Space X Falcon 9 First Stage Landing Prediction

Assignment: Machine Learning Prediction

Estimated time needed: **60** minutes

Space X advertises Falcon 9 rocket launches on its website with a cost of 62 million dollars; other providers cost upward of 165 million dollars each, much of the savings is because Space X can reuse the first stage. Therefore if we can determine if the first stage will land, we can determine the cost of a launch. This information can be used if an alternate company wants to bid against space X for a rocket launch. In this lab, you will create a machine learning pipeline to predict if the first stage will land given the data from the preceding labs.

Several examples of an unsuccessful landing are shown here:

Most unsuccessful landings are planed. Space X performs a controlled landing in the oceans.

Objectives

Perform exploratory Data Analysis and determine Training Labels

- create a column for the class
- Standardize the data
- Split into training data and test data.

Find best Hyperparameter for SVM, Classification Trees and Logistic Regression:

- Find the method performs best using test data

Import Libraries and Define Auxiliary Functions

```
[1]: !pip install numpy
     !pip install pandas
     !pip install matplotlib
     !pip install seaborn
     !pip install scikit-learn
     !pip install sklearn
     !pip install joblib
     !pip install xgboost
     !pip install pyarrow
     !pip install fastparquet
     !pip install boto3
     !pip install ipykernel
     !pip install ipywidgets
     !pip install jupyterlab_widgets
     !pip install numpy==1.26.4 --force-reinstall --no-deps --no-cache-dir
     !pip install scipy==1.13.1 --force-reinstall --no-deps --no-cache-dir
     !pip install scikit-learn==1.5.2 --force-reinstall --no-deps --no-cache-dir
     !pip install --force-reinstall --no-deps --no-cache-dir numpexpr bottleneck numexpr
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