CIS5560 Term Project Tutorial

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Lab Tutorial

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San Francisco Bay Area Bike Share Analysis On Microsoft Azure Machine Learning

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Objectives

List what your objectives are. In this hands-on lab, you will learn how to:

- Get data manually
- Create Spark cluster
- Train NLP system

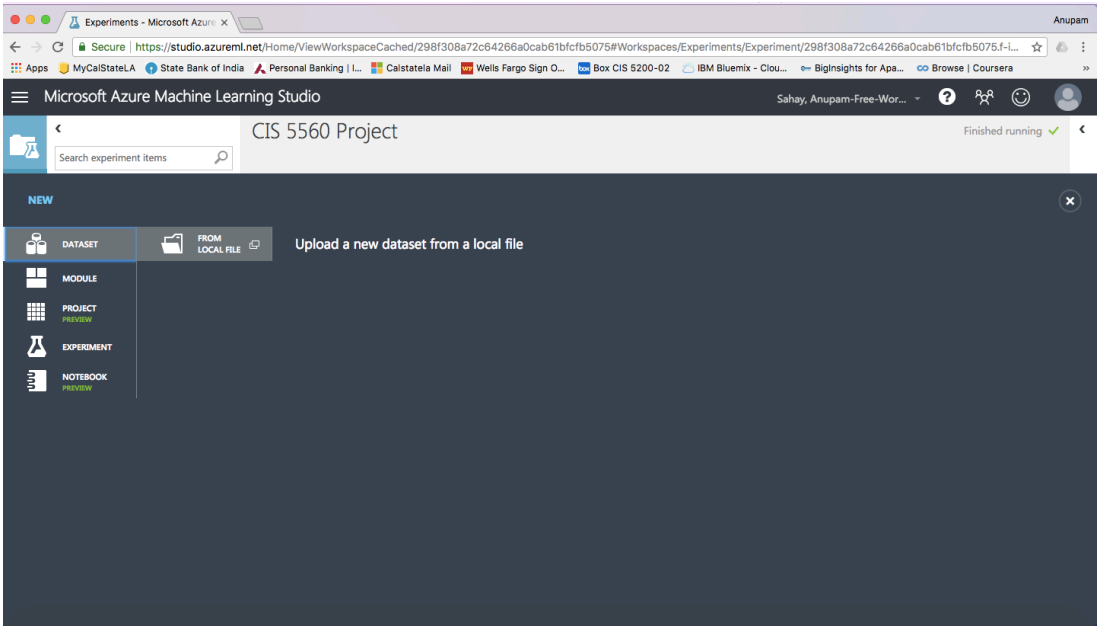
- Predicting total number of docks available in a station using Decision Forest Regression and Boosted Decision Tree.
- Visualization
- https://gallery.cortanaintelligence.com/Experiment/CIS-5560-Project-2

Platform Spec

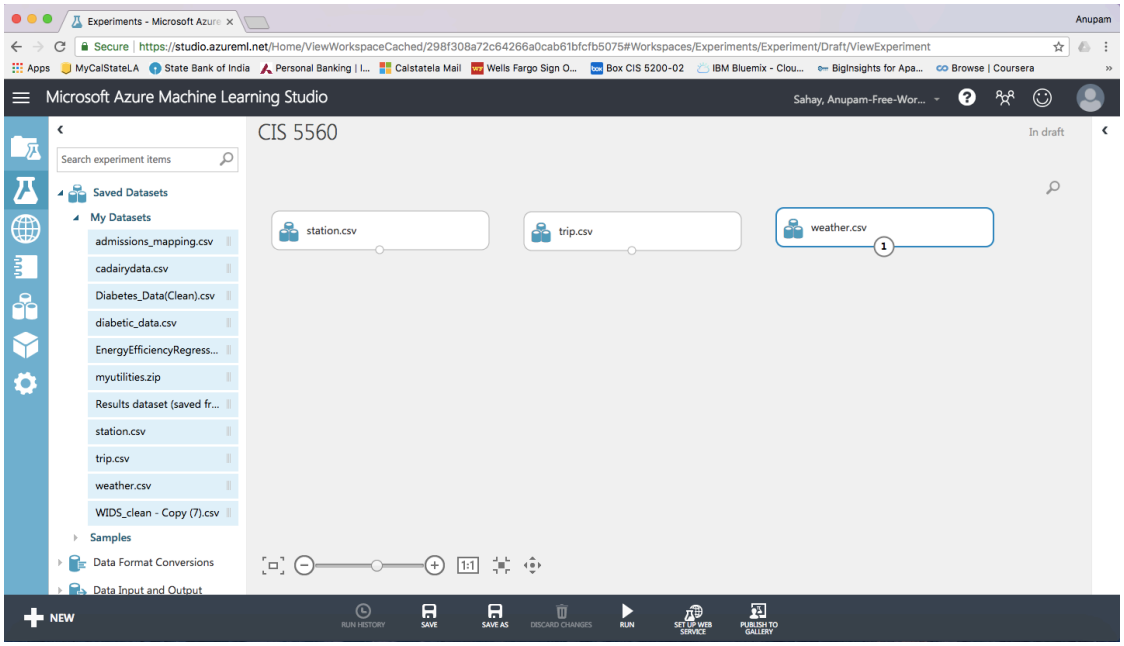
- Microsoft Azure Machine Learning
- CPU Speed: 3.4GHz
- # of nodes: 1
- Total Memory Size: 10GB

Step 1: Upload the Data Set from the Local File

1. This step is to upload the Dataset trip.csv, weather.csv, station.csv

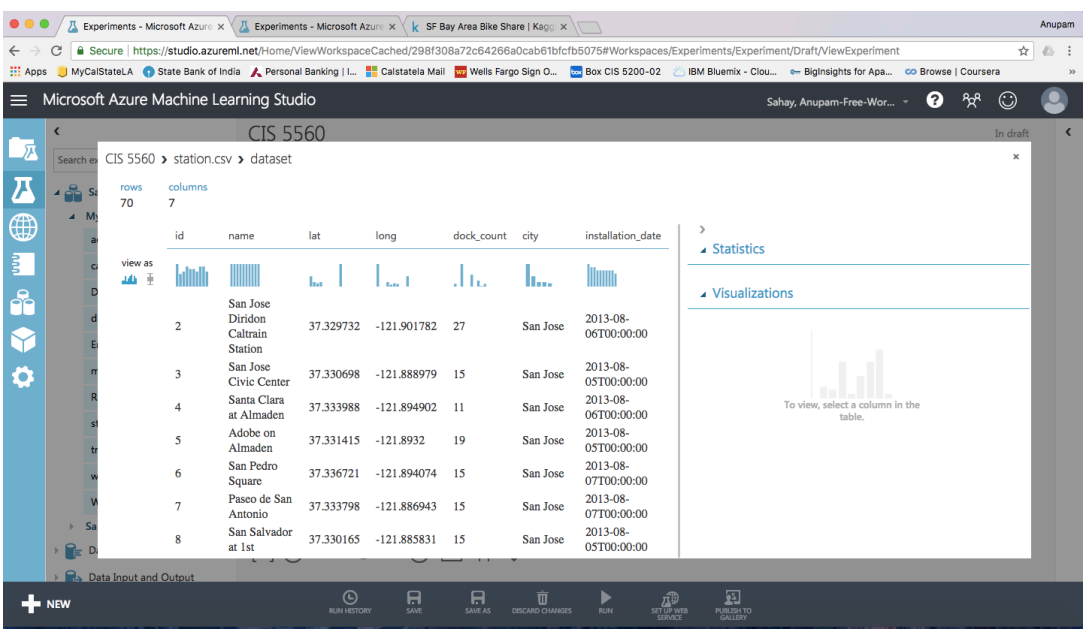


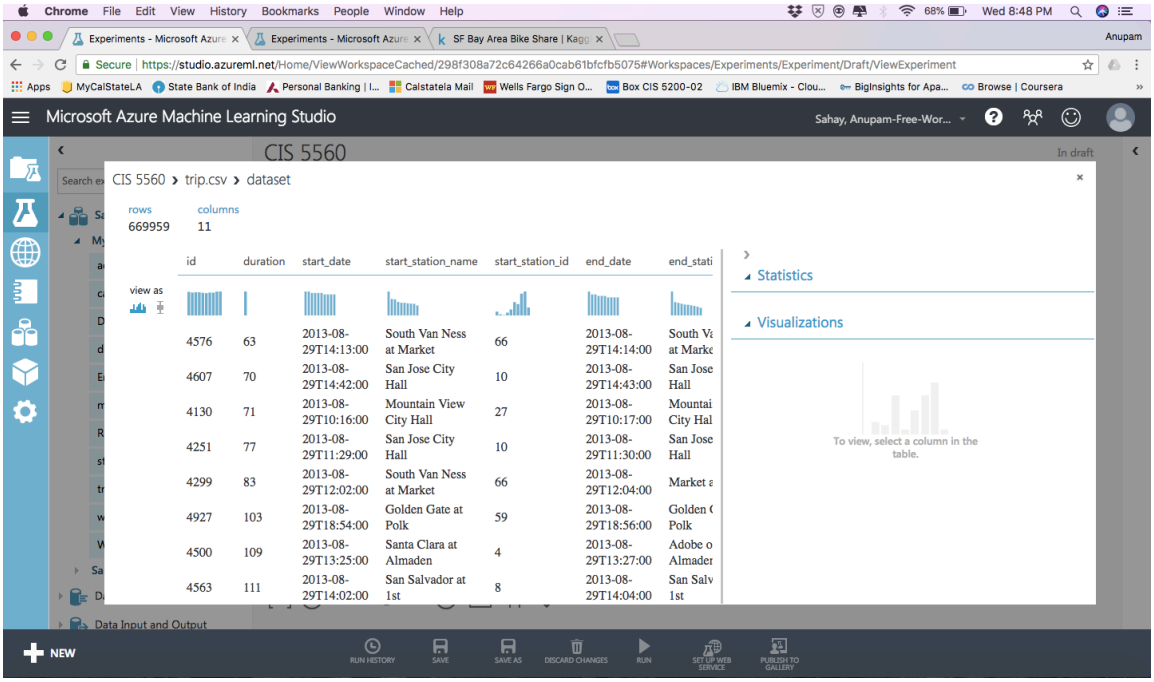
- This dataset is available in the Kaggle website and was last updated 2 years ago
- We enter the name of the dataset which we have to work on i.e. trip.csv, weather.csv, station.csv in the in the working space.
- All the dataset should be in format of Generic CSV file with a header(.csv)

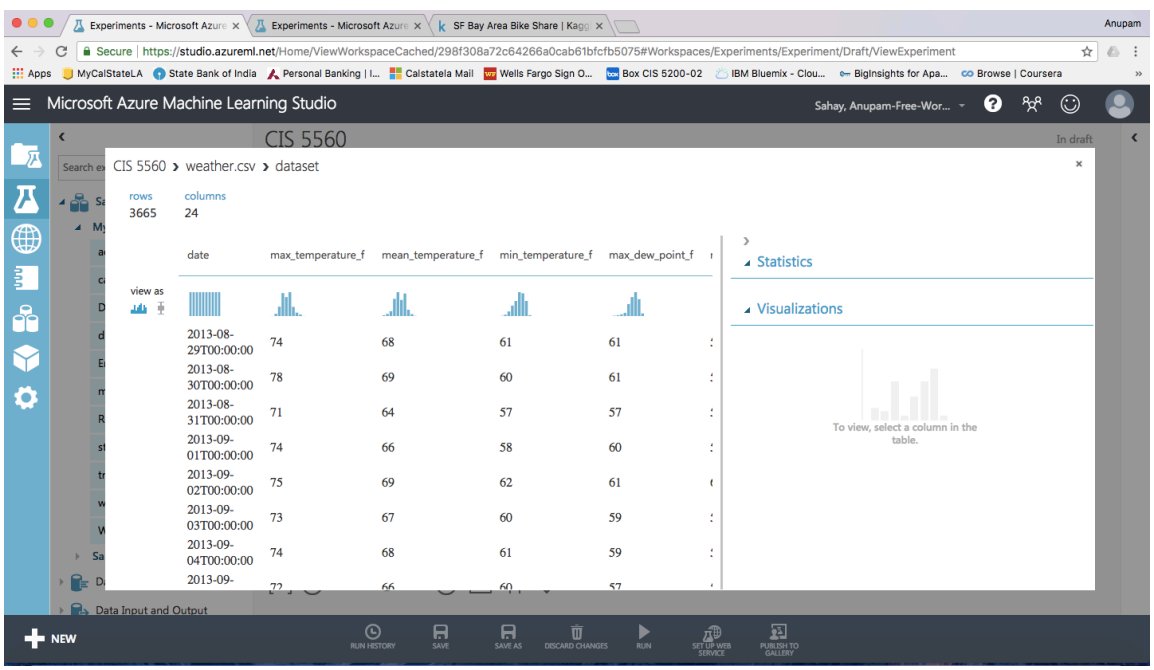


Step 2: Visualization of the Dataset Loaded in Azure ML

This step is to verify if all the columns are present in the dataset from source.

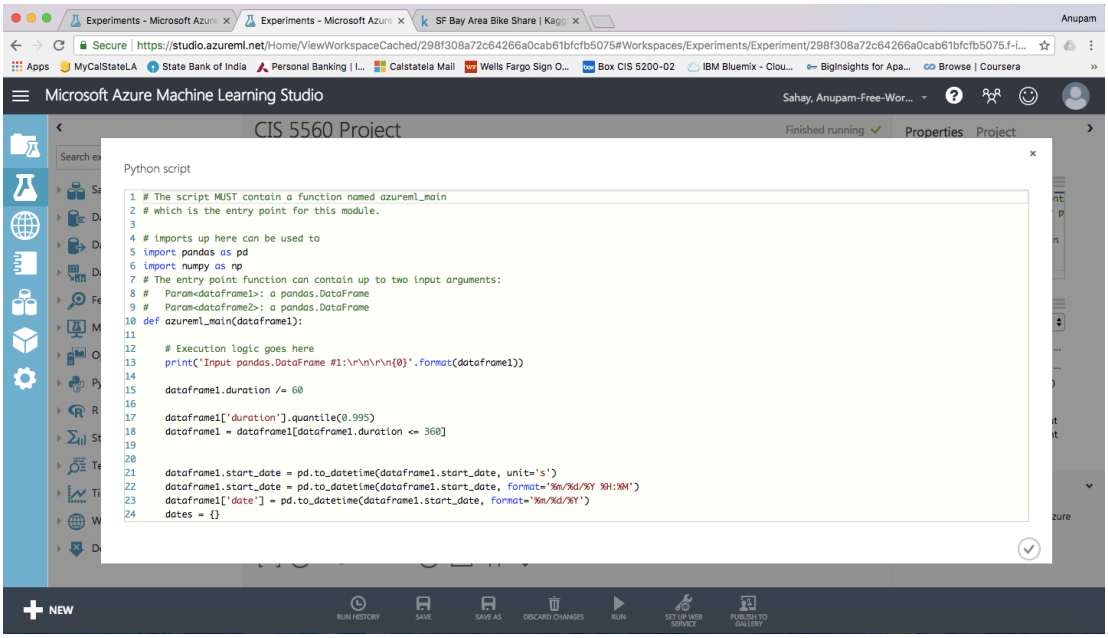


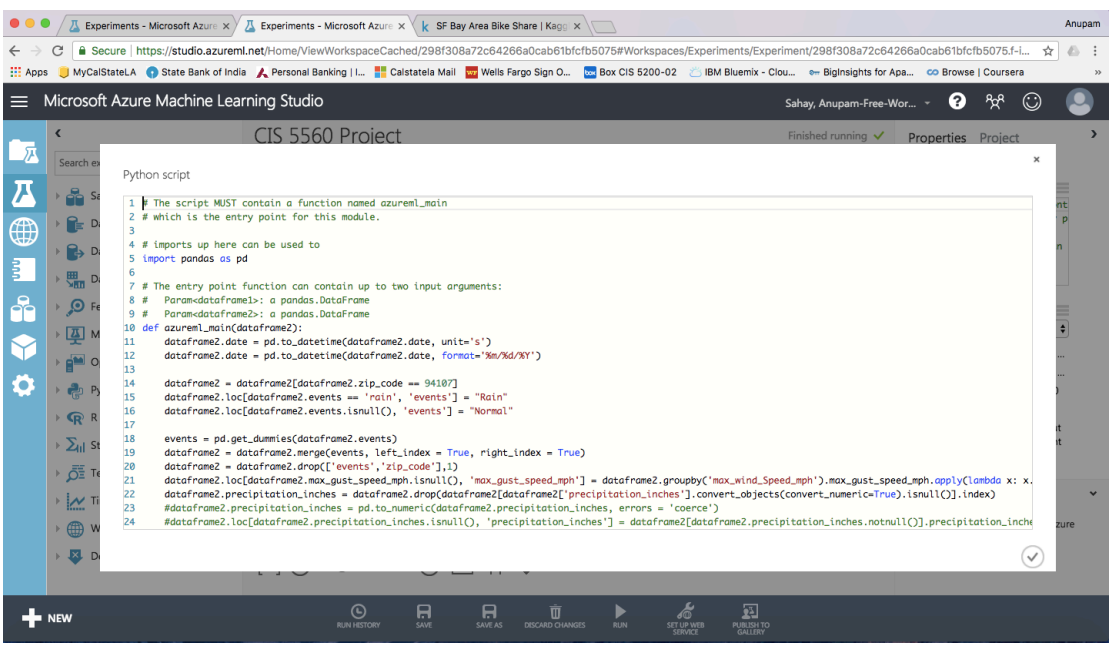

Microsoft Azure Machine Learning Studio
CIS 5560 › trip.csv › dataset
rows 669959
columns 11
id duration start_date start_station_name start_station_id end_date end_stati
4576 63 2013-08-29T14:13:00 South Van Ness at Market 66 2013-08-29T14:14:00 South Va at Marke
4607 70 2013-08-29T14:42:00 San Jose City Hall 10 2013-08-29T14:43:00 San Jose Hall
4130 71 2013-08-29T10:16:00 Mountain View City Hall 27 2013-08-29T10:17:00 Mountai City Hal
4251 77 2013-08-29T11:29:00 San Jose City Hall 10 2013-08-29T11:30:00 San Jose Hall
4299 83 2013-08-29T12:02:00 South Van Ness at Market 66 2013-08-29T12:04:00 Market a
4927 103 2013-08-29T18:54:00 Golden Gate at Polk 59 2013-08-29T18:56:00 Golden (Polk
4500 109 2013-08-29T13:25:00 Santa Clara at Almaden 4 2013-08-29T13:27:00 Adobe o Almaden
4563 111 2013-08-29T14:02:00 San Salvador at 1st 8 2013-08-29T14:04:00 San Salv 1st
Statistics
Visualizations
To view, select a column in the table.

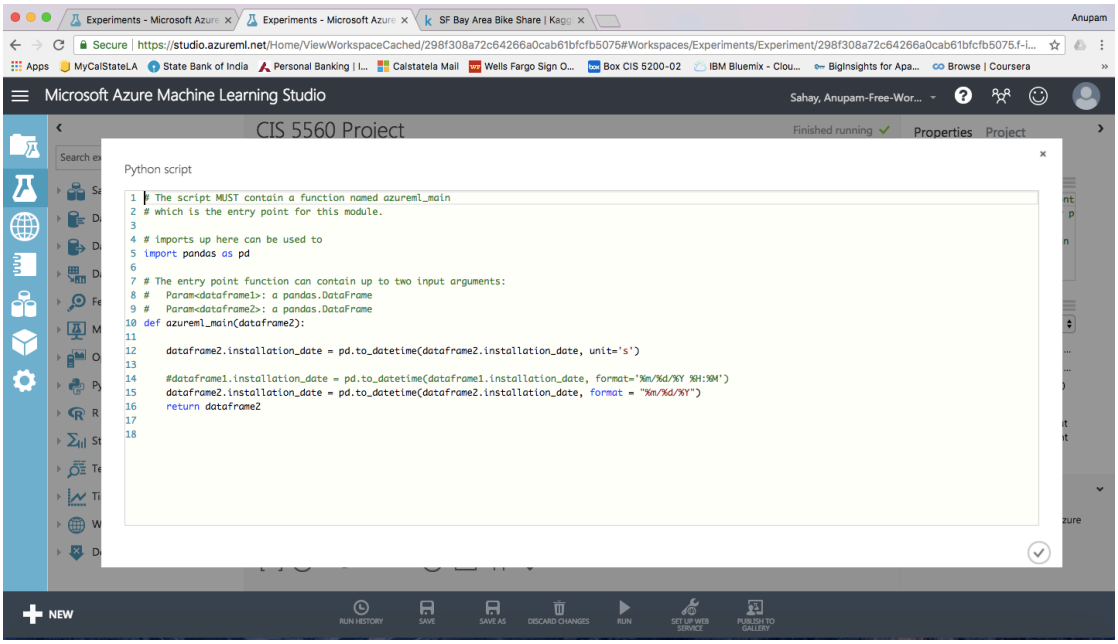

Microsoft Azure Machine Learning Studio
CIS 5560 › weather.csv › dataset
rows 3665
columns 24
date max_temperature_f mean_temperature_f min_temperature_f max_dew_point_f
2013-08-29T00:00:00 74 68 61 61
2013-08-30T00:00:00 78 69 60 61
2013-08-31T00:00:00 71 64 57 57
2013-09-01T00:00:00 74 66 58 60
2013-09-02T00:00:00 75 69 62 61
2013-09-03T00:00:00 73 67 60 59
2013-09-04T00:00:00 74 68 61 59
Statistics
Visualizations
To view, select a column in the table.

Step 3: Use Python Scripts

In this step we are using python scripts to drop the dummy values and to convert the duration into minutes and join all the tables.



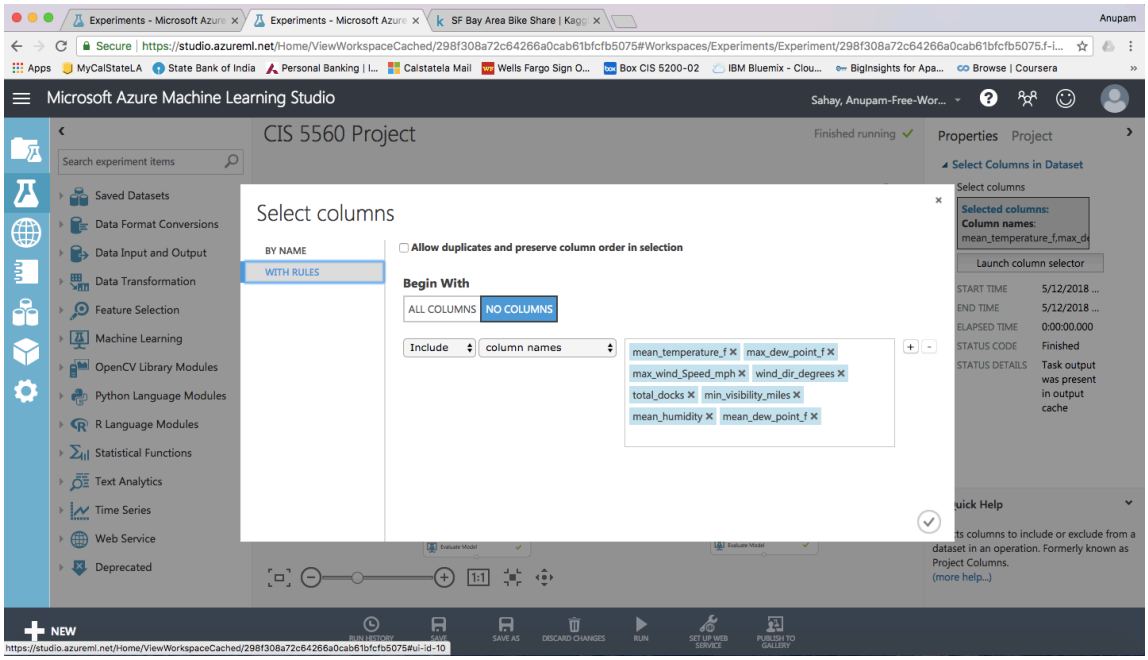




- All the 3 tables are joined using the python scripting
- The dummies and the redundant data are dropped
- All the data which has no effect on our prediction column are removed and the size of the dataset is reduced.
- We are using only 57 rows and 8 columns.

Step 4: Select columns in Data Set

This is a common interface in Azure Machine Learning modules to enable selecting the columns you want to use in the experiment, in our case column total_docks. In the select column dialog box, select option with Rule to begin with no columns, and include all the column name shown in the image.



Properties:

- We are selecting the column in the Dataset using Permutation feature Importance which is affecting our prediction column.
- We then do two models to predict total_docks to find out the best prediction model we have developed.

Step 5: Model 1

- In this model we have used the Boosted Decision Tree Algorithm

  Create Trainer Mode: ingle Parameter

  Maximum Number of leaves: 20

  Minimum Number of samples: 10

  Learning Rate: 0.006

  Total Number of trees Connected: 1000

  Random Number of seeds: 0

  Allow Unknown Category: Checked

- We split the data in the in the following order: -

  Splitting Mode: Split rows

  Fraction of rows in the first output dataset: - 0.7

  Randomized Split: Checked

  Random Seed: 0

  Stratified Split: False

- Cross-Validation Model: Selected Column, With Rules Include column names: “total_docks”,

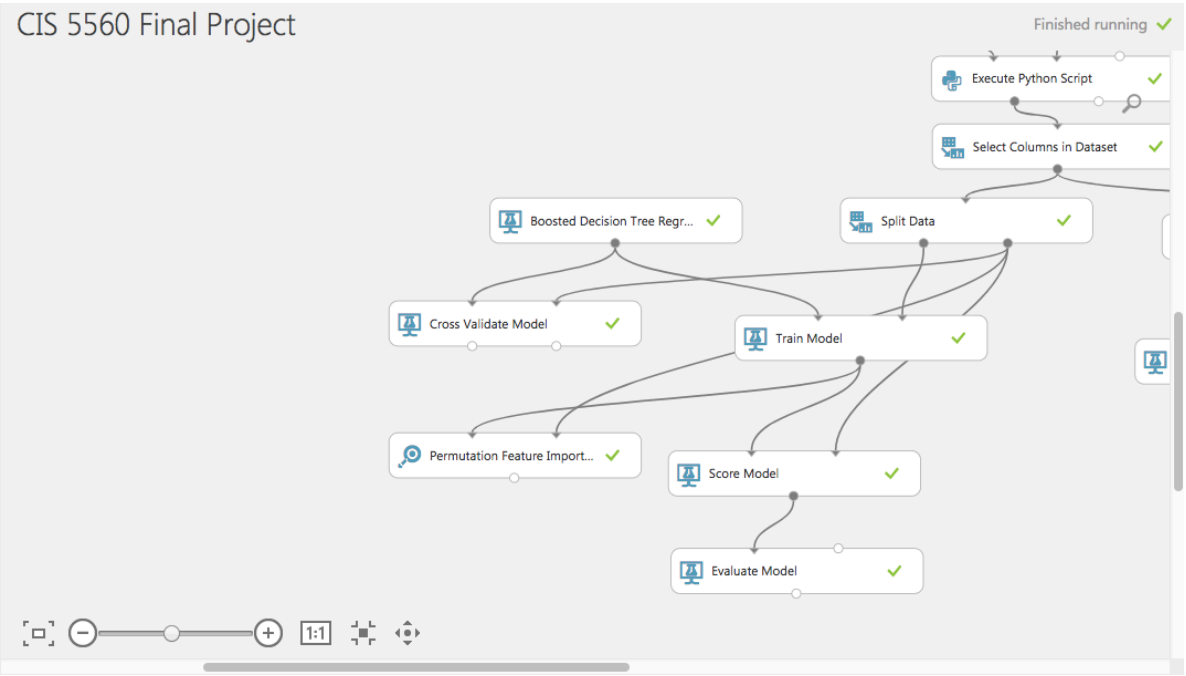
  Random Seed: Checked

- In Train Model: Selected Column, With Rules Include column names: “total_docks”

- In Permutation Feature Importance:

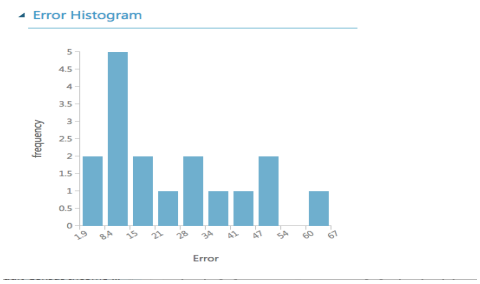
  Random Seed: 0

  Metric for measuring performance: Regression: Root mean square error



Step 6: Visualization-1

These are the results which we achieved for the first model:



CIS 5560 Final Project › Evaluate Model › Evaluation results

Metrics

Mean Absolute Error	26.215447
Root Mean Squared Error	32.033217
Relative Absolute Error	0.838453
Relative Squared Error	0.802699
Coefficient of Determination	0.197301

Step 7: Model 2

- In this model we have used the Decision Forest Regression Algorithm

  Resampling Method: Bagging

  Create Trainer Mode: Single Parameter

  Number of decision Trees: 8

  Maximum Depth of the decision forest: 32

  Number of Random Splits: 128

  Minimum number of samples: 1

  Allow Unknown Values: Checked

- We split the data in the in the following order: -

  Splitting Mode: Split rows

  Fraction of rows in the first output dataset: - 0.7

  Randomized Split: Checked

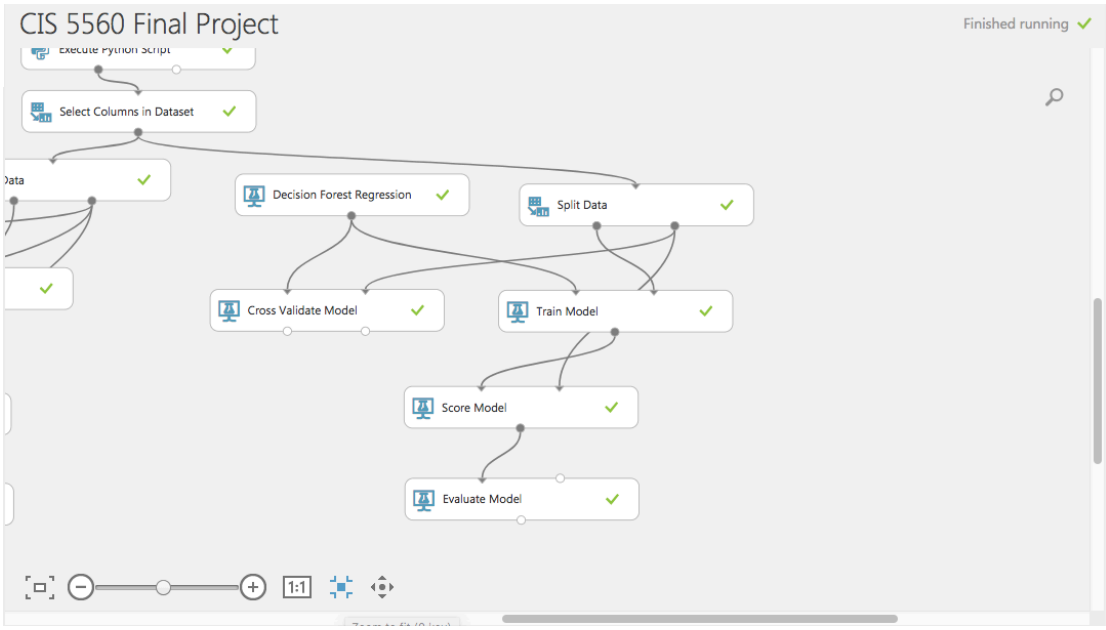
Random Seed: 0

Stratified Split: False

- Cross-Validation Model: Selected Column, With Rules Include column names: “total_docks”,

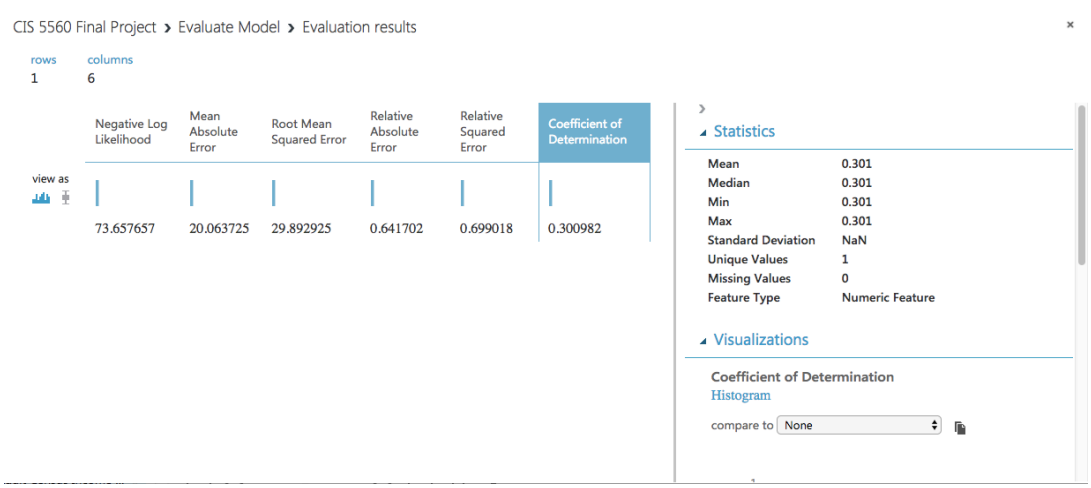
  Random Seed: Checked

- In Train Model: Selected Column, With Rules Include column names: “total_docks”



Step 7: Visualization-2

These are the results which we achieved for the second model:



References:-

1. https://www.kaggle.com/benhamner/sf-bay-area-bike-share/data - 4.45GB
2. https://gallery.cortanaintelligence.com/Experiment/CIS-5560-Project-2