UDACITY

PROJECT

# Titanic Survival Exploration

A part of the Machine Learning Engineer Nanodegree Program

PROJECT REVIEW

NOTES

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## Requires Changes

1 SPECIFICATION REQUIRES CHANGES

Dear Student,

Great work with your project!. As a side comment in this Kaggle section there are other examples of Titanic that you can use to keep learning Pandas, matplotlib or Scikit-Learn.

Congratulations on passing your exam and stay U! 🎉

### Answers to Each Question

**The `predictions_0` function has been run and the accuracy of the predictions is reported.**

Nice work! 👌

At this moment we have a pretty simple algorithm that always predicts that passengers did not survive. 😰

**The `predictions_1` function has been correctly implemented. The expected accuracy of the predictions is reported.**

Well done implementing the new condition into your function. Now, using `Sex` to determine whether a passenger survived or not seems to be quite important since accuracy is significantly higher!

Our model now assumes all females survived while all males perished and the accuracy boosted up to 78%, wow! this means that out of 100 predictions, our model is right in 78 of them 💪.

So, had females higher survival rates than males? It seems so, actually, it seems that most females survived while most males perished!

**The `predictions_2` function has been correctly implemented. The expected accuracy of the predictions is reported.**

Well done completing this predictor!. It seems `Age` is also important since it helps to improve our model a bit more. `males` with `age < 10` seems to mostly survive, it seems male Childs had higher survival rates than adults!.

**The `predictions_3` function has been correctly implemented and obtains a prediction accuracy of at least 80%. The approach to the task has been documented, including features that were explored and intermediate steps taken to complete the function.**

While you did a great job getting an accuracy over 80.0% within just few statements, in this section it is also required you describe the process taken, in particular you need to address the following questions:

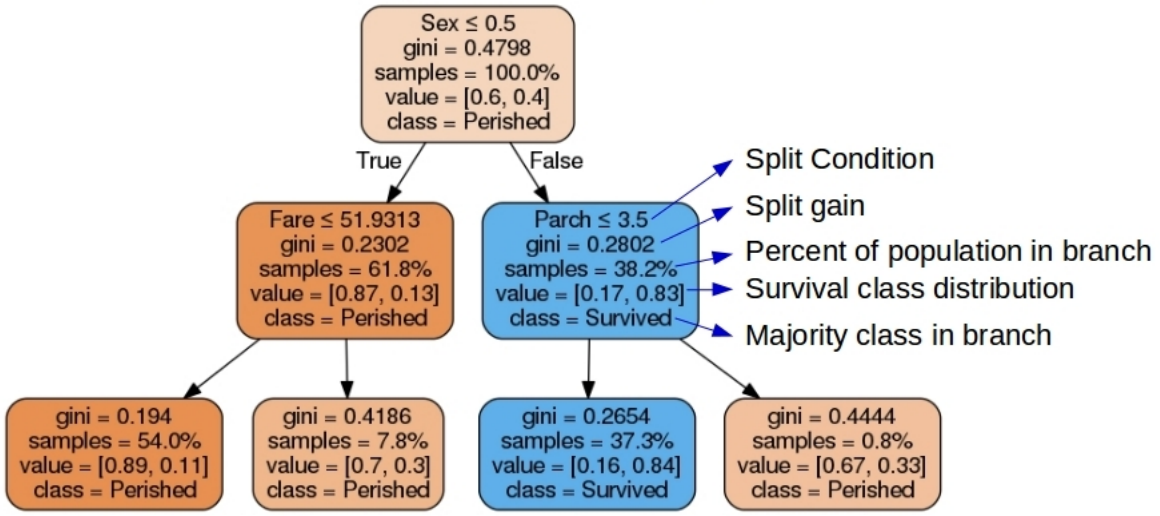
*"Describe the steps you took to implement the final prediction model so that it got an accuracy of at least 80%. What features did you look at? Were certain features more informative than others? Which conditions did you use to split the survival outcomes in the data? How accurate are your predictions?"*

As an extra tip, although an accuracy between 80-83% is the best you can get, note you can deploy and **visualize** a Decision Tree to investigate how it splits the dataset into different features to maximize score (don't feel overwhelmed if you don't understand parts of this code, at this stage it is not expected you understand most of it, this is part of what you will learn in the NanoDegree! 😉)

For example, I tried with `max_features=3` and `max_depth= 2` but feel free to change parameters to investigate different trees:

**NOTE:** You might need to install some of the libraries here used to draw the decision tree!.

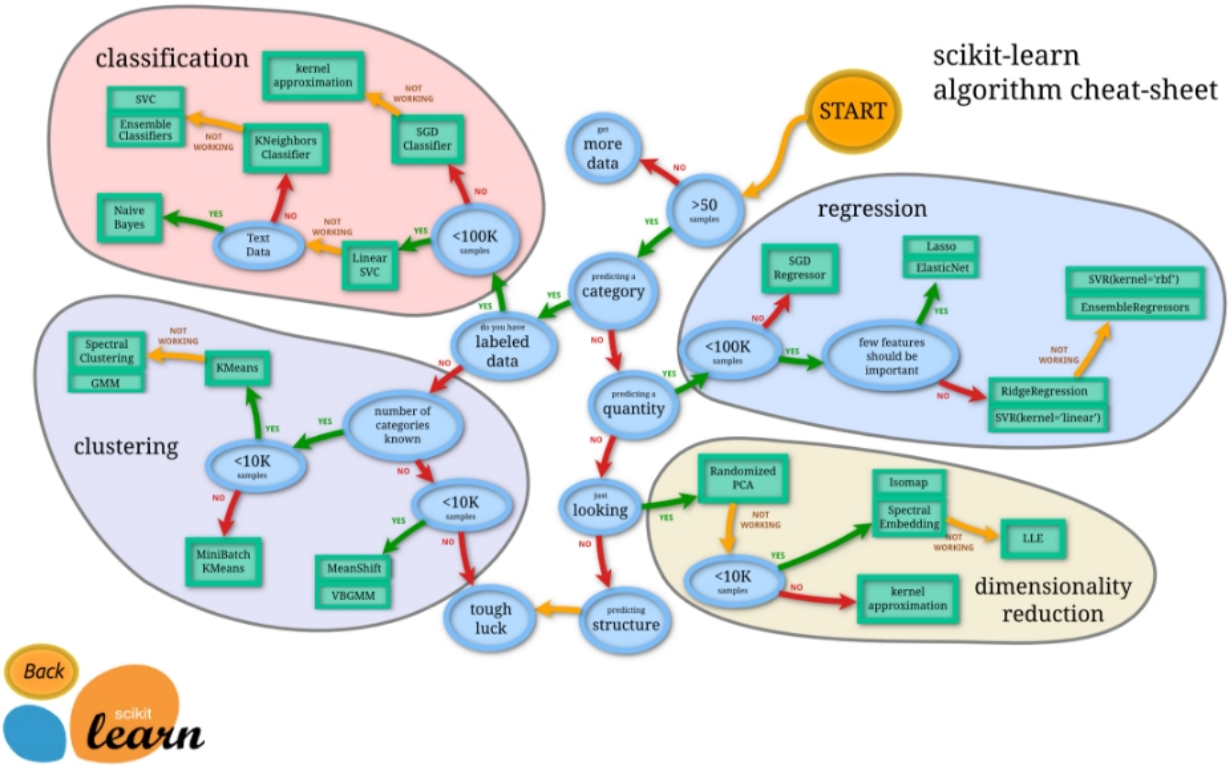
```
## Load Data
data = pandas.read_csv('titanic_data.csv', sep=',')

## Define outcome, drop non used features and generate a binary variable for Sex:
outcomes = data['Survived']
data = data.drop(['Survived','Name','Ticket','Cabin','Embarked','PassengerId'], axis = 1)
data.loc[:, 'Sex'] = data['Sex'].apply(lambda x: 1. if x == 'female' else 0.)

## impute missing values in the age column using Sex and Pclass:
data.loc[:, 'Age'] = data.groupby(['Sex','Pclass']).transform(lambda x: x.fillna(x.median()))

## Split the data into train/test sets: (train data is used to make the model learn from data and test data is used to estimate how well
 model generalized)
from sklearn.cross_validation import StratifiedShuffleSplit
sss = StratifiedShuffleSplit(outcomes, 1, test_size=0.3, random_state=450)
for train_index, test_index in sss:
    X_train = data.iloc[train_index]
    y_train = outcomes.iloc[train_index]
    X_test = data.iloc[test_index]
    y_test = outcomes.iloc[test_index]

## Define Decision Tree to use: (give it a try and change parameters to see the different trees built)
from sklearn import tree
clf = tree.DecisionTreeClassifier(max_features=3,max_depth=2)

## Use train data to train the model:
clf = clf.fit(X_train, y_train)

# Generate predictions over test set:
predictions = clf.predict(X_test)

# Accuracy results over test set:
from sklearn.metrics import accuracy_score
print "Accuracy Score:", accuracy_score(y_test, predictions)

## Represent Generated Tree:
from sklearn.externals.six import StringIO
from IPython.display import Image
import pydot
print data.columns
dot_data = StringIO()
tree.export_graphviz(clf, out_file=dot_data,
                         feature_names=data.columns,
                         class_names=['Perished','Survived'],
                         filled=True, rounded=True,
                         proportion = True,
                         special_characters=True)
graph = pydot.graph_from_dot_data(dot_data.getvalue())
Image(graph.create_png())
```




**A valid scenario where supervised learning can be applied is reported. A clear outcome variable and at least two potential predictor variables are identified as part of the description.**

That is exactly right, excellent example! 👌. Check Scikit implemented supervised algorithms for your reference, you will use several of them along the NanoDegree.

Also, have a look at the Scikit algorithm-cheat sheet to help you find the right estimator for the job.

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