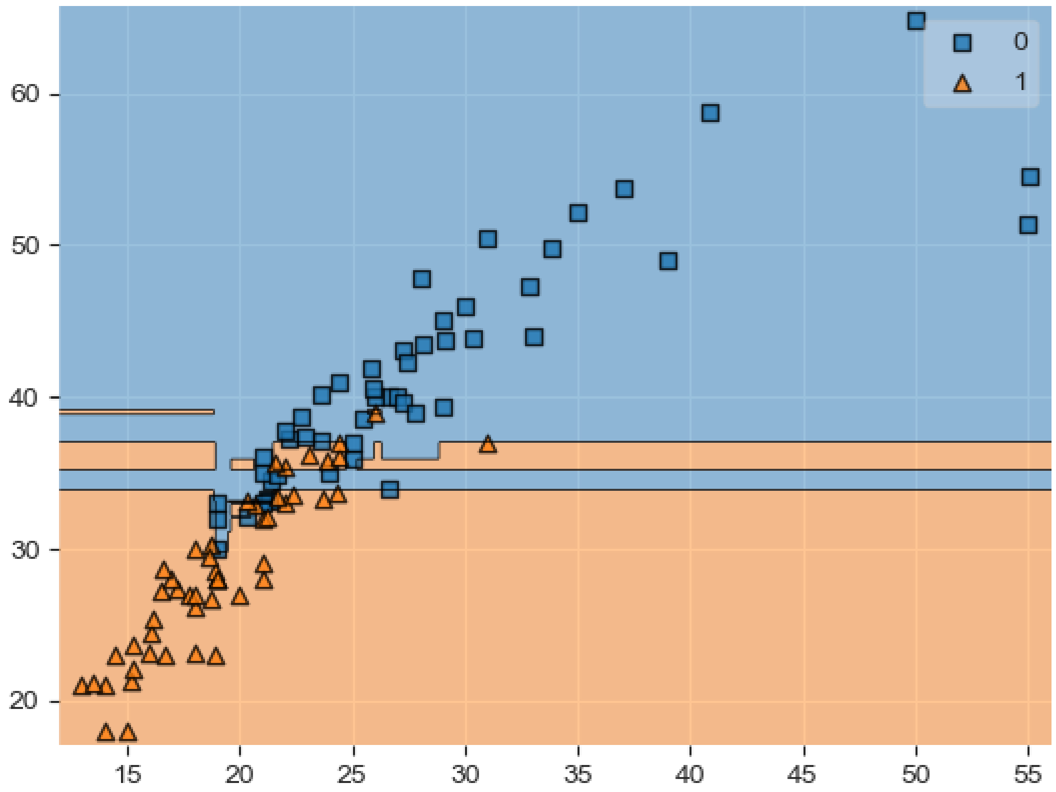


In [6]:

```
# Import GradientBoostingClassifier from sklearn.ensemble
from sklearn.ensemble import GradientBoostingClassifier

# Instantiate the GradientBoostingClassifier with default settings
#   and fit on X and y
# Store the trained model in gbc
gbc = GradientBoostingClassifier().fit(X,y)

# Plot the training set and trained classifier with plot_decision_regions()
plot_decision_regions(X.values,y.values,gbc)
```

Out[6]:

```
<AxesSubplot: >
```



In [ ]: