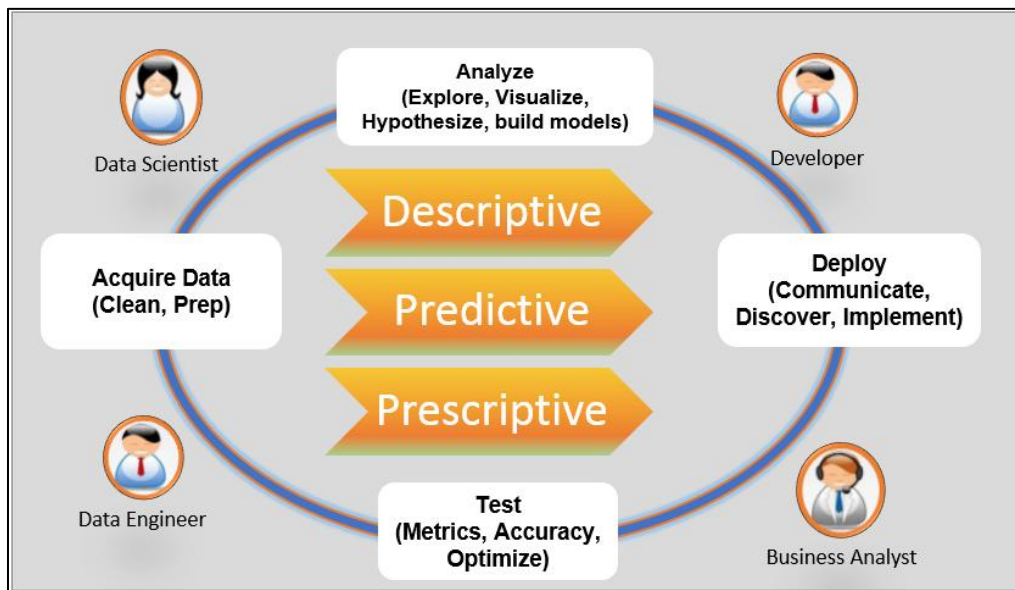
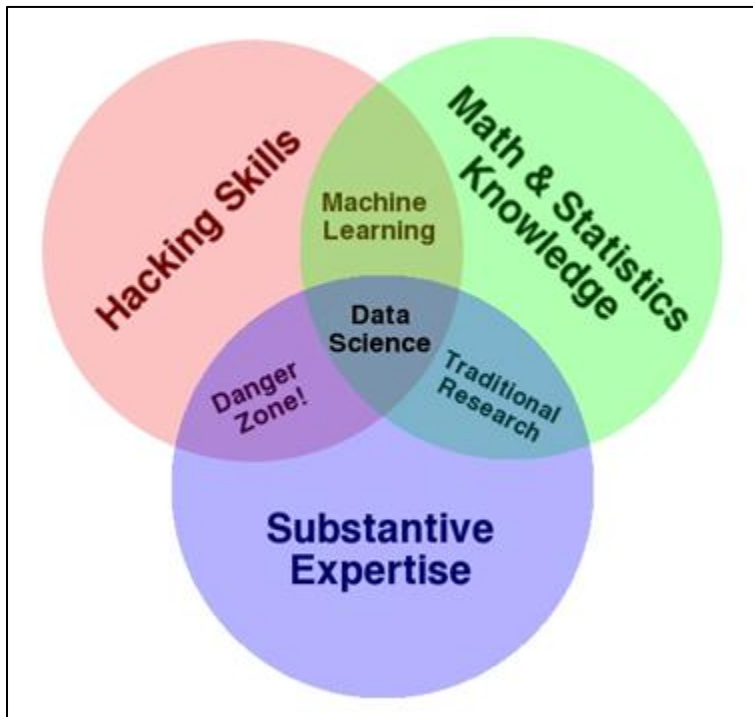
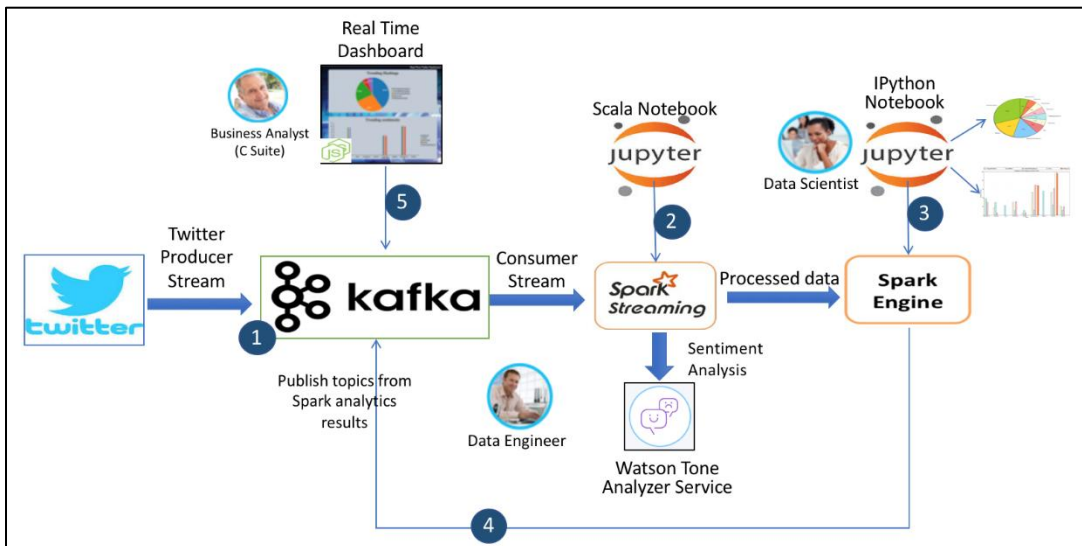
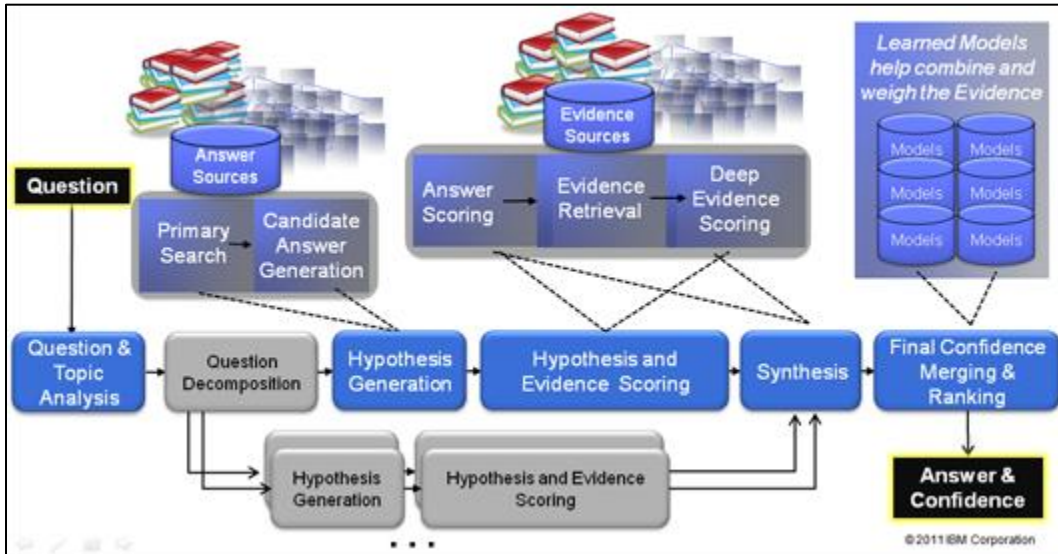


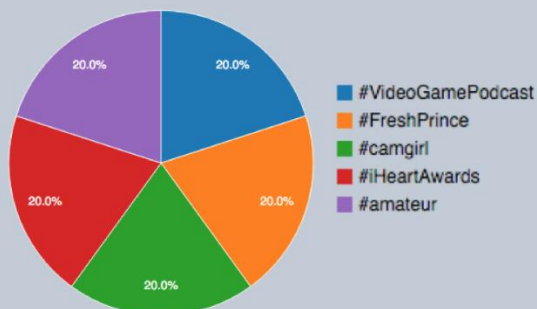
Chapter 1: Perspectives on Data Science from a Developer



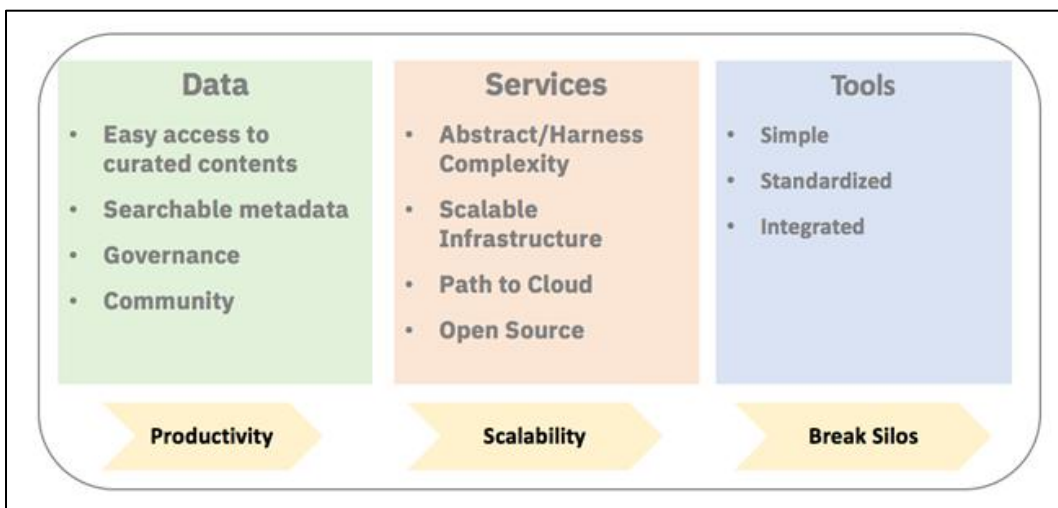
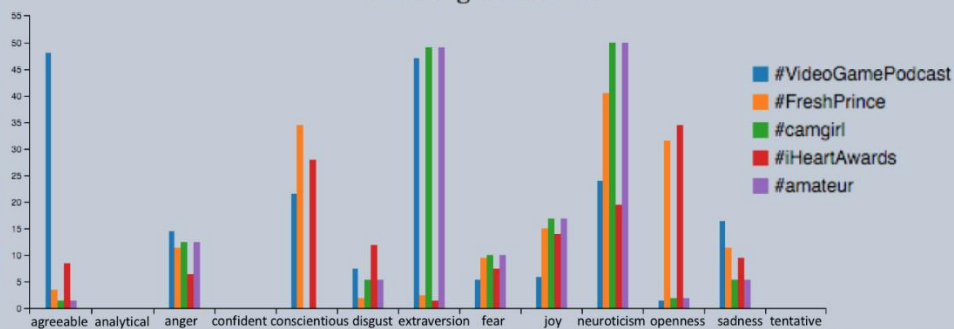




Trending Hashtags on Twitter



Trending sentiments



Rich Text
Markdown

Code

Visualizations
Widgets
Output

3D surface plot

You create a surface with the `plot_surface()` function. You can customize the stride (the space between each contour line extension), the linewidth of that line, and many more properties with the appropriate function parameters

```
In [23]: import matplotlib.pyplot as plt
          %matplotlib inline
          import numpy as np
          from mpl_toolkits.mplot3d.axes3d import Axes3D

          fig = plt.figure(figsize=(14,6))

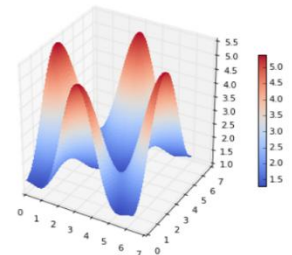
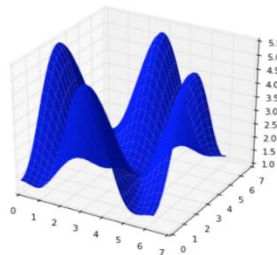
          alpha = 0.7
          phi_ext = 2 * np.pi * 0.5

          def flux_qubit_potential(phi_m, phi_p):
              return 2 * alpha - 2 * np.cos(phi_p)*np.cos(phi_m) - alpha * np.cos(phi_ext - 2*phi_p)
          phi_m = np.linspace(0, 2*np.pi, 100)
          phi_p = np.linspace(0, 2*np.pi, 100)
          X,Y = np.meshgrid(phi_p, phi_m)
          Z = flux_qubit_potential(X, Y).T

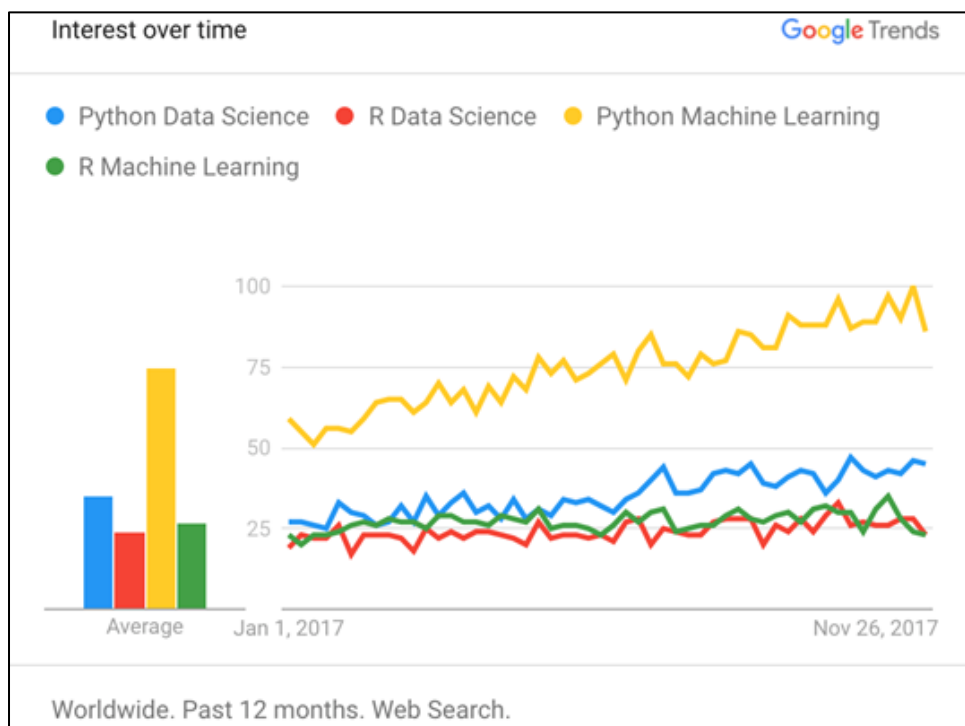
          # `ax` is a 3D-aware axis instance because of the
          # projection='3d' keyword argument to add_subplot
          ax = fig.add_subplot(1, 2, 1, projection='3d')























          p = ax.plot_surface(X, Y, Z, rstride=3, cstride=4, linewidth=0)

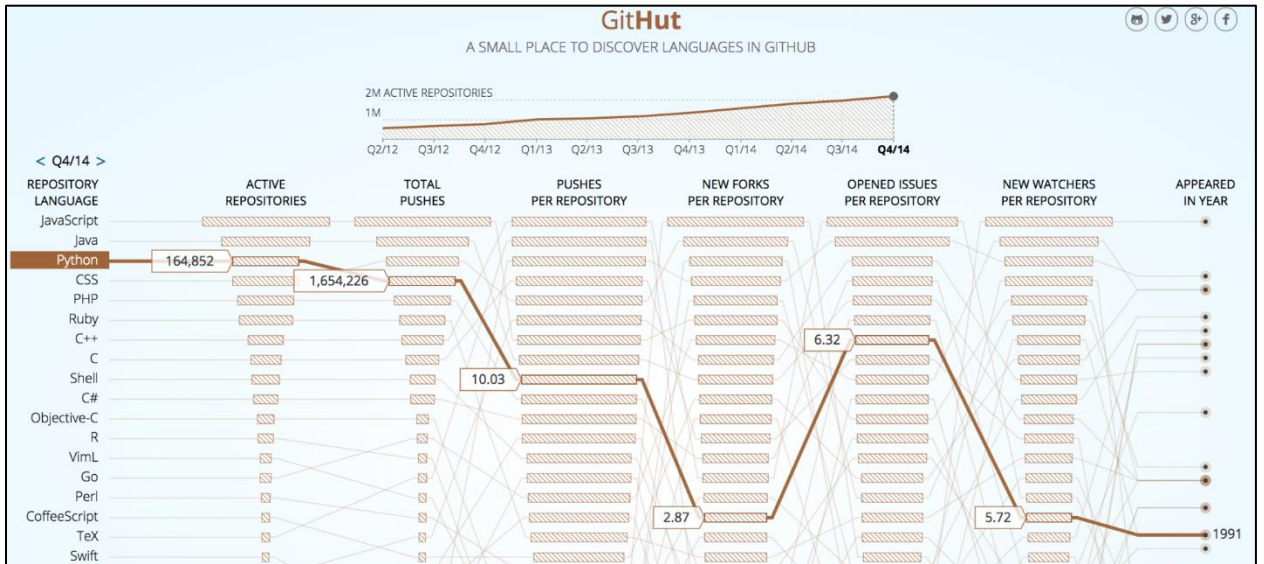
          # surface plot with color grading and color bar
          ax = fig.add_subplot(1, 2, 2, projection='3d')
          p = ax.plot_surface(X, Y, Z, rstride=1, cstride=1,
                             cmap=plt.cm.coolwarm, linewidth=0, antialiased=False)
          cb = fig.colorbar(p, shrink=0.5)
```



Chapter 2: Data Science at Scale with Jupyter Notebooks and PixieDust



Language Rank	Types	Spectrum Ranking
1. Python	 	100.0
2. C	  	99.7
3. Java	  	99.5
4. C++	  	97.1
5. C#	  	87.7
6. R		87.7
7. JavaScript	 	85.6
8. PHP		81.2
9. Go	 	75.1
10. Swift	 	73.7





ipynb in:path

Pull requests Issues Marketplace Explore



Repositories	1K
Code	2M
Commits	236K
Issues	24K
Topics	3
Wikis	2K
Users	2

Languages

Jupyter Notebook	2,108,468
Text	5,594
Python	1,872
HTML	1,791
JSON	826

Showing 2,530,019 available code results

Sort: Best match



dedenbangkit/crime-analysis - test.ipynb

Last indexed a day ago

ipynb/test.ipynb

Jupyter Notebook



calvlaw92/Project_3 - 01-sampling_method.ipynb

Last indexed on Feb 16

ipynb/01-sampling_method.ipynb

Jupyter Notebook



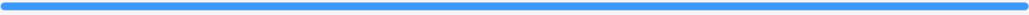
calvlaw92/Project_3 - 02-sample_analysis.ipynb

Last indexed on Feb 16

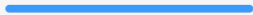
ipynb/02-sample_analysis.ipynb

Jupyter Notebook

Id	Name	Topic	Publisher
1	Car performance data	Transportation	IBM
2	Sample retail sales transactions, January 2009	Economy & Business	IBM Cloud Data Services
3	Total population by country	Society	IBM Cloud Data Services
4	GoSales Transactions for Naive Bayes Model	Leisure	IBM
5	Election results by County	Society	IBM
6	Million dollar home sales in NE Mass late 2016	Economy & Business	Redfin.com
7	Boston Crime data, 2-week sample	Society	City of Boston

▼ Job 1 (1 Stage): 

[Job 0 \(1 Stage\)](#) [Job 1 \(1 Stage\)](#)

Stage	Progress	Executor	Details
Stage 1 1/1:		driver(localhost)	🔔 Completed

```

Downloading 'Car performance data' from https://github.com/ibm-watson-data-lab/open-data/raw/master/cars/cars.csv
Downloaded 20954 bytes
Creating pySpark DataFrame for 'Car performance data'. Please wait...
Loading file using 'SparkSession'
Successfully created pySpark DataFrame for 'Car performance data'

```

PixieDust: Pie Chart Options



Chart Title:

Crime Rate Per Area

Fields:

Show only numeric columns

Search/Filter Fields

Area name *string*

Average Age, 2015 *numeric*

Average Band D Council Tax charge (£), 2015/16 *numeric*

Average Public Transport Accessibility score, 2014 *numeric*

Being bought with mortgage or loan, (2014) % *numeric*

Childhood Obesity Prevalance (%) 2013/14 *numeric*

Code *string*

Keys: ?

Area name x

Values: ?

Crime rates per thousand population 2014/15 x

Aggregation:

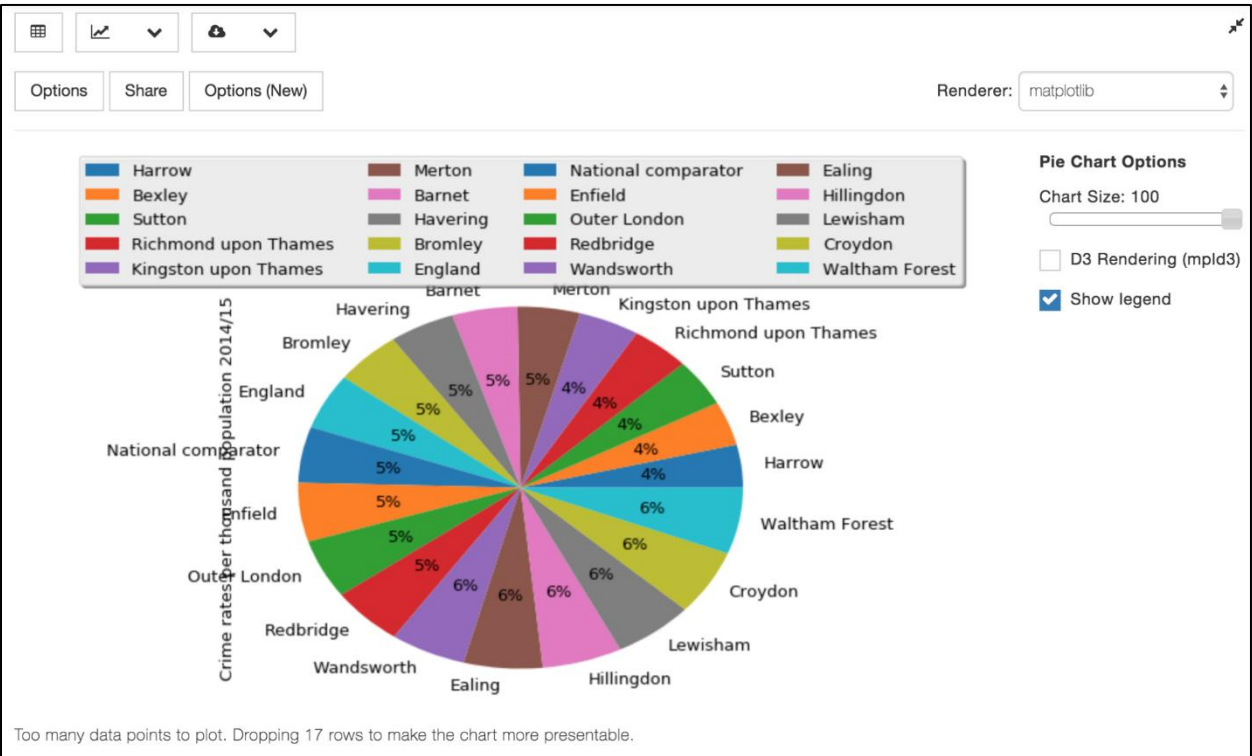
AVG

of Rows to Display:

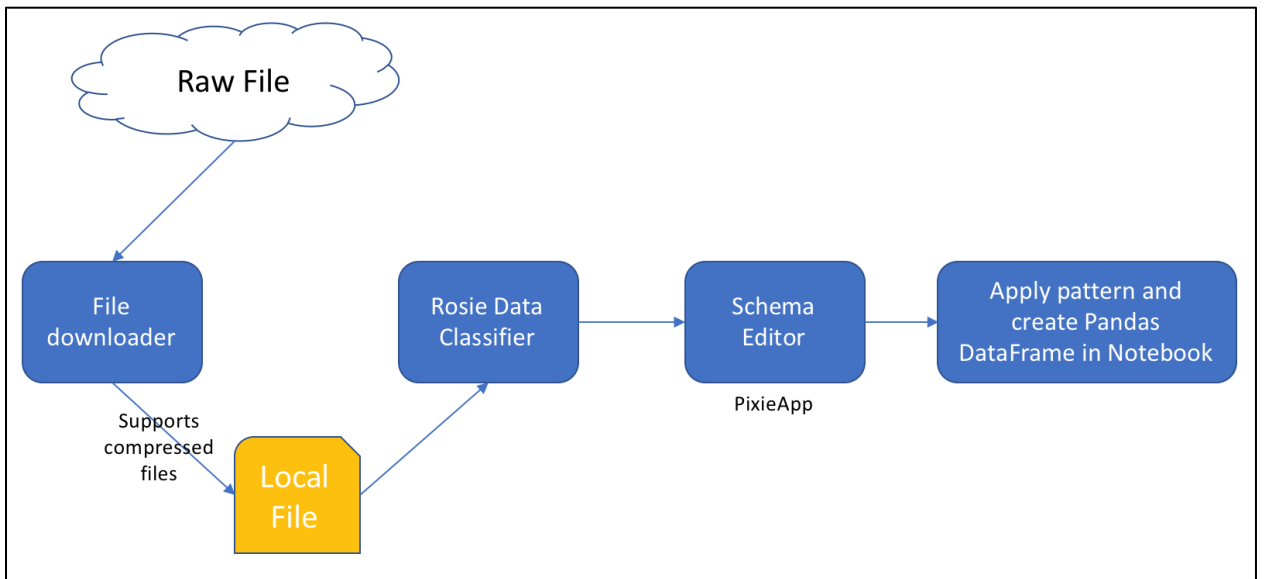
100

OK

Cancel















Id	Name	Topic	Publisher
1	Car performance data	Transportation	IBM
2	Sample retail sales transactions, January 2009	Economy & Business	IBM Cloud Data Services
3	Total population by country	Society	IBM Cloud Data Services
4	GoSales Transactions for Naive Bayes Model	Leisure	IBM
5	Election results by County	Society	IBM
6	Million dollar home sales in Massachusetts, USA Feb 2017 through Jan 2018	Economy & Business	Redfin.com
7	Boston Crime data, 2-week sample	Society	City of Boston



Wrangle Data: Schema

Schema

Column Name	Rosie Type	Column Type	Actions
Year	num.int	int	  
IndicatorID	all.identifier	str	  
BreakOutCategoryId	all.identifier	str	  
Concentration	num.mantissa	float	  

Sample Data

Year	IndicatorID	BreakOutCategoryId	Concentration
2004	HC101	BOC01	17.0
2004	HC101	BOC03	21.1
2006	HC103	BOC03	1.9
2006	HC103	BOC03	1.7
2006	HC103	BOC03	2.0
2006	HC103	BOC03	4.3
2004	HC201	BOC02	18.2

Finish

Transform Selected Column

Build Rosie Pattern to Create New Column(s) From Selected Column

Enter Rosie Pattern:

Get Help With Rosie

Enter a Rosie pattern line with variables that correspond to the new column(s) that will be created from the selected column. In the next step you will define a pattern for each of the specified variables. See an example with the link below:

[Rosie Documentation](#)

Sample of Selected Column

IndicatorID

HC101

HC101

HC103

HC103

HC103

HC103

HC201

HC401

HC401

HC401

Sample of New Column(s)

[Build Rosie pattern to display new column(s)]

Build Rosie Pattern to Create New Column(s) From Selected Column

Enter Rosie Pattern:

{Indicator_Prefix Indicator_Code}

Indicator_Prefix

[A-Z]+

Indicator_Code

[0-9]+

Clear

Create Columns

Sample of New Column(s)

Indicator_Prefix	Indicator_Code
HC	101
HC	101
HC	103
HC	103
HC	103
HC	103
HC	201
HC	401
HC	401
HC	401

Wrangle Data: Schema

Schema

Column Name	Rosie Type	Column Type	Actions
Year	num.int	int	
IndicatorID	all.identifier	str	
Indicator_Prefix	Indicator_Prefix	str	
Indicator_Code	Indicator_Code	str	
CategoryID	all.identifier	str	
Concentration	num.mantissa	float	

Sample Data

Year	IndicatorID	Indicator_Prefix	Indicator_Code	CategoryID	Concentration
2004	HC101	HC	101	BOC01	17.0
2004	HC101	HC	101	BOC03	21.1
2006	HC103	HC	103	BOC03	1.9
2006	HC103	HC	103	BOC03	1.7
2006	HC103	HC	103	BOC03	2.0
2006	HC103	HC	103	BOC03	4.3
2004	HC201	HC	201	BOC02	18.2

Finish

Enter the variable name for the Result Pandas DataFrame:

`wrangled_df`

Cancel

Finish

Top-level Menu

Button Bar (Options | Share)

Visualization area

Contextual Options

Table View Options

- Hide Schema
- Hide Search
- Hide Row Count

Schema

Table

Search table

Showing 100 of 406 rows

acceleration	cylinders	engine	mpg	origin
15.5	4	121.0	19.0	European
13.5	8	318.0	11.0	American
14.3	4	140.0	23.6	American
10.0	8	455.0	14.0	American
14.0	4	113.0	25.0	Japanese
18.0	4	121.0	22.0	European
17.3	4	85.0	40.9	European
15.4	6	225.0	22.0	American
17.0	4	97.5	25.0	American
16.5	4	108.0	22.0	Japanese
16.0	4	97.0	29.0	Japanese
14.5	4	90.0	28.0	American

Grid icon | Chart icon with dropdown arrow | Download icon

Sche

Table

Search

Show

mpg

18.0	8	307.0
15.0	8	350.0
18.0	8	318.0

Bar Chart

Line Chart

Scatter Plot

Pie Chart

Map

Histogram

Pixiedust: Bar Chart Options



Chart Title:

Average Mileage by Horsepower

Fields:

Show only numeric columns

Keys: ⓘ

Search/Filter Fields

acceleration	<i>numeric</i>
cylinders	<i>numeric</i>
engine	<i>numeric</i>
horsepower	<i>numeric</i>
mpg	<i>numeric</i>
name	<i>string</i>
origin	<i>string</i>
weight	<i>numeric</i>
year	<i>numeric</i>

horsepower



Values: ⓘ

mpg



Aggregation:

of Rows to Display:

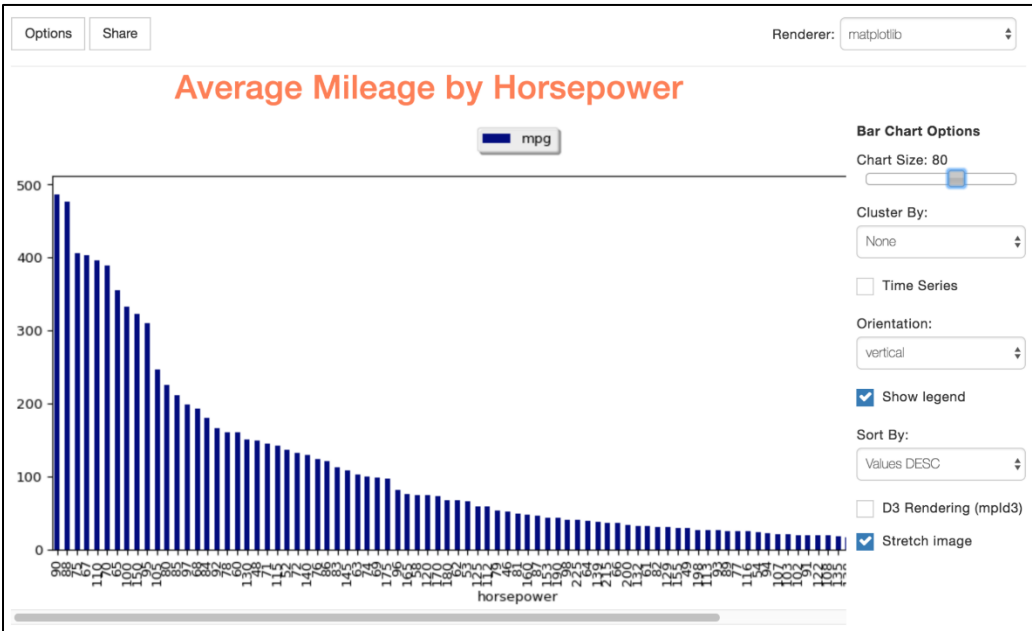
AVG

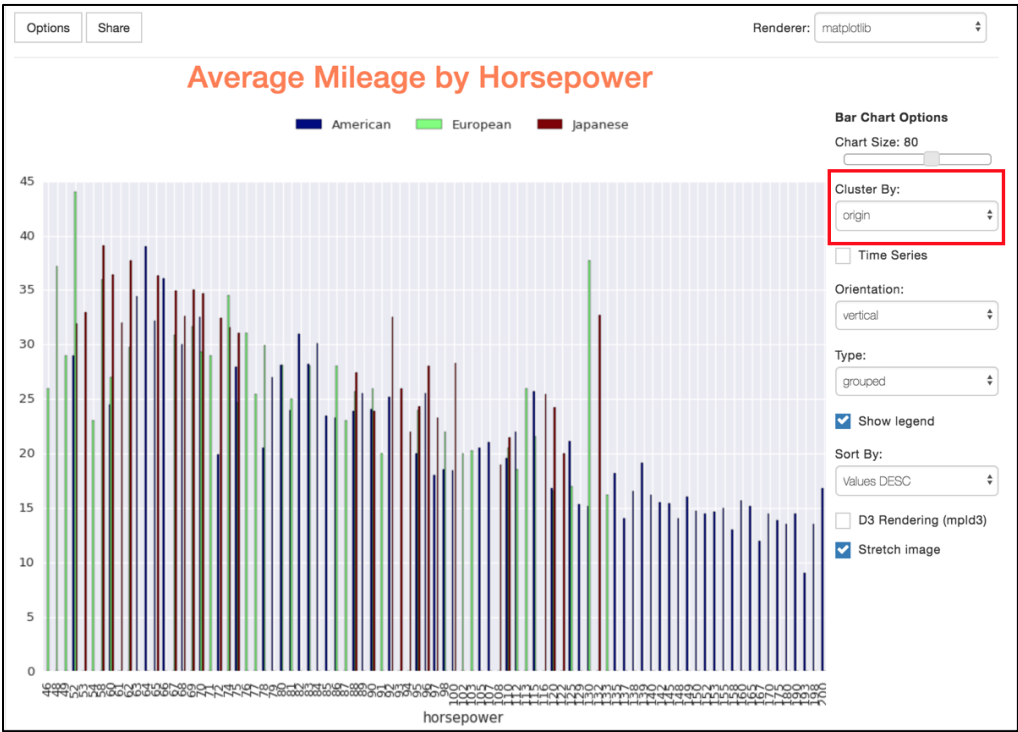


500

OK

Cancel

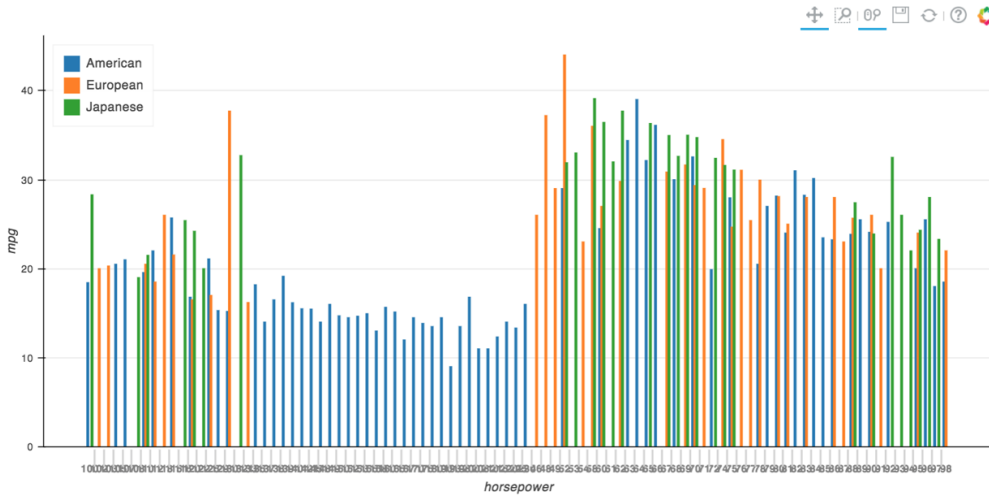




Options Share

Renderer: bokeh

Average Mileage by Horsepower



Bar Chart Options

Chart Size: 95

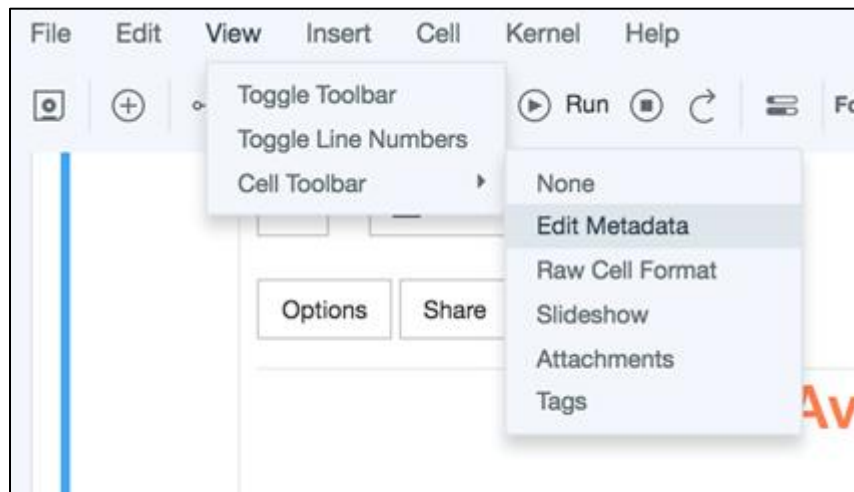
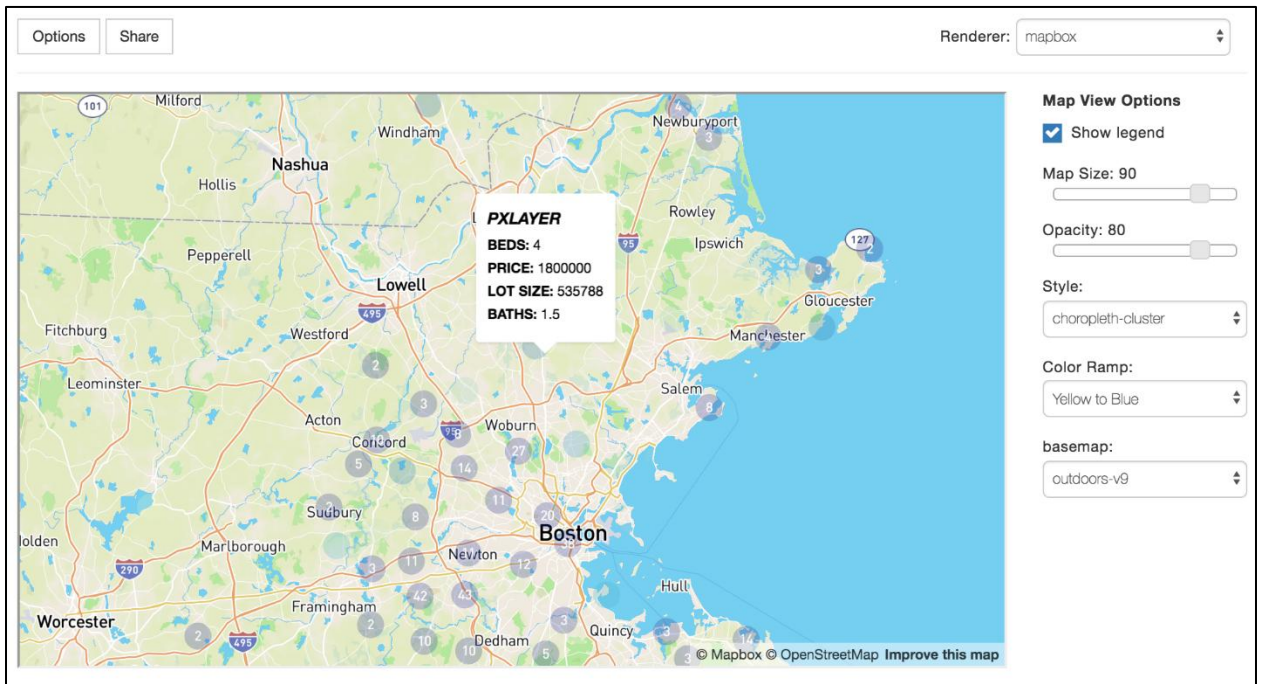
Cluster By: origin

Time Series

Type: grouped

Show legend

Sort By: Values DESC



Edit Cell Metadata

Manually edit the JSON below to manipulate the metadata for this cell. We recommend putting custom metadata attributes in an appropriately named substructure, so they don't conflict with those of others.

```
1 {
2   "pixiedust": {
3     "displayParams": {
4       "title": "Average Mileage by Horsepower",
5       "stretch": "true",
6       "chartsize": "95",
7       "aggregation": "AVG",
8       "clusterby": "origin",
9       "rowCount": "500",
10      "handlerId": "barChart",
11      "valueFields": "mpg",
12      "rendererId": "bokeh",
13      "sortBy": "Values DESC",
14      "keyFields": "horsepower"
15    }
16  },
17  "trusted": true
18 }
```

Cancel Edit

Renderer: bokeh

Bar Chart Options

Chart Size: 95

Cluster By: origin

Time Series

Invoke Filter UI

Statistics Data

Filter:

mpg = Enter value Apply Clear

Statistics: mpg				
	Summary	Quantiles	Frequents	
count	406	2%ile	9.00	24.2
mean	23.37	9%ile	9.00	32.0
std	7.81	25%ile	17.70	38.0
min	9.00	50%ile	22.30	31.0
max	46.60	75%ile	26.00	34.0
		91%ile	46.60	
		98%ile	46.60	

☰ | 📊 | ▼ | 📄 | 🔍

Filter:

name | [Enter value] | Case-sensitive | Regex | **Apply** | Clear

▼ **Regex help**

Character classes

- [abc]**
matches a or b, or c.
- [^abc]**
negation, matches everything except a, b, or c.
- [a-c]**
range, matches a or b, or c.
- [a-c[f-h]]**
union, matches a, b, c, f, g, h.
- [a-c&&[b-c]]**
intersection, matches b or c.
- [a-c&&[^b-c]]**

Filter: field: mpg, constraint: greater_than, value: 23, casematters: False, regex: False

mpg

>

23

Apply

Clear

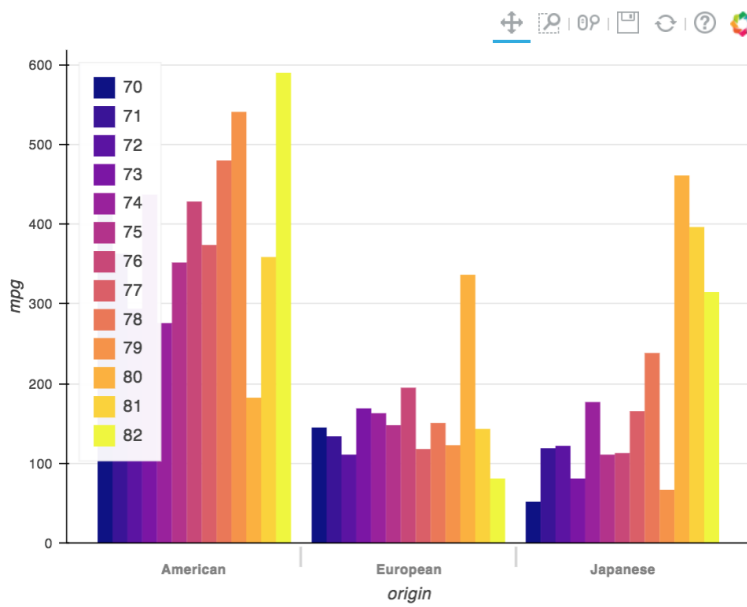
Statistics: mpg

Summary		Freqs
count	406	13.0
mean	23.37	14.0
std	7.81	18.0
min	9.00	15.0
max	46.60	16.0

Options

Share

Renderer: bokeh



Bar Chart Options

Chart Size: 60

Cluster By:

year

Time Series

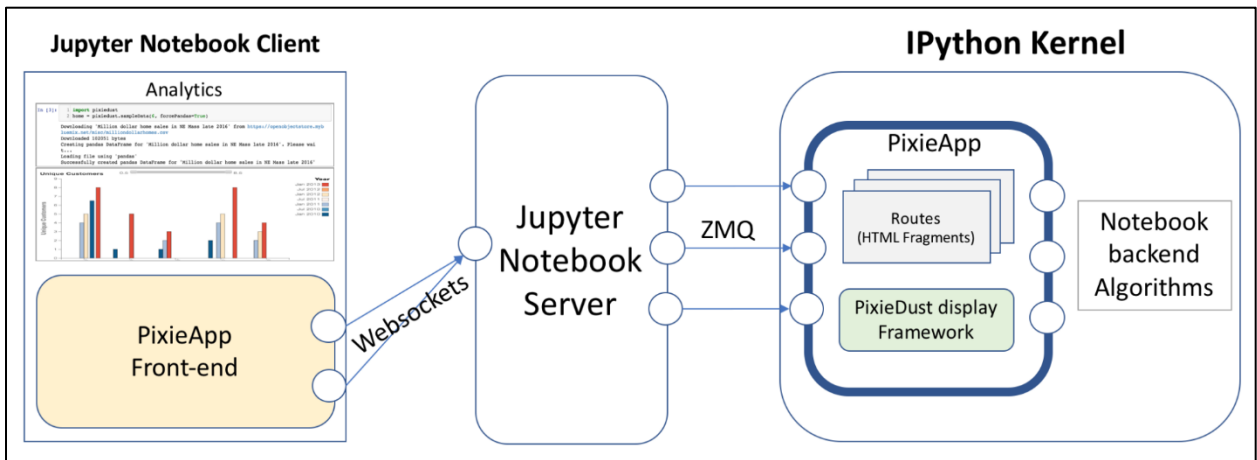
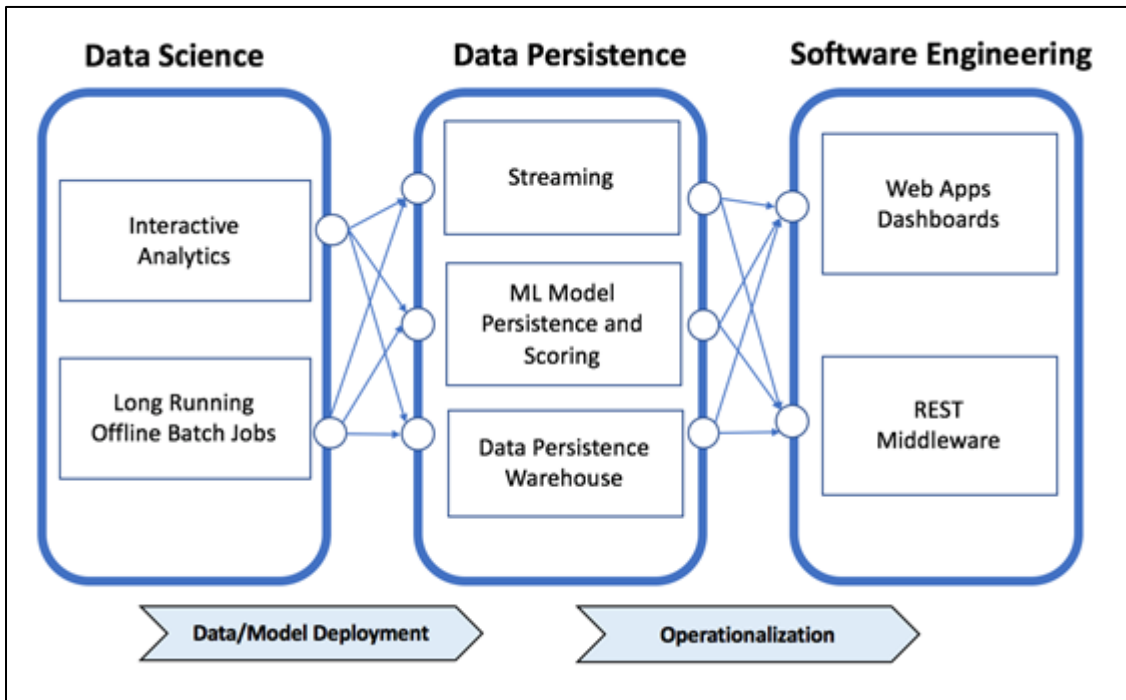
Type:

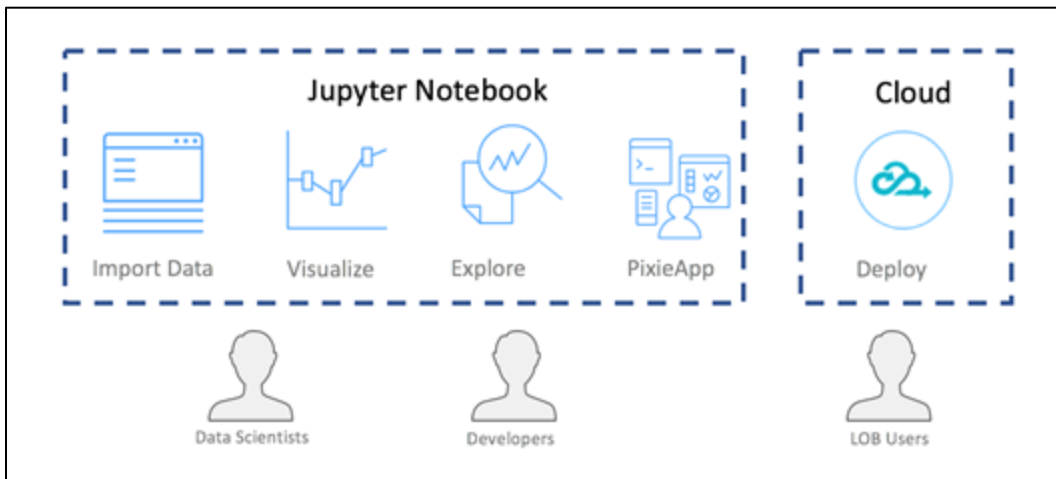
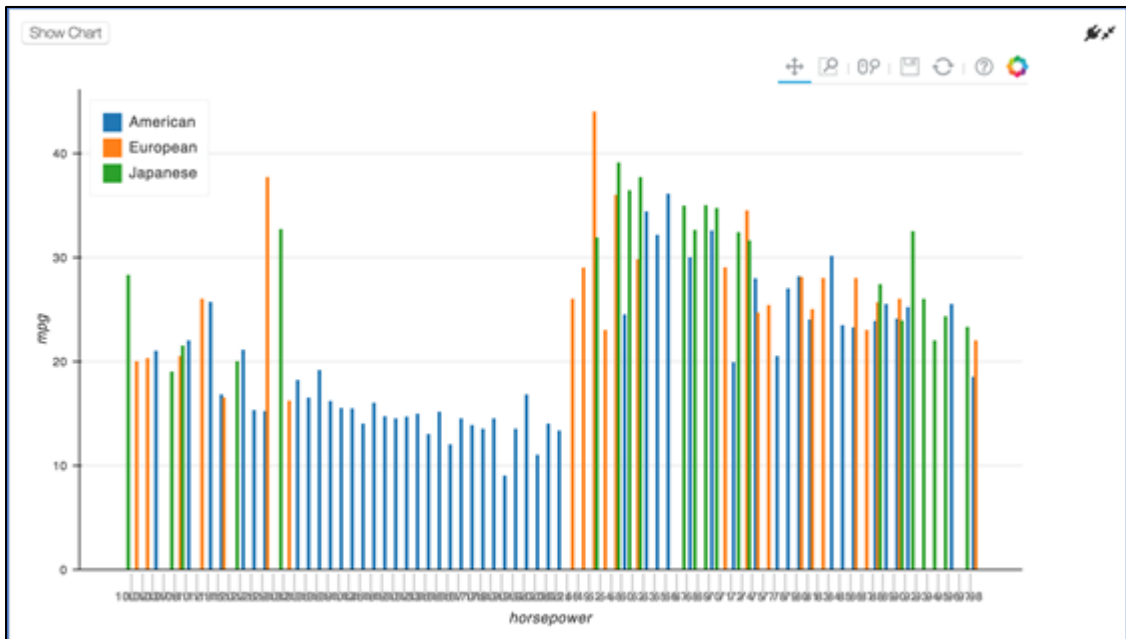
grouped

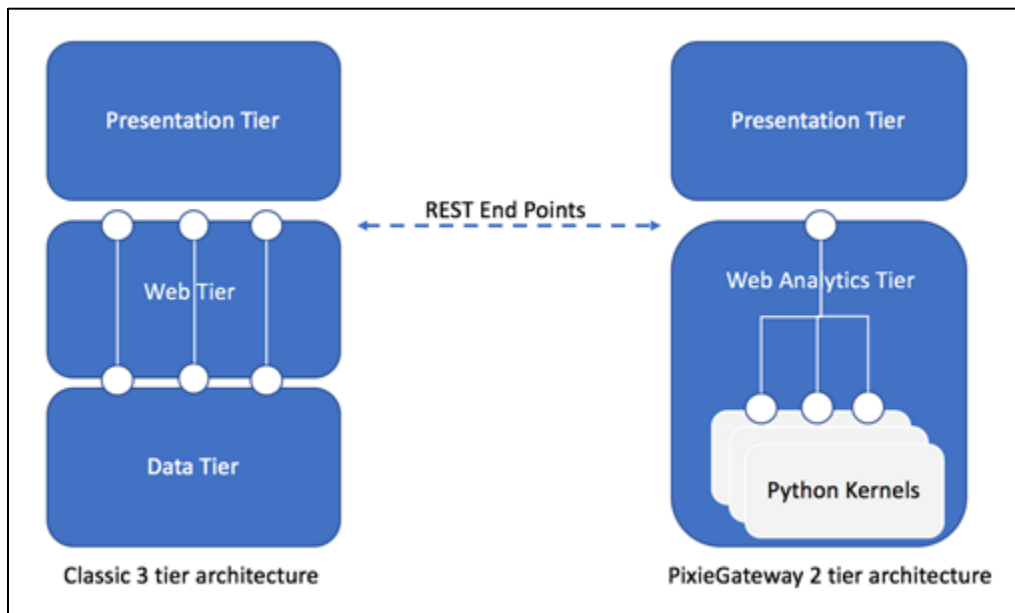
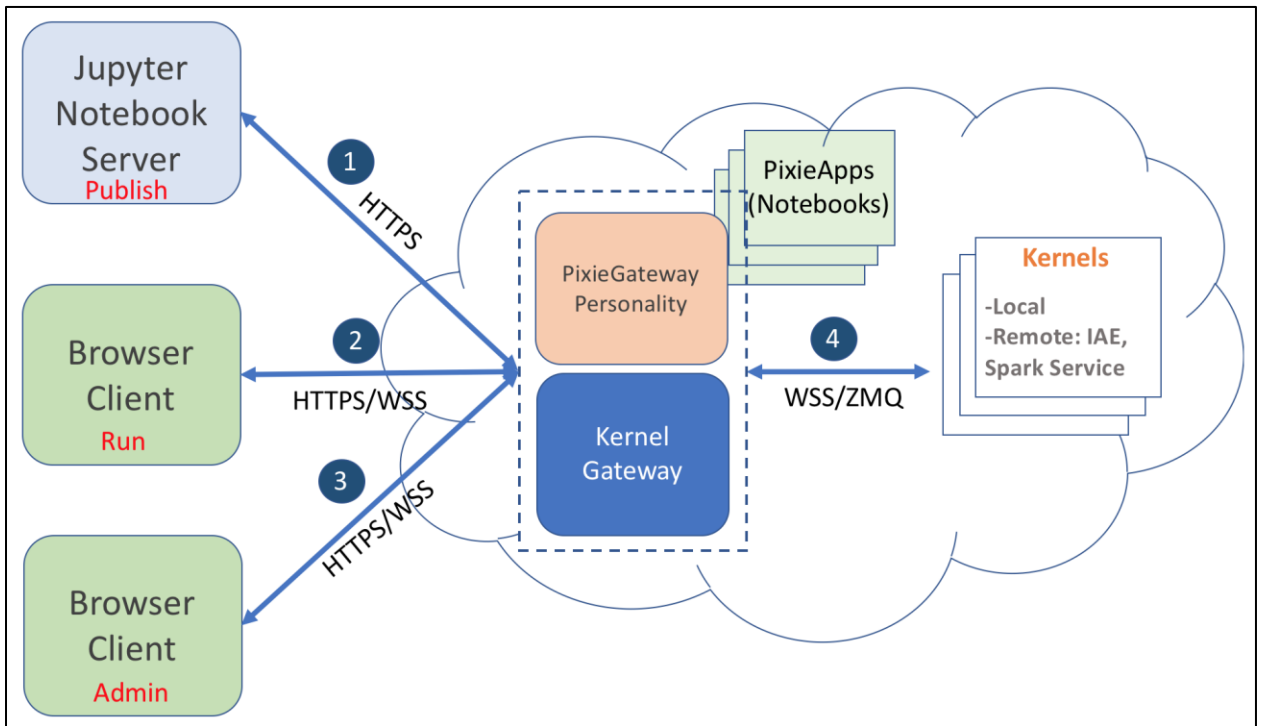
Show legend

Sort By:

Keys ASC







PixieDust: Share Chart



Share Chart and make it accessible on the web

Options

PixieGateway Server:

http://,mybluemix.net/

If you don't have an IP address for a PixieGateway Server [deploy one](#)

Description:

Bar chart showing the average mpg by HorsePower

Cancel

Share

PixieDust: Share Chart

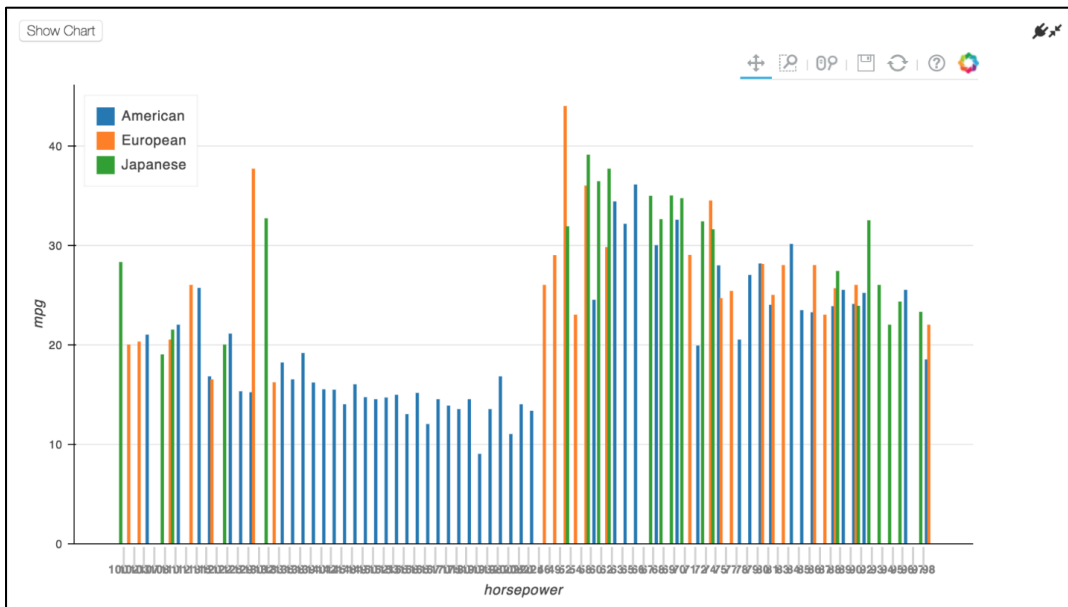


Chart Successfully shared

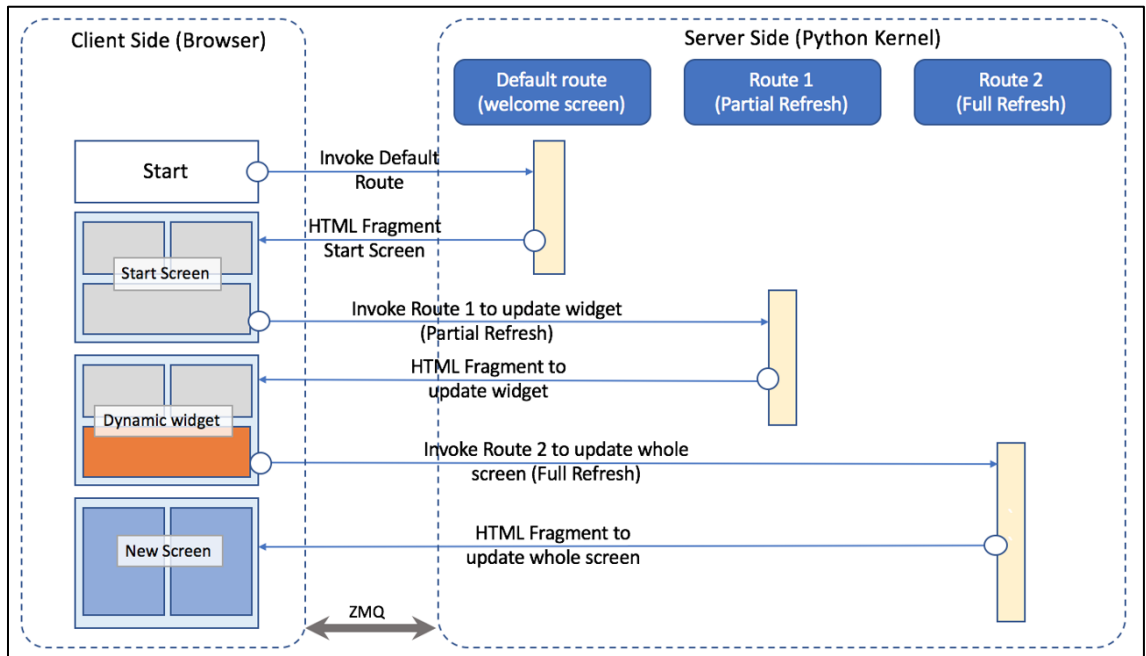
[http://\[redacted\].containers.mybluemix.net/chart/a6a1aa62-6a59-414a-a11e-415eefd43f04](http://[redacted].containers.mybluemix.net/chart/a6a1aa62-6a59-414a-a11e-415eefd43f04)

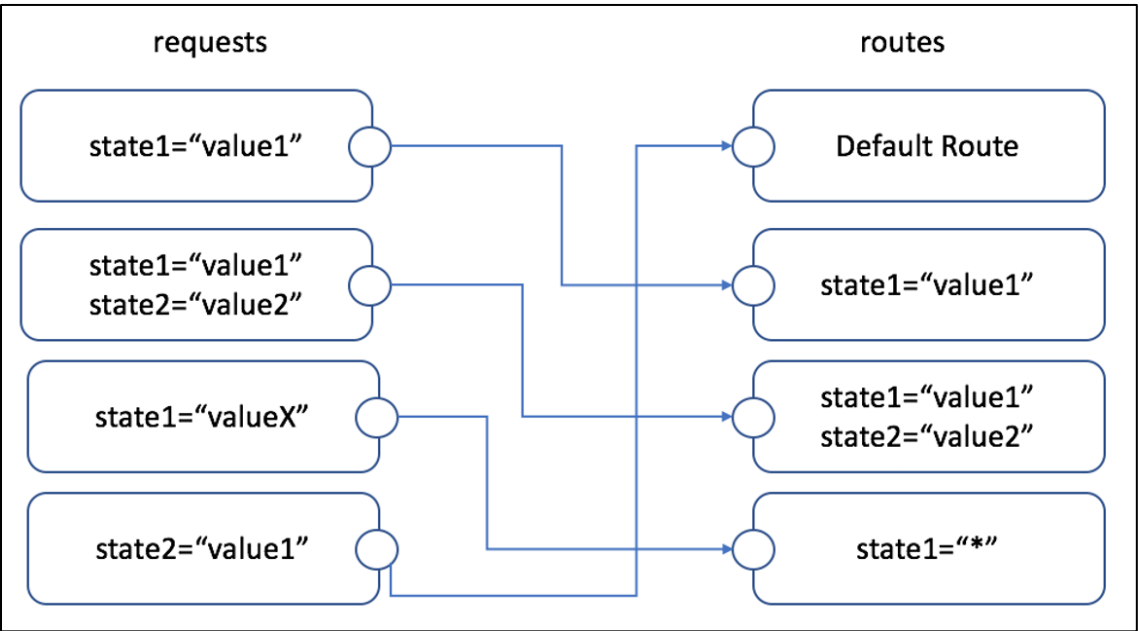
Embed the chart into your web app

```
<object type="text/html" data="http://[redacted].containers.mybluemix.net/embed/a6a1aa62-6a59-414a-a11e-415eefd43f04/600/400" width="600" height="400">  
<a href="http://[redacted].containers.mybluemix.net/chart/a6a1aa62-6a59-414a-a11e-415eefd43f04">
```



Chapter 3: PixieApp under the Hood







49 repositories were found



[First](#) [Prev](#) [Next](#) [Last](#)

Repo Name	Lastname	URL	Stars
pixiedust	ibm-watson-data-lab	https://github.com/ibm-watson-data-lab/pixiedust	304
pixiedust	nutterb	https://github.com/nutterb/pixiedust	123
PixieDust	PixieEngine	https://github.com/PixieEngine/PixieDust	10
pixiedust	mixu	https://github.com/mixu/pixiedust	13
pixiedust-facebook-analysis	IBM	https://github.com/IBM/pixiedust-facebook-analysis	13
pixiedust_incubator	ibm-watson-data-lab	https://github.com/ibm-watson-data-lab/pixiedust_incubator	9
pixiedust_node	ibm-watson-data-lab	https://github.com/ibm-watson-data-lab/pixiedust_node	19
pixiedust-traffic-analysis	IBM	https://github.com/IBM/pixiedust-traffic-analysis	7

49 repositories were found



[First](#) [Prev](#) [Next](#) [Last](#)

Repo Name	Lastname	URL	Stars	Actions
pixiedust	ibm-watson-data-lab	https://github.com/ibm-watson-data-lab/pixiedust	304	
pixiedust	nutterb	https://github.com/nutterb/pixiedust	123	
PixieDust	PixieEngine	https://github.com/PixieEngine/PixieDust	10	
pixiedust	mixu	https://github.com/mixu/pixiedust	13	
pixiedust-facebook-analysis	IBM	https://github.com/IBM/pixiedust-facebook-analysis	13	

Simple PixieApp with dynamically computed dataframe

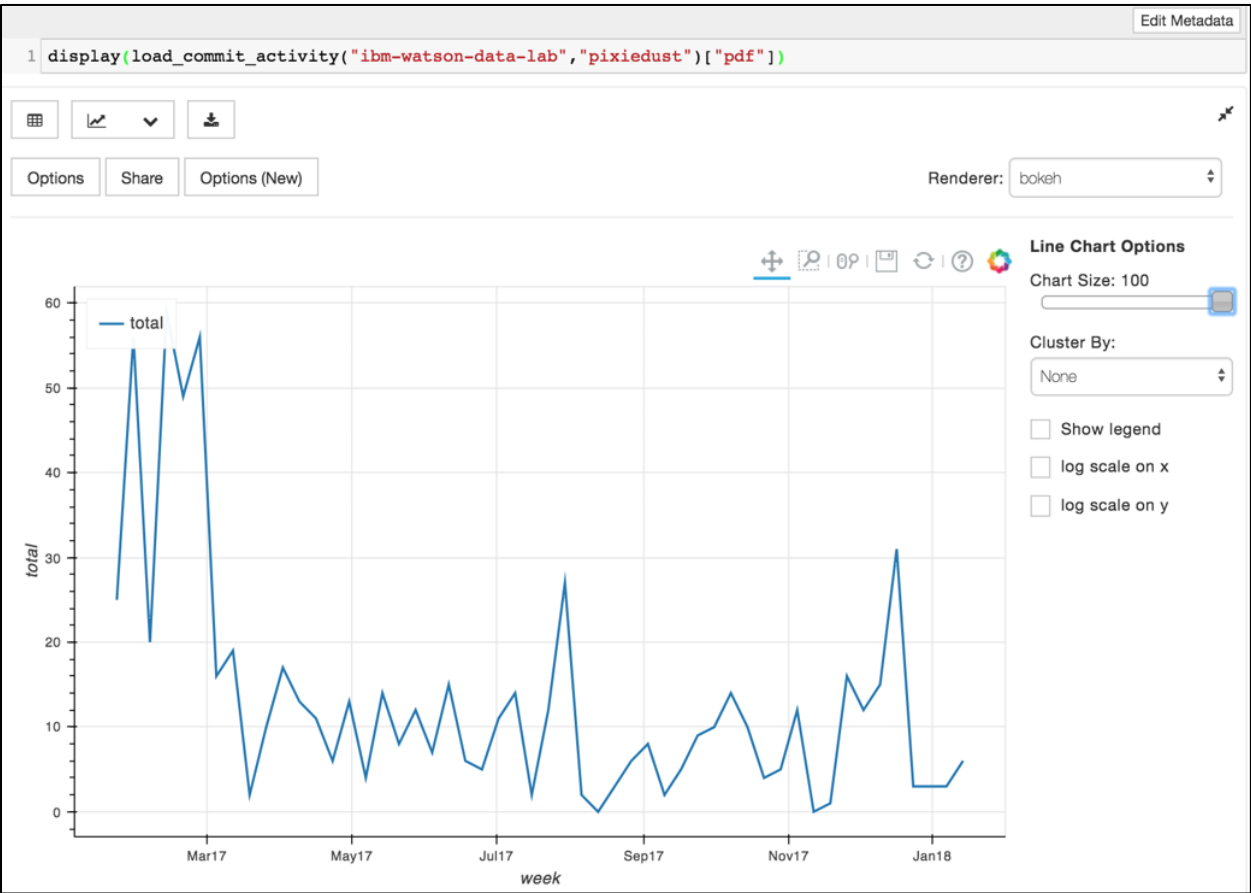


Schema

Table

Showing 10 of 10

col0	col1	col2	col3
prefix0-0	prefix1-0	prefix2-0	prefix3-0
prefix0-1	prefix1-1	prefix2-1	prefix3-1
prefix0-2	prefix1-2	prefix2-2	prefix3-2
prefix0-3	prefix1-3	prefix2-3	prefix3-3
prefix0-4	prefix1-4	prefix2-4	prefix3-4
prefix0-5	prefix1-5	prefix2-5	prefix3-5
prefix0-6	prefix1-6	prefix2-6	prefix3-6
prefix0-7	prefix1-7	prefix2-7	prefix3-7
prefix0-8	prefix1-8	prefix2-8	prefix3-8
prefix0-9	prefix1-9	prefix2-9	prefix3-9



Edit Cell Metadata

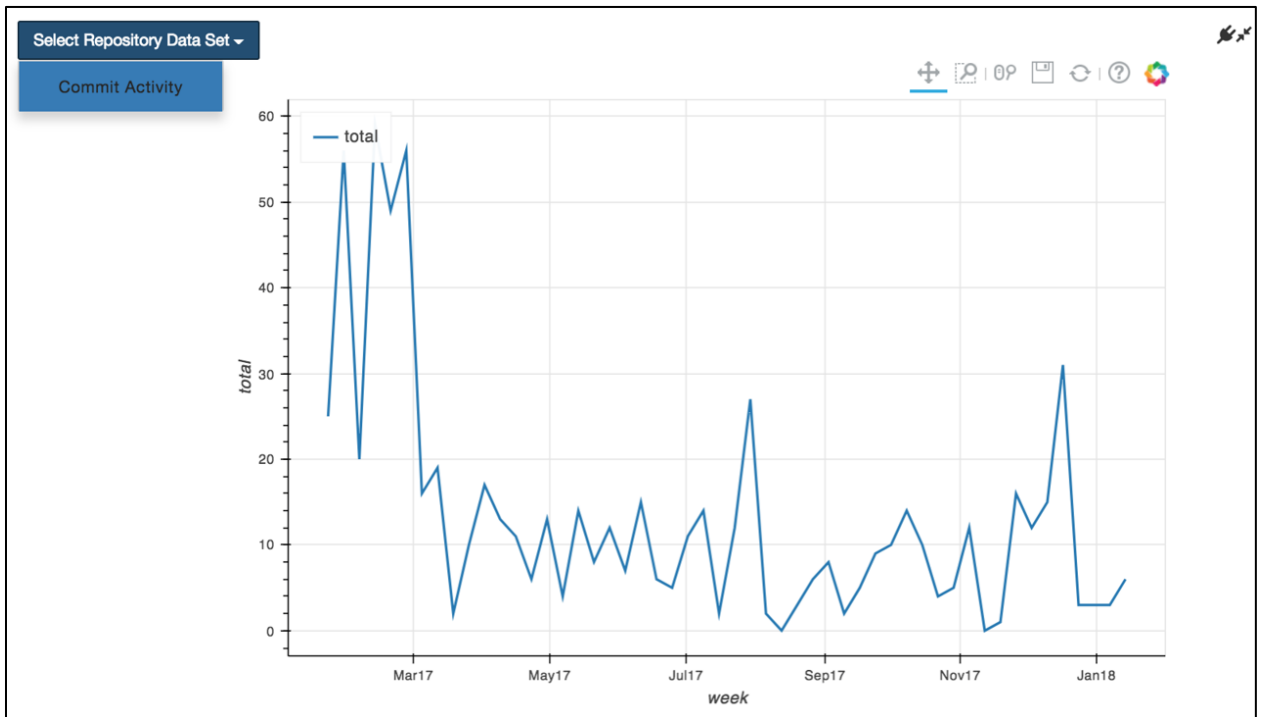


Manually edit the JSON below to manipulate the metadata for this cell. We recommend putting custom metadata attributes in an appropriately named substructure, so they don't conflict with those of others.

```
1 {  
2   "pixiedust": {  
3     "displayParams": {  
4       "handlerId": "lineChart",  
5       "keyFields": "week",  
6       "valueFields": "total",  
7       "aggregation": "SUM",  
8       "rowCount": "500",  
9       "rendererId": "bokeh"  
10    }  
11  }  
12 }
```

Cancel

Edit



Select Repo Data Set ▾

Show Statistics

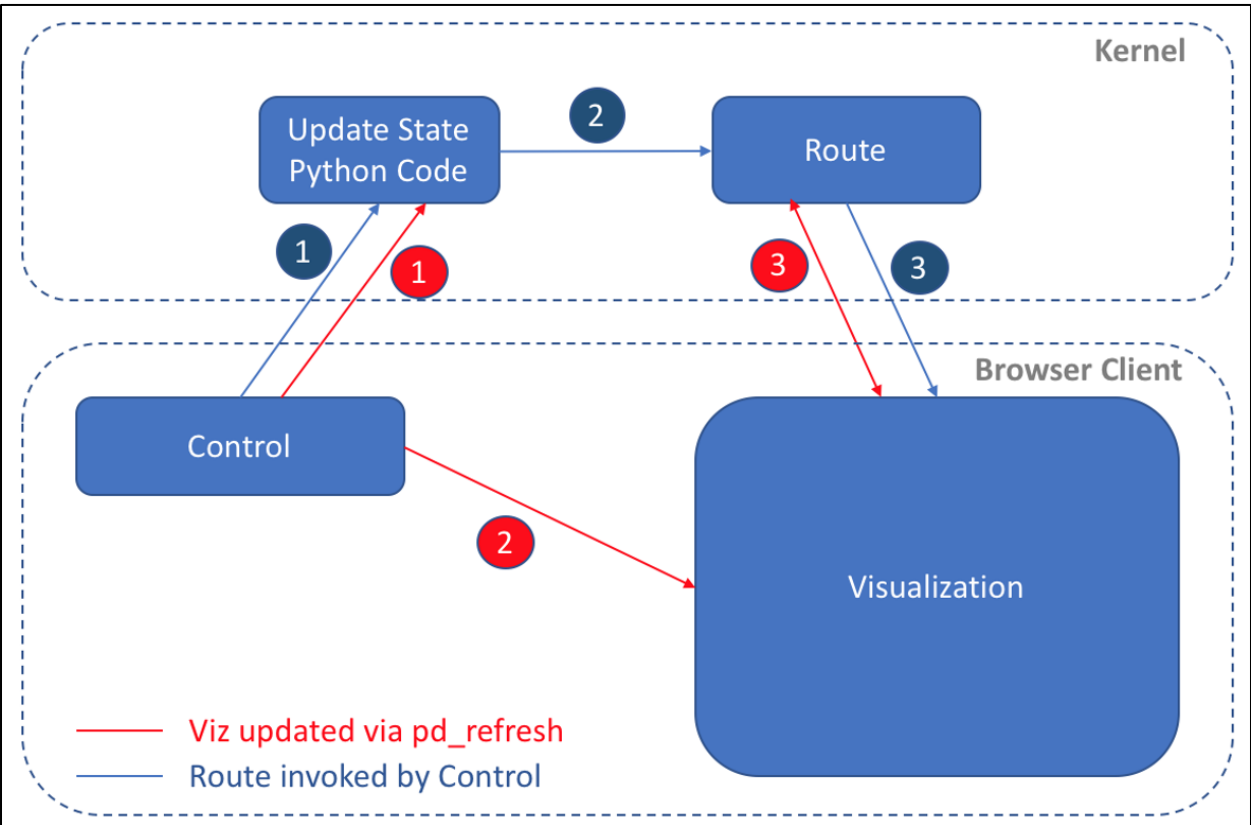
Schema

Table

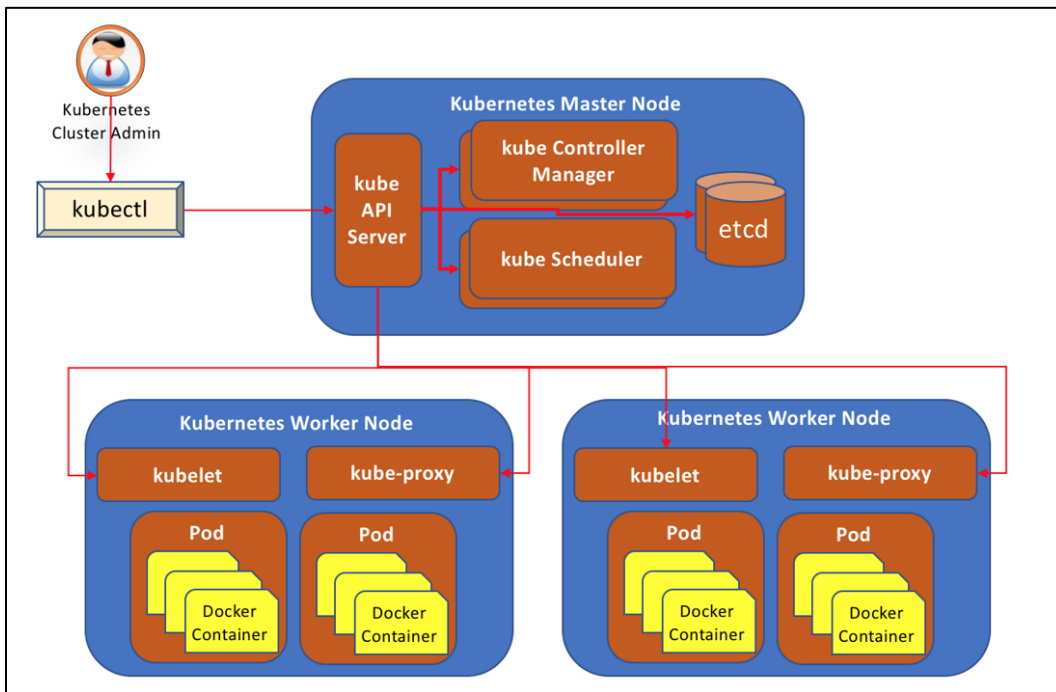
Search table

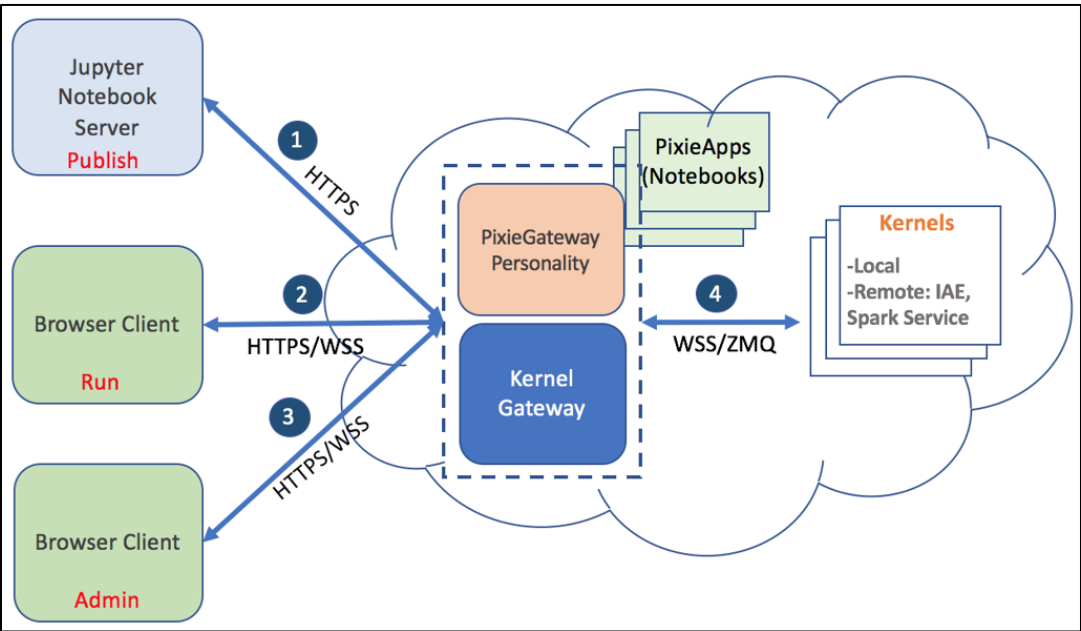
Showing 8 of 8

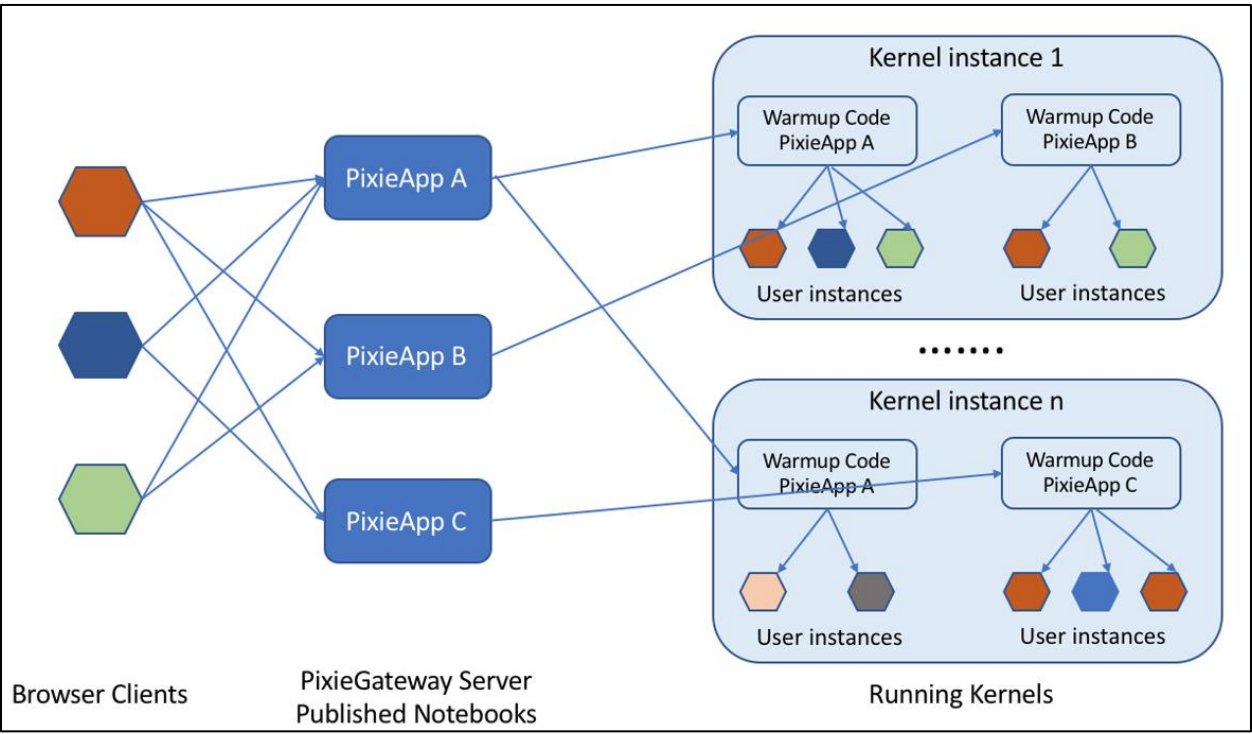
Stat	total
count	52.0
mean	12.7692307692
std	13.9910551041
min	0.0
25%	4.0
50%	10.0
75%	14.25
max	59.0



Chapter 4: Deploying PixieApps to the Web with the PixieGateway Server







Warmup Code

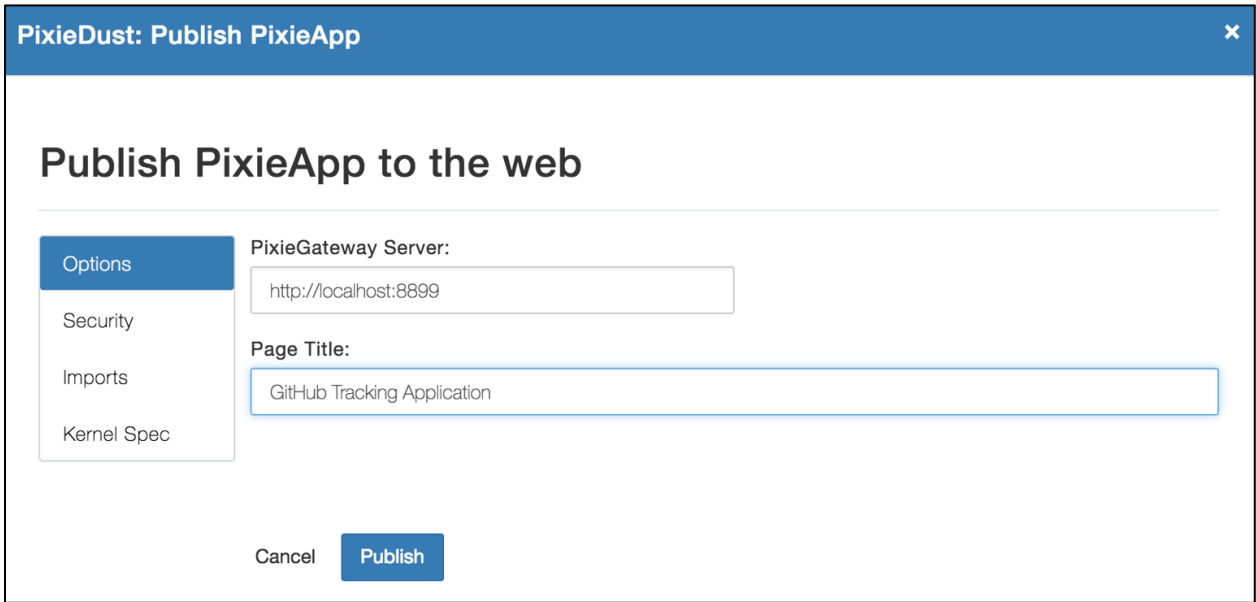
```
1 #import the pixieapp decorators
2 from pixiedust.display.app import *
3
4 #Load the cars dataframe into the Notebook
5 cars = pixiedust.sampleData(1)
6
7 def get_data_frame(arg):
8     return cars
```

Creating pandas DataFrame for 'Car performance data'. Please wait...
Loading file using 'pandas'
Successfully created pandas DataFrame for 'Car performance data'

Run Code

```
1 @PixieApp #decorator for making the class a PixieApp
2 class HelloWorldApp():
3     @route() #decorator for making a method a route (no arguments means default route)
4     def main_screen(self):
5         return """
6         <button type="submit" pd_options="show_chart=true" pd_target="chart">Show Chart</button>
7         <!--Placeholder div to display the chart-->
8         <div id="chart"></div>
9         """
10
11     @route(show_chart="true", persist_args="true")
12     @template_kwargs
13     def chart(self):
14         #Return a div bound to the cars dataframe using the pd_entity attribute
15         #pd_entity can refer a class variable or a global variable scoped to the notebook
16         return """
17         <div pd_render_onload_pd_entity="get_data_frame('david')">
18             <pd_options>
19                 {
20                     "title": "Average Mileage by Horsepower",
21                     "aggregation": "AVG",
22                     "clusterby": "origin",
23                     "handlerId": "barChart",
24                     "valueFields": "mpg",
25                     "rendererId": "bokeh",
26                     "keyFields": "horsepower"
27                 }
28             </pd_options>
29         </div>
30         """
31
32 app = HelloWorldApp()
33 app.run()
```

The diagram illustrates the execution environment. A box labeled "Kernel instance 1" contains a box for "Warmup Code PixieApp A". Three arrows point from this box to three colored hexagons labeled "User instances". Below these hexagons, three vertical lines labeled "User Sessions" connect them to a common horizontal line.



PixieDust: Publish PixieApp

Validating Notebook... Looking for a PixieApp
PixieApp GitHubTracking found. Proceeding with Publish
Successfully stored notebook file GitHub Sample Application - Part 3.ipynb
Validating Kernels for publishing...
Restarting kernel 735c7cc6-ad29-4f6e-be47-350d1f63568d...
Done Validating Kernels...
Kernel successfully restarted...

Notebook Successfully published
[GitHub Sample Application - Part 3.ipynb](#)

The screenshot shows a web browser window at localhost:8899/pixieapp/GitHubTracking?token=0836356e616649f4b4fff28c86b8a943. The page displays "49 repositories were found" and a table of repository data. A line chart titled "total" shows the number of repositories over time from March 2017 to January 2018. The chart shows a significant peak in March 2017, followed by a sharp decline and then a more stable, lower-level fluctuation.

Repo Name	Lastname	URL	Stars	Actions
pixiedust	ibm-watson-data-lab	https://github.com/ibm-watson-data-lab/pixiedust	305	
pixiedust	nutter			
PixieDust	PixieE			
pixiedust	mixu			

total

week

Mar17 May17 Jul17 Sep17 Nov17 Jan18

Edit Cell Metadata



Manually edit the JSON below to manipulate the metadata for this cell. We recommend putting custom metadata attributes in an appropriately named substructure, so they don't conflict with those of others.

```
1 {  
2   "trusted": true,  
3   "pixiedust": {  
4     "displayParams": {},  
5     "pixieapp": {  
6       "query": "pixiedust"  
7     }  
8   }  
9 }
```

Cancel

Edit

PixieDust: Bar Chart Options



Chart Title:

Average Mileage by Horsepower

Fields:

Show only numeric columns

Search/Filter Fields

acceleration	numeric
cylinders	numeric
engine	numeric
horsepower	numeric
mpg	numeric
name	string
origin	string
weight	numeric
year	numeric

Keys:

horsepower

Values:

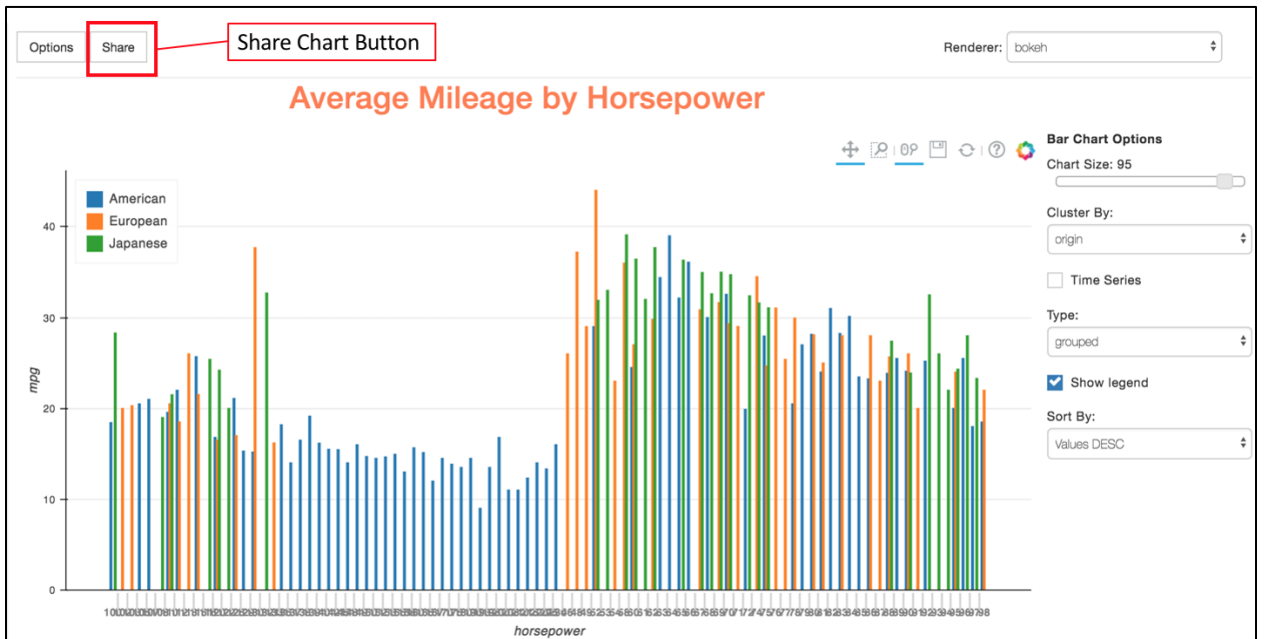
mpg

Aggregation:

AVG

of Rows to Display:

100



PixieDust: Share Chart [Close]

Share Chart and make it accessible on the web

Options

PixieGateway Server:

If you don't have an IP address for a PixieGateway Server [deploy one](#)

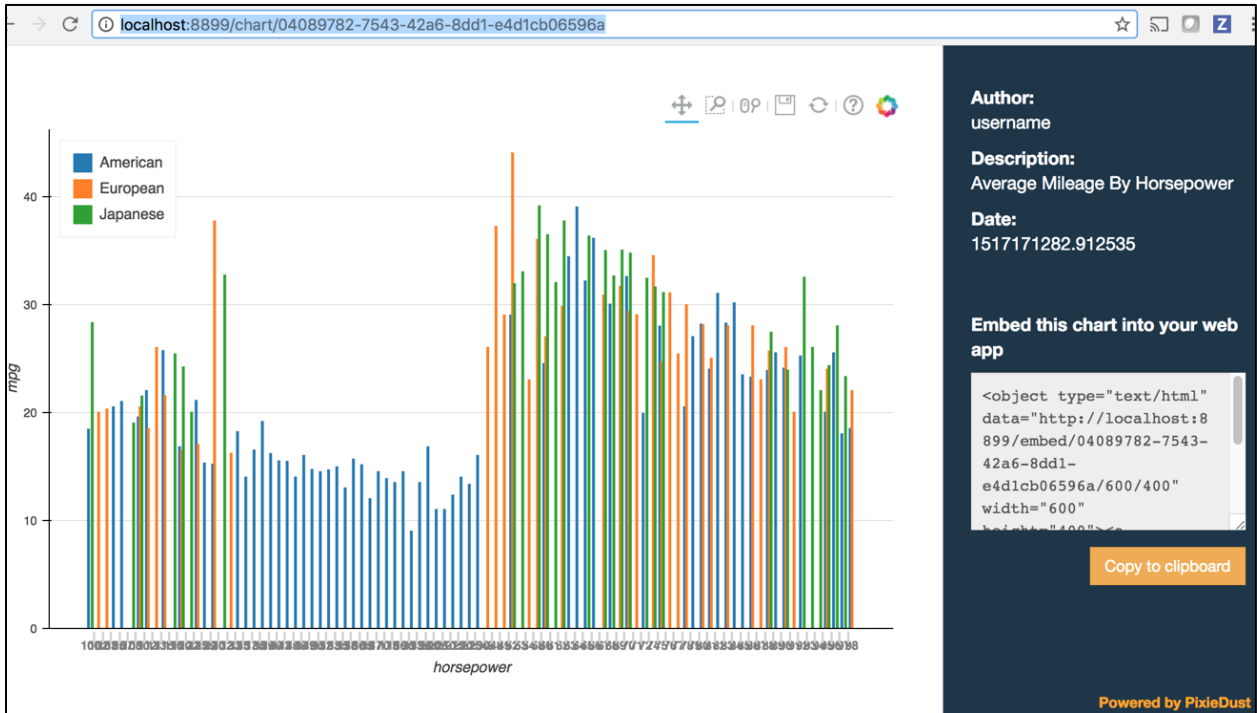
Description:

Chart Successfully shared

<http://localhost:8899/chart/04089782-7543-42a6-8dd1-e4d1cb06596a>

Embed the chart into your web app

```
<object type="text/html" data="http://localhost:8899/embed/04089782-7543-42a6-8dd1-  
e4d1cb06596a/600/400" width="600" height="400">  
  <a href="http://localhost:8899/embed/04089782-7543-42a6-8dd1-e4d1cb06596a">View  
Chart</a>
```



Author:
username

Description:
Average Mileage By Horsepower

Date:
1517171282.912535

Embed this chart into your web app

```
<object type="text/html" data="http://localhost:8899/embed/04089782-7543-42a6-8dd1-e4d1cb06596a/600/400" width="600" height="400">
```

Copy to clipboard

localhost:8899/admin/apps

PixieDust Gateway

Published PixieApps

PixieApp Name	Description	Notebook Location	
WatsonHealthApp	PixieApp that perform Machine Learning classification for a disease on a cohort of patient	/Users/dtaieb/pixiedust/gateway/Visual_Cohort_Analysis.ipynb	
RemoteApp	None	/Users/dtaieb/pixiedust/gateway/pd_app.ipynb	
GitHubTracking	GitHub Tracking Sample Application	/Users/dtaieb/pixiedust/gateway/GitHub Sample Application - Part 3.ipynb	
HelloWorldApp	None	/Users/dtaieb/pixiedust/gateway/Hello World.ipynb	
NLCClassifier	None	/Users/dtaieb/pixiedust/gateway/NLC Trainer App.ipynb	
CatalogDashboard	None	/Users/dtaieb/pixiedust/gateway/localcart-catalog-dashboard.ipynb	

PixieDust Gateway

Shared Charts

Showing 1 - 15 of 31 NEXT

Date	Renderer	Author	Description	Action
2018-01-28 15:28:02		username	Average Mileage By Horsepower	link preview delete
2017-11-28 13:25:42	brunel	username		link preview delete
2017-11-29 00:15:37	brunel	username		link preview delete
2017-12-17 07:55:45	bokeh	username		link preview delete

Kernel Name
Status
Busy Ratio
Running Apps
Users Count

Kernel Name	Status	Busy Ratio	Running Apps	Users Count
python3	idle	0%	GitHubTracking (running)	0

```

[I 180129 21:31:58 web:2063] 200 GET /stats (127.0.0.1) 1.09ms
[I 180129 21:31:58 web:2063] 200 GET /admin/stats/app/GitHubTracking/kernel/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 1.09ms
[I 180129 21:31:58 web:2063] 304 GET /pixiedust.css (127.0.0.1) 9.74ms
[I 180129 21:31:58 web:2063] 304 GET /pixiedust.js (127.0.0.1) 22.60ms
[I 180129 21:34:29 web:2063] 304 GET /admin/stats (127.0.0.1) 5.59ms
[I 180129 21:34:29 web:2063] 304 GET /pixiedust.css (127.0.0.1) 8.53ms
[I 180129 21:34:29 web:2063] 304 GET /pixiedust.js (127.0.0.1) 23.89ms
[I 180129 21:34:30 web:2063] 200 GET /stats (127.0.0.1) 1.03ms
[I 180129 21:34:31 web:2063] 200 GET /admin/stats/kernel/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 8.20ms
[I 180129 21:34:31 web:2063] 304 GET /pixiedust.css (127.0.0.1) 9.01ms
[I 180129 21:34:31 web:2063] 304 GET /pixiedust.js (127.0.0.1) 23.22ms
[I 180129 21:34:47 web:2063] 200 POST /executeCode/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 1260.49ms
[I 180129 21:35:18 web:2063] 200 POST /executeCode/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 20.27ms
[I 180129 21:36:38 web:2063] 200 GET /admin/stats/kernel/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 8.44ms
[I 180129 21:36:38 web:2063] 304 GET /pixiedust.css (127.0.0.1) 12.05ms
[I 180129 21:36:38 web:2063] 304 GET /pixiedust.js (127.0.0.1) 23.10ms
[I 180129 21:36:43 web:2063] 200 POST /executeCode/11fd7212-fad0-42a9-9ee5-f703c8ae150c (127.0.0.1) 15.55ms
[I 180129 21:40:18 web:2063] 200 GET /admin/logs (127.0.0.1) 64.33ms
[I 180129 21:40:18 web:2063] 304 GET /pixiedust.css (127.0.0.1) 11.68ms
[I 180129 21:40:18 web:2063] 304 GET /pixiedust.js (127.0.0.1) 22.90ms

```


Kernel Information for Instance 11fd7212-fad0-42a9-9ee5-f703c8ae150c

[Details](#)

[Kernel Spec](#)

[Log](#)

[Python Console](#)

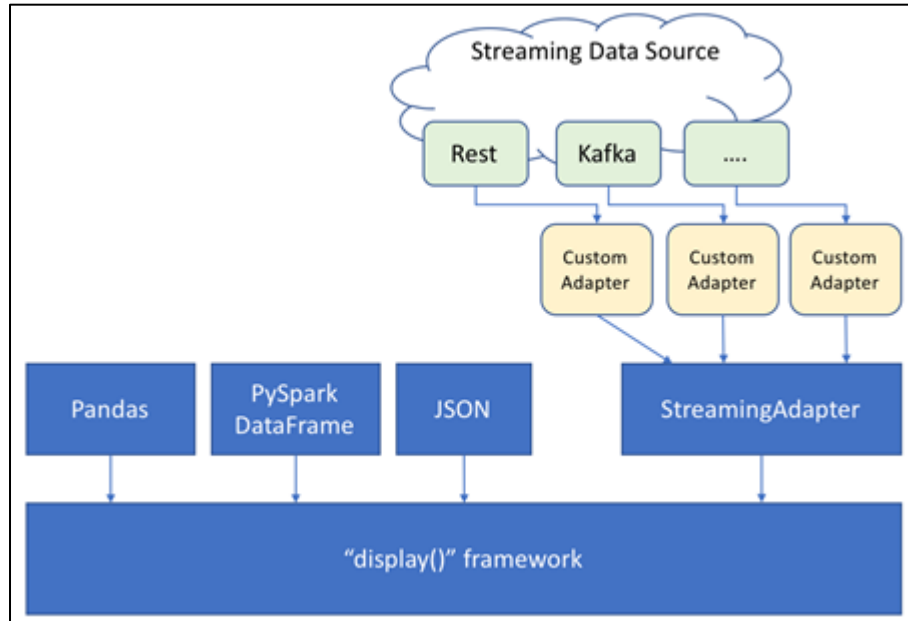
```
1 %pixiedustLog -l debug
```

[Submit](#)

2018-01-27 21:31:29,389 - pixiedust.utils.storage - INFO - No change in version: 1.1.6 -> 1.1.6.

[Details for GitHubTracking](#)[Warmup Code](#)[Run Code](#)

```
3 from datetime import datetime
4 import requests
5 import pixiedust
6 import pandas
7
8 def ns17_load_commit_activity(owner, repo_name):
9     response = requests.get('https://api.github.com/repos/{}/{}/stats/commit_activity'.format(
10         pdf = pandas.DataFrame([{'total': item['total'], 'week': datetime.fromtimestamp(item['week
11         return {'pdf': pdf, 'chart_options': {'handlerId': 'lineChart', 'keyFields': 'week', 'valu
12 display(ns17_load_commit_activity('ibm-watson-data-lab', 'pixiedust')['pdf'])
13 ns17_analyses = [('Commit Activity', ns17_load_commit_activity)]
14 from pixiedust.display.app import *
15 import requests
16 import pandas
17
```

Options

Share

Renderer: mapbox

Drone



Map View Options

Show legend

Map Size: 95

Opacity: 67

Style:

simple

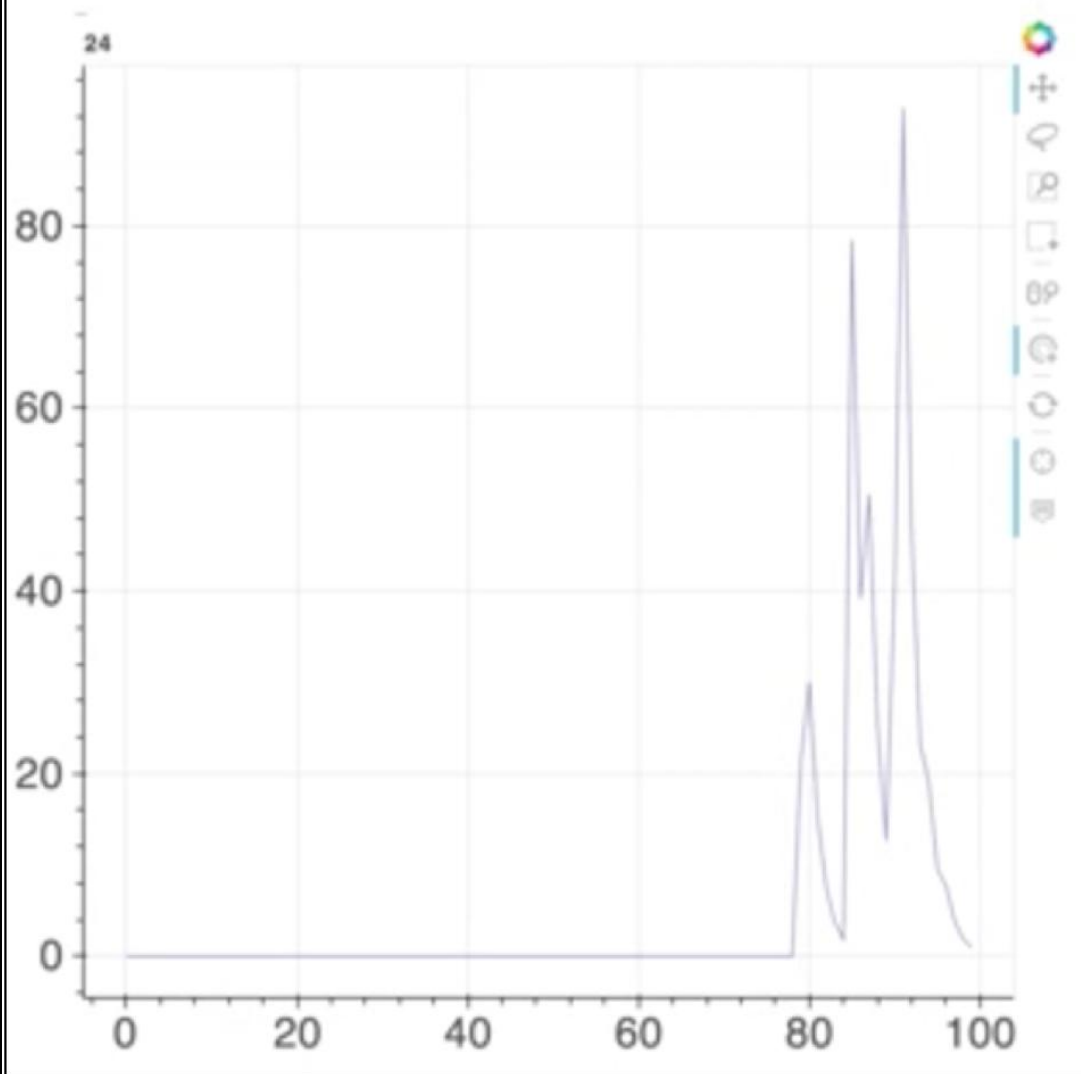
Color Ramp:

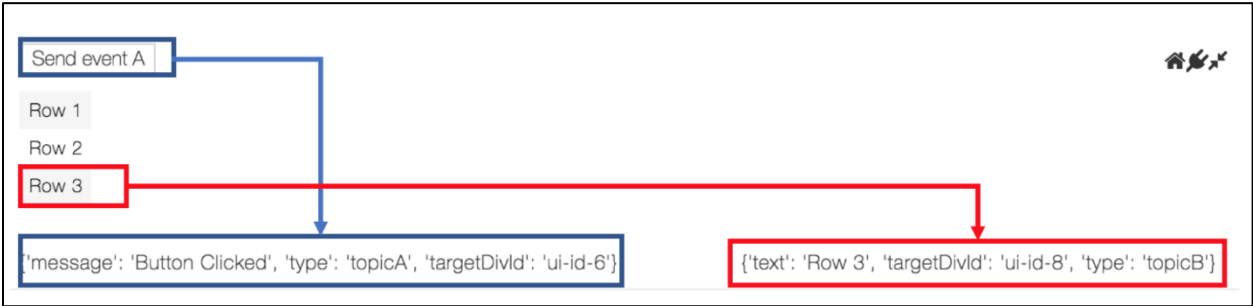
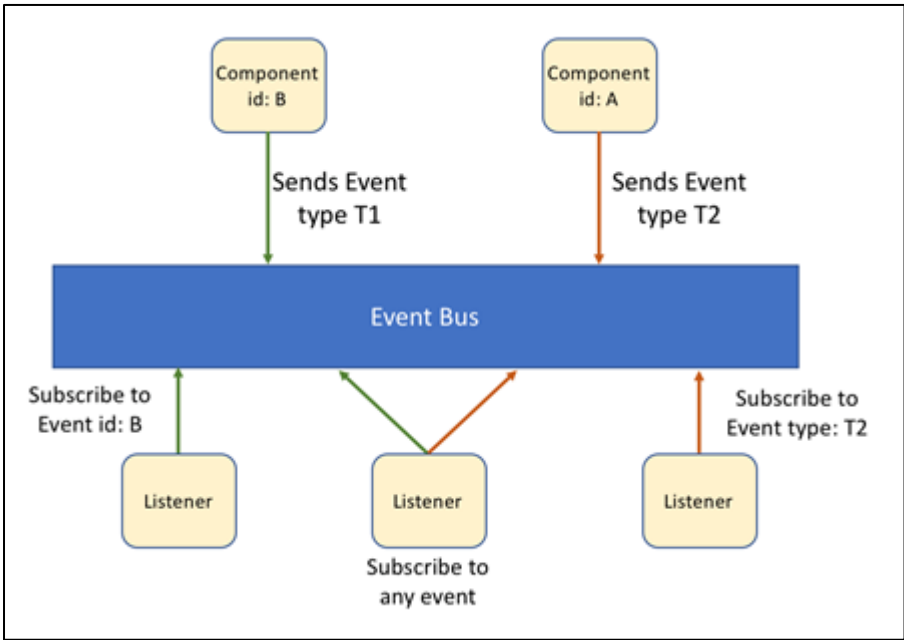
Yellow to Blue

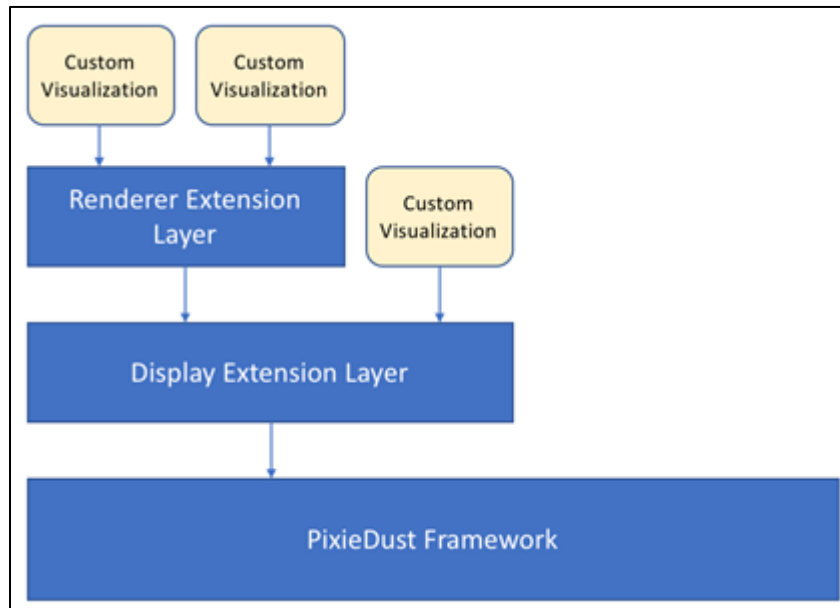
basemap:

light-v9

Real-time chart for total_price_of_basket(average).







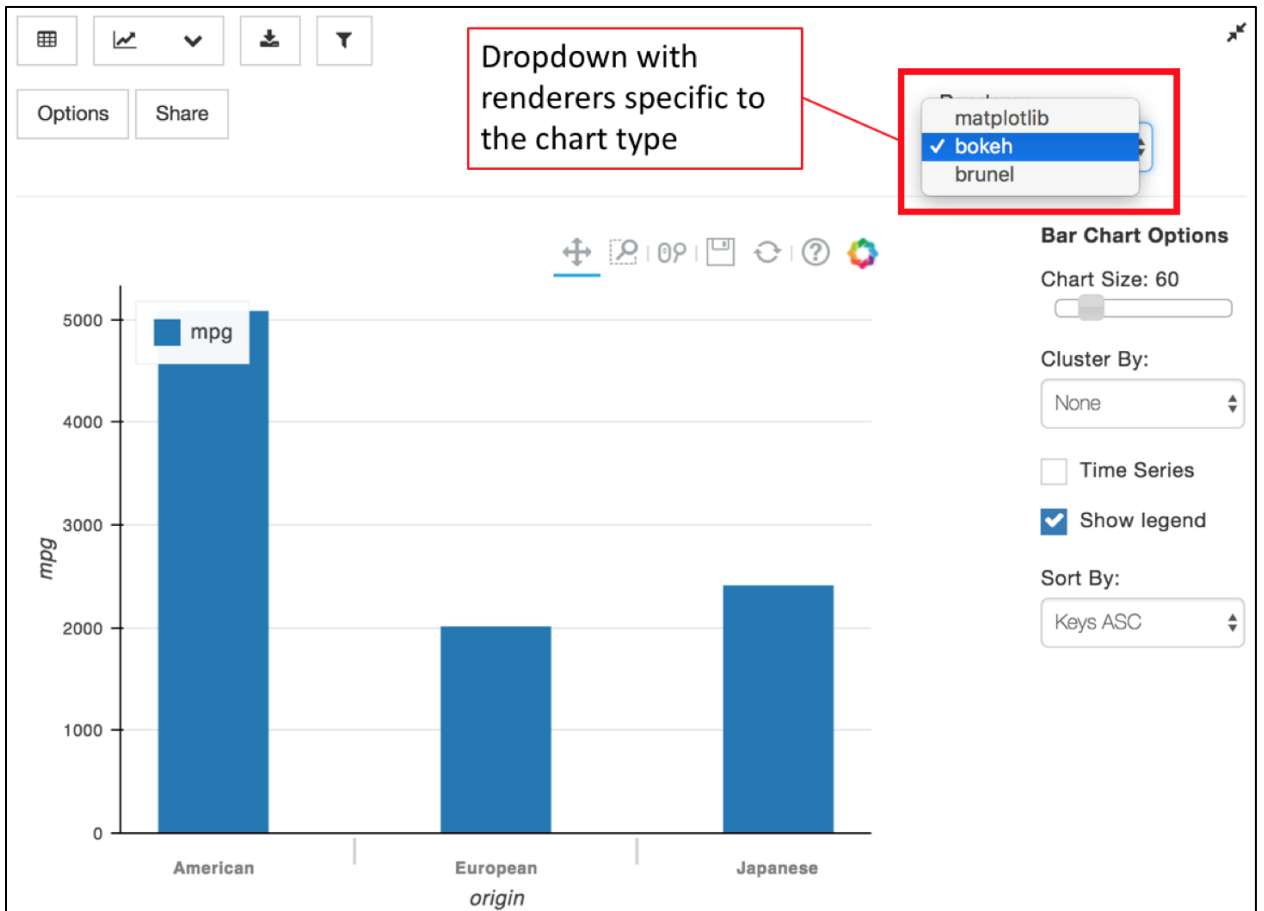
```

1 import pixiedust
2 cars = pixiedust.sampleData(1)
3 display(cars)

```

Creating pandas DataFrame for 'Car performance data'. Please wait...
Loading file using 'pandas'
Successfully created pandas DataFrame for 'Car performance data'

	cylinders	engine	horsepower	weight	acceleration	year	origin	name
10.0	8	307.0	130	3504	12.0	70	American	chevrolet chevelle malibu
15.0	8	350.0	165	3693	11.5	70	American	buick skylark 320
18.0	8	318.0	150	3436	11.0	70	American	plymouth satellite
16.0	8	304.0	150	3433	12.0	70	American	amc rebel sst
17.0	8	302.0	140	3449	10.5	70	American	ford torino



1 display(cars)

Grid icon | Line chart icon | Dropdown arrow | Download icon | Filter icon

Share

Rendered as: table ✓ simpletable

mpg	cylinders	engine	horsepower	weight	acceleration	year	origin	name
18.0	8	307.0	130	3504	12.0	70	American	chevrolet chevelle malibu
15.0	8	350.0	165	3693	11.5	70	American	buick skylark 320
18.0	8	318.0	150	3436	11.0	70	American	plymouth satellite
16.0	8	304.0	150	3433	12.0	70	American	amc rebel sst
17.0	8	302.0	140	3449	10.5	70	American	ford torino
15.0	8	429.0	198	4341	10.0	70	American	ford galaxie 500

In [*]:

```
1 %pdb on
2 def bad_code(div):
3     print(3/div)
4
5 bad_code(0)
```

Activate automatic pdb calling

Automatic pdb calling has been turned ON

ZeroDivisionError Traceback (most recent call last)

<ipython-input-7-175ba20c9322> in <module>()
3 print(3/div)

4

----> 5 bad_code(0)

<ipython-input-7-175ba20c9322> in bad_code(div)

1 get_ipython().run_line_magic('pdb', 'on')

2 def bad_code(div):

----> 3 print(3/div)

4
5 bad_code(0)

ZeroDivisionError: division by zero

> <ipython-input-7-175ba20c9322>(3)bad_code()

1 get_ipython().run_line_magic('pdb', 'on')

2 def bad_code(div):

----> 3 print(3/div)

4
5 bad_code(0)

Interactive input for pdb commands

ipdb>

In [*]:

```
1 %debug
```

```
> <ipython-input-8-175ba20c9322>(3)bad_code()  
1 get_ipython().run_line_magic('pdb', 'on')  
2 def bad_code(div):  
----> 3     print(3/div)  
4  
5 bad_code(0)
```

ipdb>

In [*]:

```
1 from IPython.core.debugger import set_trace  
2 def do_something():  
3     set_trace()  
4     print("something")  
5  
6 do_something()
```

```
> <ipython-input-1-139f27a9a72d>(4)do_something()  
2 def do_something():  
3     set_trace()  
----> 4     print("something")  
5  
6 do_something()
```

ipdb>

Code execution Toolbar

Local Variables

Code Editor highlights the currently executing line

```

1 def pixie_run():
2     import pdb
3     pdb.set_trace()
4     import pixiedust
5     cars = pixiedust.sampleData(1, forcePandas=True)
6
7     def count_cars(name):
8         count = 0
9         for row in cars.itertuples():
10            if name in row.name:
11                count += 1
12            return count
13
14    count_cars('chevrolet')

```

Variables

pdb	<module 'pdb' fro...
json	<module 'json' fr...

Breakpoints Management

Deleted breakpoint 1 at <ipython-input-1-7089baf694cd>:13 Deleted breakpoint 2 at <ipython-input-1-7089baf694cd>:19 Deleted breakpoint 3 at <ipython-input-2-7089baf694cd>:13 Deleted breakpoint 4 at <ipython-input-3-bd70b42f202b>:13

Console Output Pane

Evaluate Python expression

Code execution Toolbar

Variables

cars	mpg cylind...
name	chevrolet
json	<module 'json' fr...

```

7     def count_cars(name):
8         count = 0
9         for row in cars.itertuples():
10            if name in row.name:
11                count += 1
12            return count

```

Console Evaluate Breakpoints

Downloaded 20954 bytes Creating pandas DataFrame for 'Car performance data'. Please wait... Loading file using 'pandas' Successfully created pandas DataFrame for 'Car performance data' > <ipython-input-3-faded700bbd5>(8)count_cars() -> count = 0

Column to search Query

```

-----\nKeyError
Traceback (most recent call last)\n~/anaconda/envs/dashboard/lib/python3.5/site-packages/pandas/core/indexes/base.py in get_loc(self, key, method, tolerance)
 2441         try:
-> 2442             return self._engine.get_loc(key)
 2443         except KeyError:
\npandas/_libs/index.pyx in pandas._libs.index.IndexEngine.get_loc (pandas/_libs/index.c:5280)()
\npandas/_libs/index.pyx in pandas._libs.index.IndexEngine.get_loc (pandas/_libs/index.c:5126)()
\npandas/_libs/hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.get_item (pandas/_libs/hashtable.c:20523)()
\npandas/_libs/hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.get_item (pandas/_libs/hashtable.c:20477)()
\nKeyError: 'foo'\n
During handling of the above exception, another exception occurred:

\nKeyError
Traceback (most recent call last)\n<ipython-input-10-8531244d918c> in <module>()
----> 1 display(app, nostore_pixieapp='app', runInDialog='false', nostore_ispix='true', nostore_pixiedust='true', handlerId='__main__Display
Cars id', nostore_bokeh='false', cell_id='1644', org='p270', org_params='nostore_pixieapp, runInDialog, nostore_ispix, nostore
_pixiedust, handlerId', nostore_vh='975', nostore_vh_params='nostore_ispix, nostore_pixiedust, handlerId', org_params='nostore_pixieapp, runInDialog, nostore_ispix, nostore
no_margin='true', prefix='861b6fa9')
\n~/watsondev/workspaces/cds_workspace/pixieapp/anaconda/lib/python3.5/site-packages/pandas/core/indexes/base.py in get_loc(self, key, method, tolerance)
 139         return
 1644         if res is None:
-> 1645             values = self._data.get(item)
 1646             res = self._box_item_values(item, values)
 1647             cache[item] = res
\n~/anaconda/envs/dashboard/lib/python3.5/site-packages/pandas/core/internals.py in get(self, item, fastpath)
 3588
 3589         if not isnull(item):
-> 3590             loc = self.items.get_loc(item)
 3591         else:
 3592             indexer = np.arange(len(self.items))[isnull(self.items)]
\n~/anaconda/envs/dashboard/lib/python3.5/site-packages/pandas/core/indexes/base.py in get_loc(self, key, method, tolerance)
 2442         return self._engine.get_loc(key)
 2443         except KeyError:
-> 2444             return self._engine.get_loc(self._maybe_cast_indexer(key))
 2445
 2446         indexer = self.get_indexer([key], method=method, tolerance=tolerance)
\npandas/_libs/index.pyx in pandas._libs.index.IndexEngine.get_loc (pandas/_libs/index.c:5280)()
\npandas/_libs/index.pyx in pandas._libs.index.IndexEngine.get_loc (pandas/_libs/index.c:5126)()
\npandas/_libs/hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.get_item (pandas/_libs/hashtable.c:20523)()
\npandas/_libs/hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.get_item (pandas/_libs/hashtable.c:20477)()
\nKeyError: 'foo'\n
Post Mortem Debug Route

```

Invoke the PixieDebugger

Column to search Query

```

20 @route(col="", query="")
21 def display_screen(self, col, query):
22     self.pdf = cars.loc[cars[col].str.contains(query)]
23     return ""
24     <div pd_render_onload pd_entity="pdf">
25         <pd_options>
26             {
27                 "handlerId": "tableView",
28                 "table_noschema": "true",
29                 "table_nosearch": "true",
30                 "table_nocount": "true"
31             }
32         </pd_options>
33     </div>
34     ""

```

Variables

self	<abc.__main__Dis...
col	foo
query	malibu
json	<module 'json' fr...

Execution starts at the beginning of the route

Console Evaluate Breakpoints

```

*** KeyError: 'foo'
> cars[col]

```

Verify that col doesn't hold a correct value

```
1 | %pixiedustLog -l debug -m 5

2018-02-09 15:21:37,341 - pixiedust.display.display.Display - DEBUG - Value Fields: ['mpg']
2018-02-09 15:21:37,341 - pixiedust.utils.template - DEBUG - Template already qualified pixiedust.display.chart.renderers.baseChartDisplay:baseChartOptionsDialogBody.html
2018-02-09 15:21:37,359 - pixiedust.display.chart.renderers.baseChartDisplay - DEBUG - Found cache data for 285AC18D11294C348C072F891FE5A8D1. Validating integrity...
2018-02-09 15:21:37,359 - pixiedust.display.chart.renderers.baseChartDisplay - DEBUG - Cache data not validated for key filter_options. Expected Value is {'constraint': 'greater than', 'value': '46', 'field': 'mpg', 'regex': 'False', 'case_matter': 'False'}. Got {'constraint': 'greater than', 'value': '45', 'field': 'mpg', 'regex': 'False', 'case_matter': 'False'}. Destroying it!...
2018-02-09 15:21:37,480 - pixiedust.display.display.Display - DEBUG - getWorkingPandasDataFrame returns:
acceleration cylinders engine horsepower mpg
0 17.9 4 86.0 65 46.6
```

```
1 | %pixiedustLog -l info -f Calling

2018-02-10 22:13:06,358 - __main__.AppWithLogger - INFO - Calling default route
```

The screenshot shows a Jupyter Notebook interface with a code cell containing the following JavaScript code:

```
15  
16  
17     @route(state="*")  
18     def my_route(self, state):  
19         return "<div>Route called with state <b>{{state}}</b></div>"  
20  
21 app = TestJSDebugger()  
22 app.run()
```

Below the code cell, a red box labeled "Call route" points to a button. The Chrome DevTools interface is open, showing the "Sources" panel with a red box around the function definition:

```
function FooJS(){  
  debugger;  
  return "value"  
}
```

The "Call Stack" panel is also visible, showing the following stack:

Function	Location
FooJS	VM24488:2
(anonymous)	VM24332:627
resolveScriptMacros	VM24332:616
readExecInfo	VM24332:792
runElement	VM24332:1032
processEvent	VM24332:1088

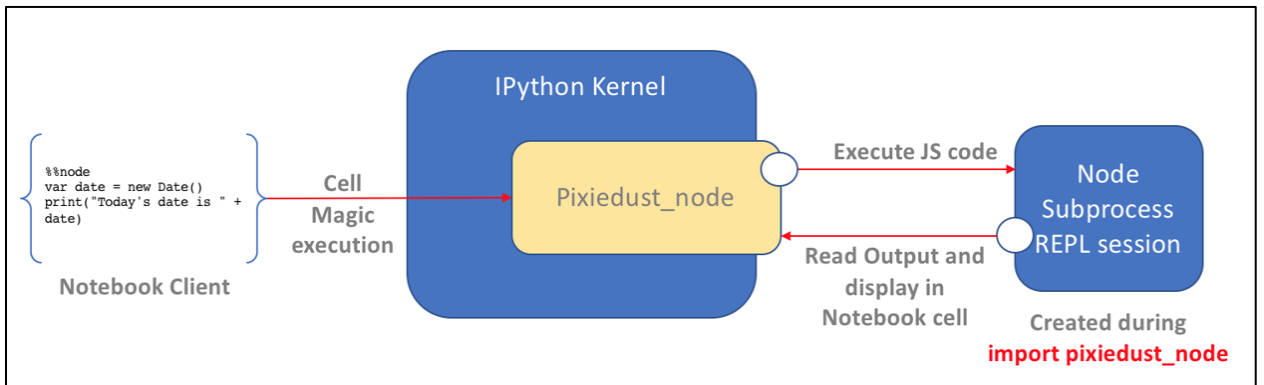
Pixiedust database opened successfully



Pixiedust version 1.1.10



Pixiedust Node.js



```

1 python_ar = [x for x in range(10)]
2 print(python_ar)
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]

```

```

1 %%node
2 for (var i = 0; i < python_ar.length; i++) {
3     python_ar[i] *= 2;
4 }
5 print(python_ar)
... ..
[0, 2, 4, 6, 8, 10, 12, 14, 16, 18]

```

PixieDust: Bar Chart Options



Chart Title:

Bar chart from data created in a Node cell

Fields:

Show only numeric columns

Search/Filter Fields

age *numeric*

name *string*

Keys: ⓘ

name



Values: ⓘ

age



Aggregation:

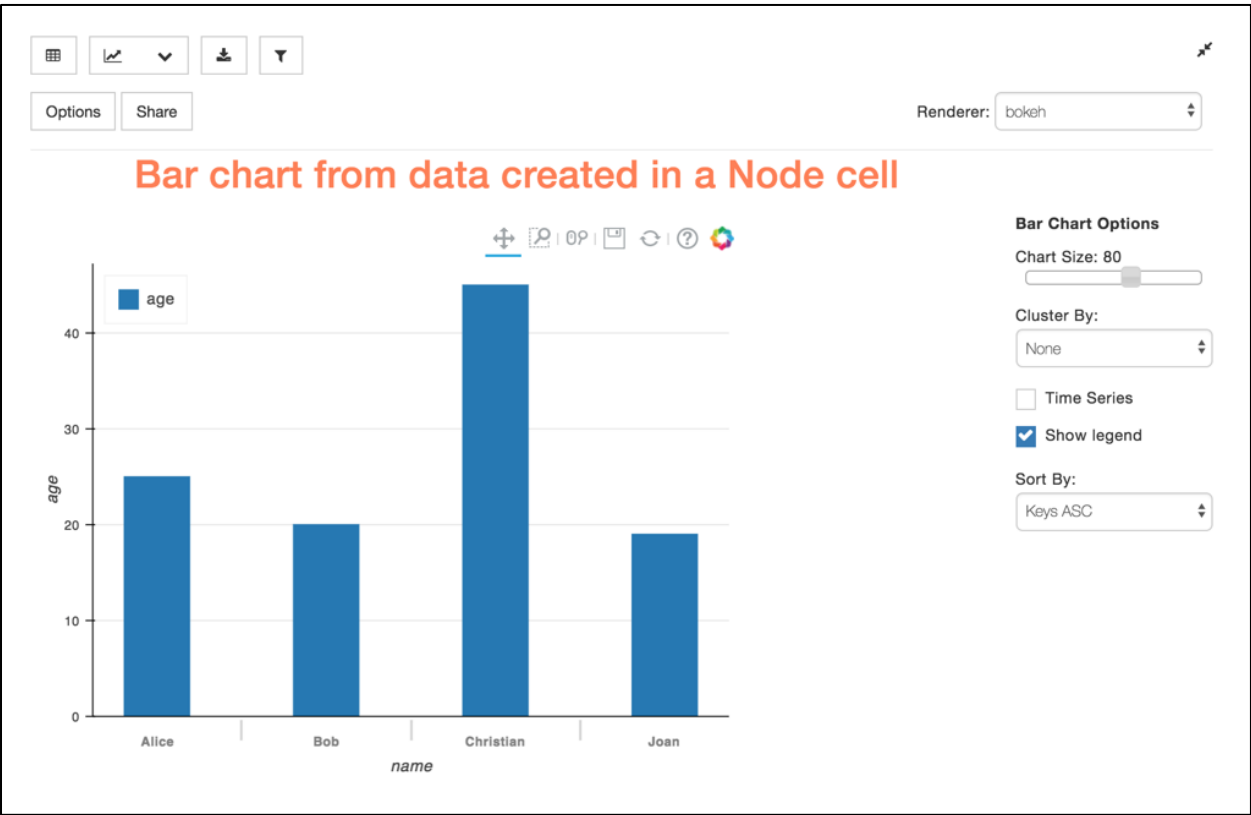
AVG

of Rows to Display:

100

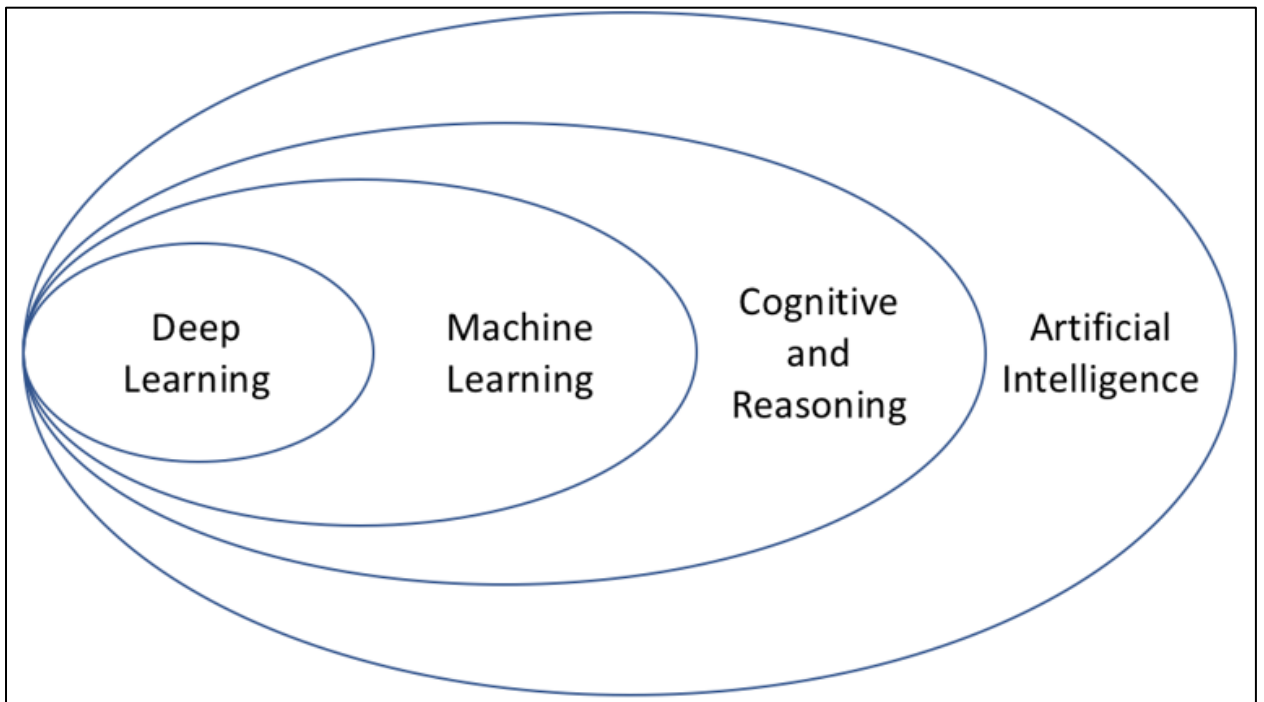
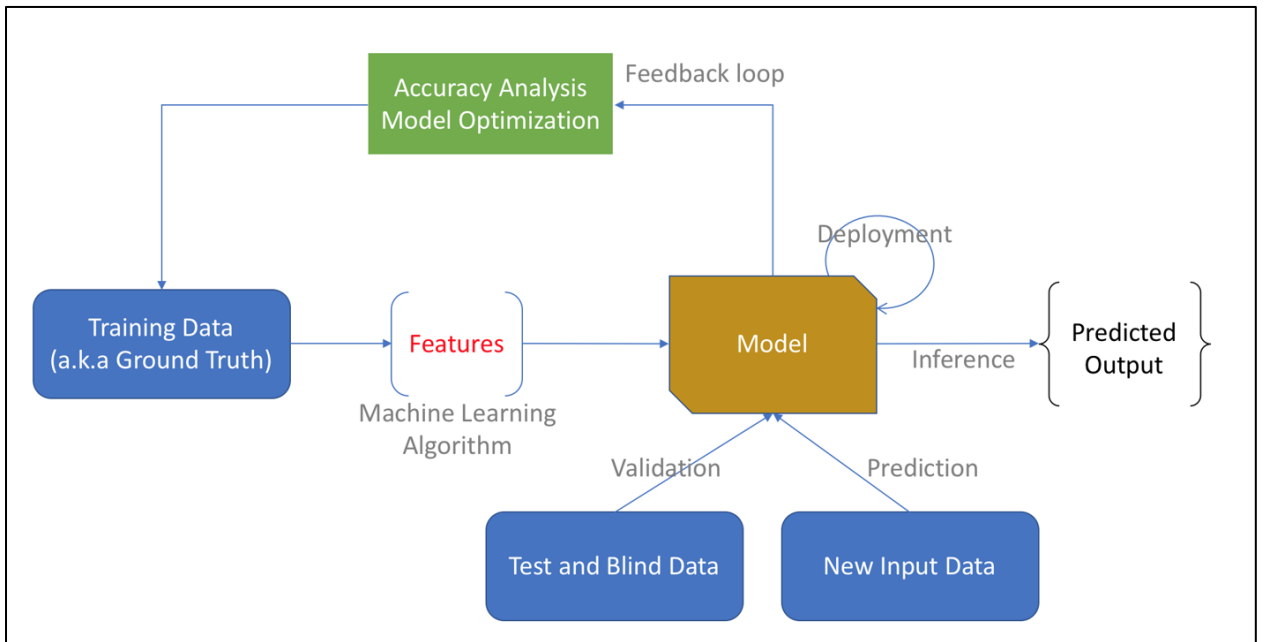
OK

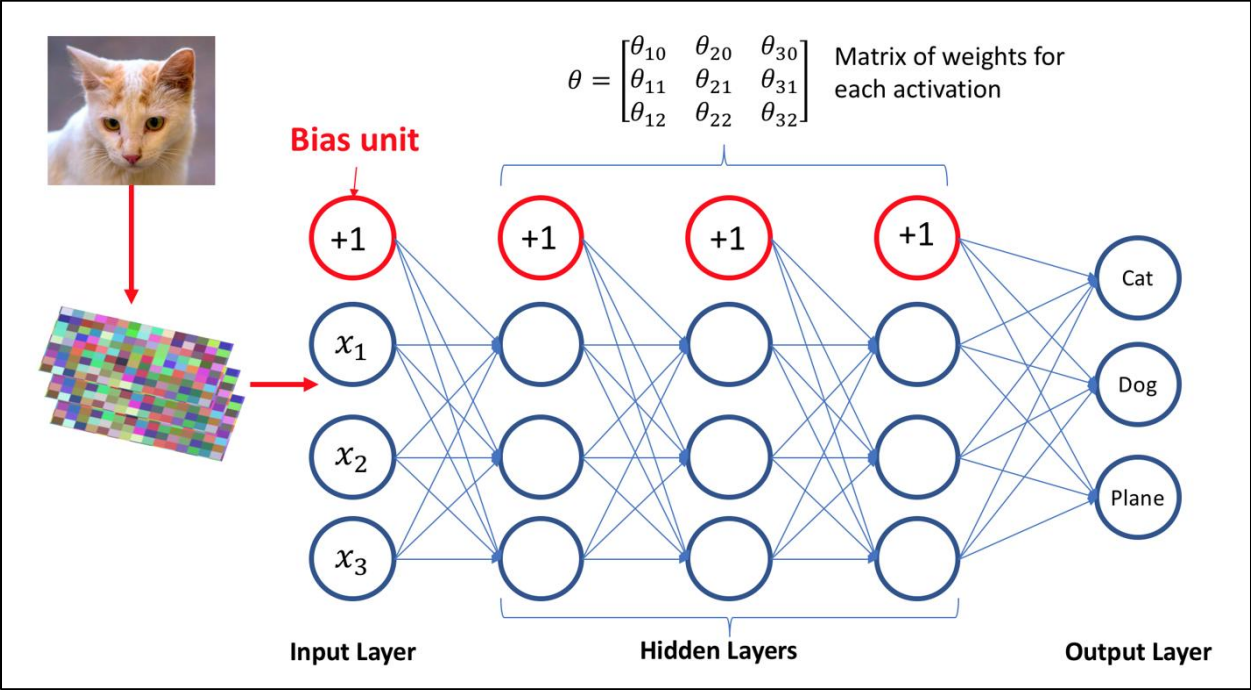
Cancel

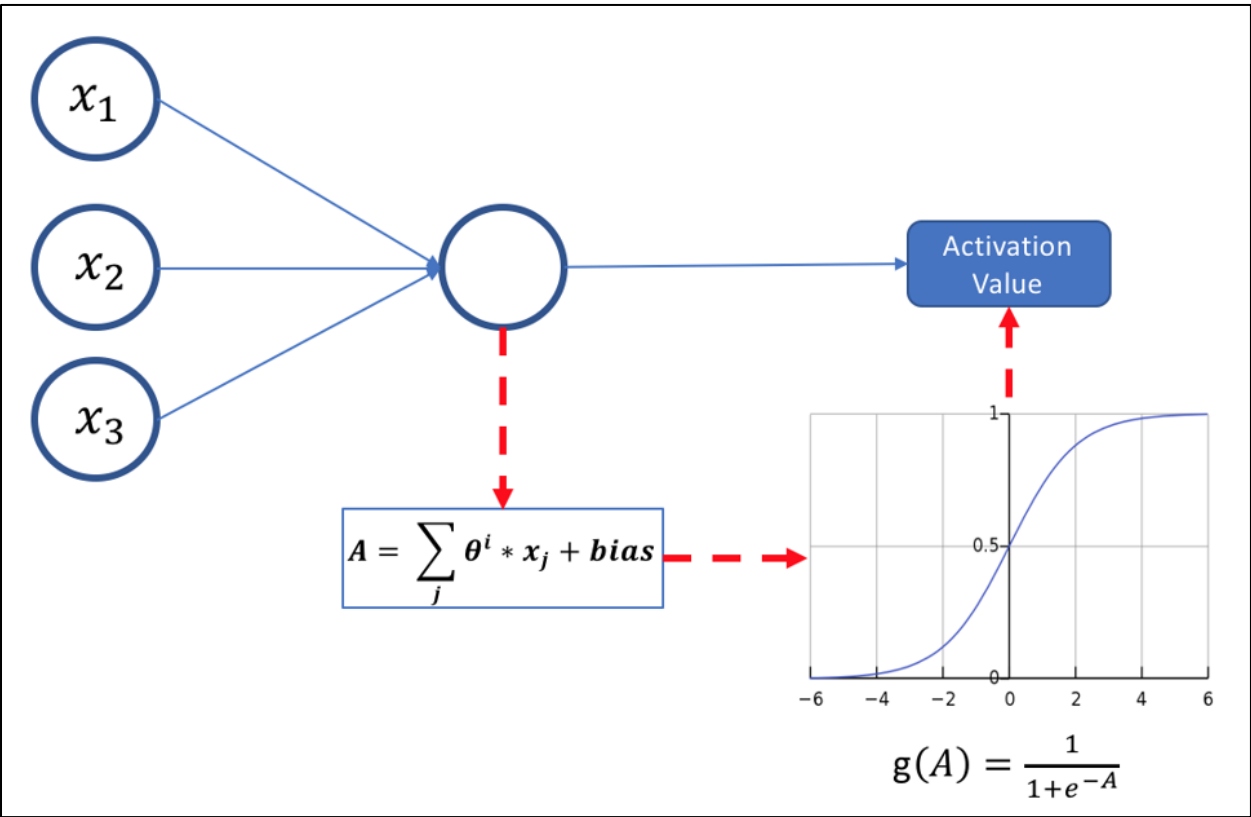


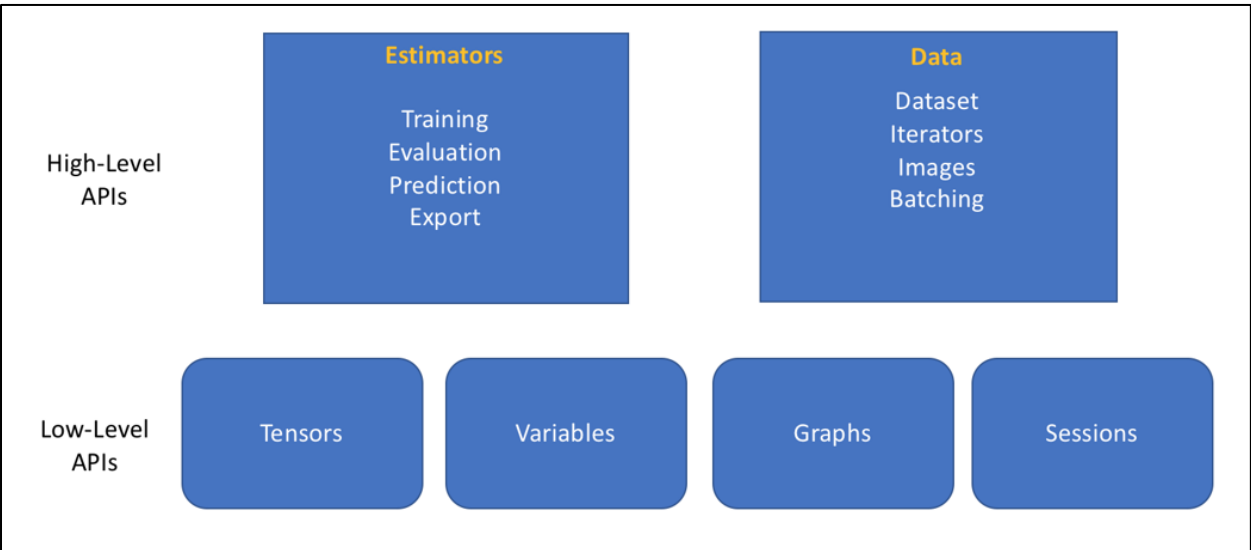
Chapter 6: Image Recognition with TensorFlow

	Continuous Output	Discrete Output
Supervised	<ul style="list-style-type: none">• Regression<ul style="list-style-type: none">- Linear- Ridge- Lasso- Isotonic• Decision Tree• RandomForest• GradientBoostedTree	<ul style="list-style-type: none">• Classification<ul style="list-style-type: none">- Logistic Regression- SVM- NaiveBayes• Decision Tree• RandomForest• GradientBoostedTree• K-NN
Unsupervised	<ul style="list-style-type: none">• Clustering<ul style="list-style-type: none">- KMeans- Gaussian Mixture• Dimensionality Reduction<ul style="list-style-type: none">- PCA- SVD	<ul style="list-style-type: none">• FP-Growth





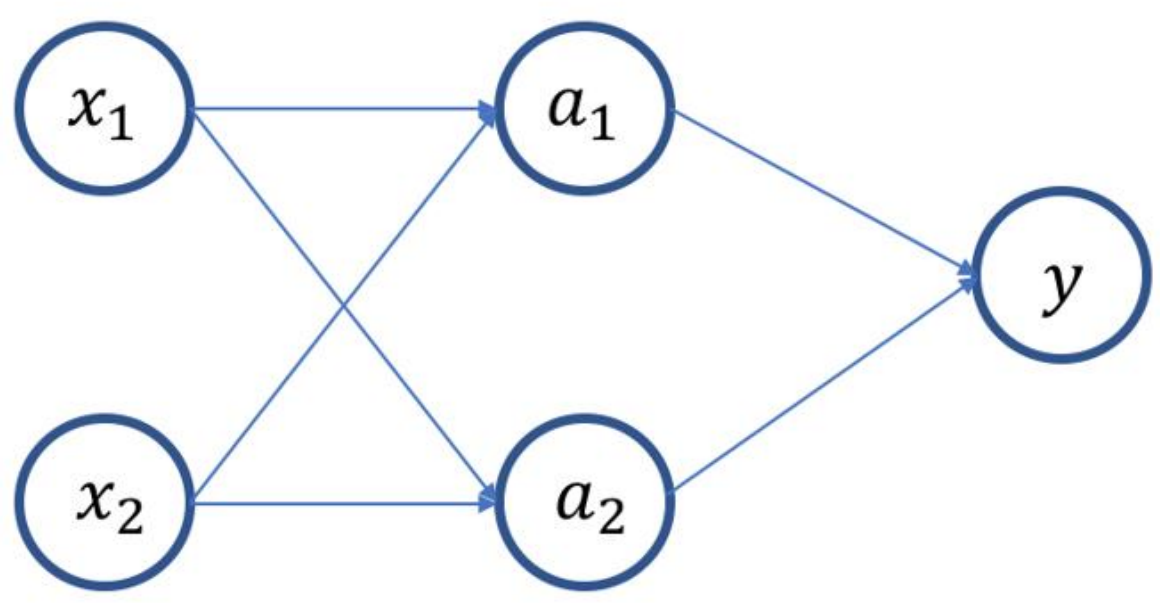




Input

$$X = \begin{bmatrix} 0 & 0 \\ 0 & 1 \\ 1 & 0 \\ 1 & 1 \end{bmatrix} * \theta = \begin{bmatrix} \theta_{10} & \theta_{20} \\ \theta_{11} & \theta_{21} \end{bmatrix}$$

Matrix of weights



Id	Name	Topic	Publisher
1	Car performance data	Transportation	IBM
2	Sample retail sales transactions, January 2009	Economy & Business	IBM Cloud Data Services
3	Total population by country	Society	IBM Cloud Data Services
4	GoSales Transactions for Naive Bayes Model	Leisure	IBM
5	Election results by County	Society	IBM
6	Million dollar home sales in Massachusetts, USA Feb 2017 through Jan 2018	Economy & Business	Redfin.com
7	Boston Crime data, 2-week sample	Society	City of Boston

Table

Showing 100 of 13557 rows

id	domestic	type	offense_description	district	nonviolent	source	updated	times
stance	0	3006	SICK/INJURED/MEDICAL - PERSON	E13	1	Boston	1476914401241	
t	0	802	ASSAULT SIMPLE - BATTERY	B2	1	Boston	1472940001293	
is	0	3301	VERBAL DISPUTE	B2	1	Boston	1477087201415	
	0	3410	TOWED MOTOR VEHICLE	B3	1	Boston	1473372001627	
ssault	0	423	ASSAULT - AGGRAVATED	B2	0	Boston	1472149593608	
ponse	0	3802	M/V ACCIDENT - PROPERTY DAMAGE	D14	1	Boston	1472940001290	
d	0	3207	PROPERTY - FOUND	D4	1	Boston	1480802401272	
ssault	0	423	ASSAULT - AGGRAVATED	C11	0	Boston	1480370401321	
	0	3410	TOWED MOTOR VEHICLE	A15	1	Boston	1477692001136	
roperty	0	3114	INVESTIGATE PROPERTY	A1	1	Boston	1475013600916	
ponse	0	3803	M/V ACCIDENT - PERSONAL INJURY	nan	1	Boston	1478383200907	

PixieDust: Bar Chart Options



Chart Title:

Fields: Show only numeric columns

Search/Filter Fields

X numeric

Y numeric

day_of_week string

desc string

district string

domestic numeric

incident_number string

month numeric

nonviolent numeric

Keys: ?

nonviolent



Values: ?

PixieDust will automatically use count aggregation for each key

Aggregation:

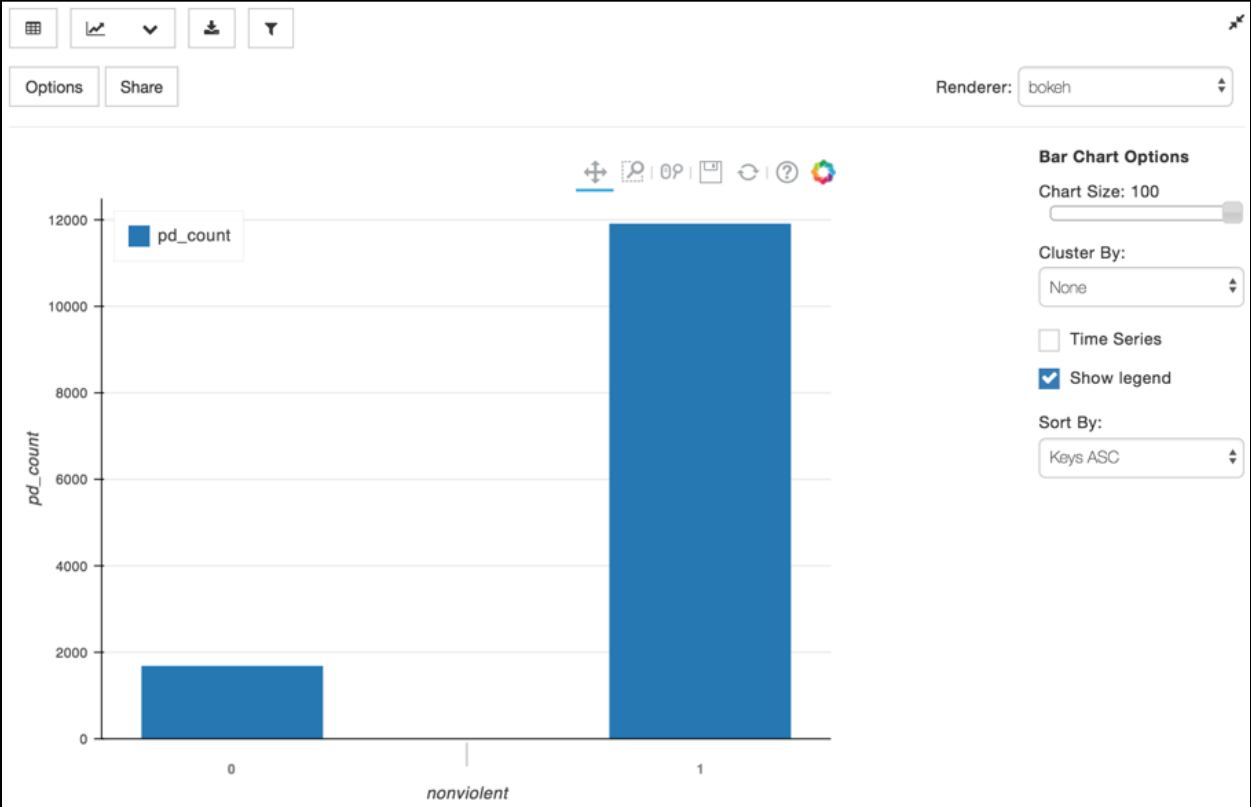
AVG

of Rows to Display:

100

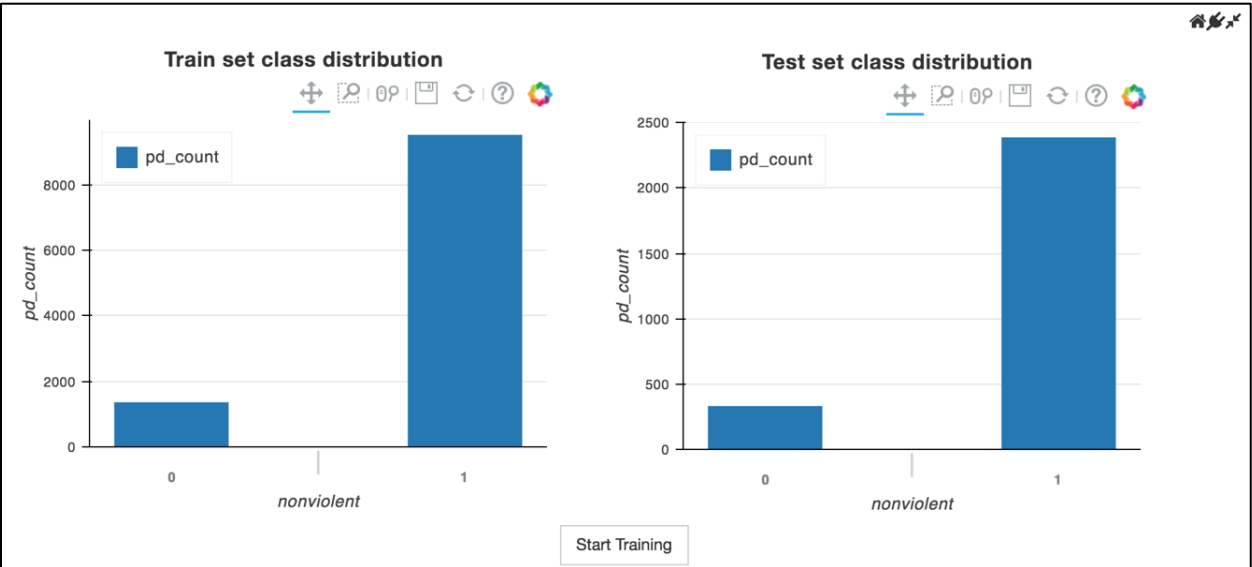
OK

Cancel



The classification model will be trained on all the numeric columns of the dataset

- ✓ Select a predictor column
- X
- Y
- streetcrime
- offense_code_group
- domestic
- type
- offense_description
- district
- nonviolent**
- source
- updated
- timestamp
- ucr_part
- reporting_area
- month
- occurred_on_date



Training completed successfully



Metric	Value
average_loss	740538200.0
prediction/mean	1.0
accuracy	0.8793803
accuracy_baseline	0.8793803
label/mean	0.8793803
global_step	1000
auc	0.5
auc_precision_recall	0.9396901
loss	71699960000.0

```
INFO:tensorflow:Running local_init_op.
INFO:tensorflow:Done running local_init_op.
INFO:tensorflow:Saving checkpoints for 1 into /var/folders/90/dnxs5rgn0c10n5vzdyw6vp0c0000gn/T/tmpma7q5lyq/model.ckpt.
INFO:tensorflow:step = 1, loss = 23589095000000.0
INFO:tensorflow:global_step/sec: 396.912
INFO:tensorflow:step = 101, loss = 177349030000.0 (0.254 sec)
INFO:tensorflow:global_step/sec: 542.39
INFO:tensorflow:step = 201, loss = 750203440000.0 (0.184 sec)
INFO:tensorflow:global_step/sec: 542.273
INFO:tensorflow:step = 301, loss = 228097110000.0 (0.184 sec)
INFO:tensorflow:global_step/sec: 547.028
```

Results for <https://geo.yahoo.com/b?s=792600534>:
[('nail', 0.034935154), ('screw', 0.03144558), ('puck, hockey puck', 0.03032596), ('envelope', 0.0285034), ('Band Aid', 0.027891463)]

Results for http://cl.staticflickr.com/6/5598/14934282524_344c84246b_n.jpg:
[('Egyptian cat', 0.4644194), ('tiger cat', 0.1485573), ('tabby, tabby cat', 0.09759513), ('plastic bag', 0.03814263), ('Siamese cat, Siamese', 0.033892646)]

Results for http://cl.staticflickr.com/4/3677/13545844805_170ec3746b_n.jpg:
[('tabby, tabby cat', 0.7330132), ('Egyptian cat', 0.14256532), ('tiger cat', 0.11719289), ('plastic bag', 0.0028653105), ('bow tie, bow-tie, bowtie', 0.00082955)]

Results for http://cl.staticflickr.com/6/5170/5372754294_db6acaale5_n.jpg:
[('Persian cat', 0.607673), ('Angora, Angora rabbit', 0.20204937), ('hamster', 0.02988311), ('Egyptian cat', 0.027227053), ('lynx, catamount', 0.018035706)]

Results for http://cl.staticflickr.com/6/5589/14818641818_b0058c0cfc_m.jpg:
[('Egyptian cat', 0.5786173), ('tabby, tabby cat', 0.27942237), ('tiger cat', 0.11966114), ('lynx, catamount', 0.016066141), ('plastic bag', 0.002206809)]

Results for http://cl.staticflickr.com/6/5036/5881933297_7974eaff82_n.jpg:
[('tiger cat', 0.26617262), ('tabby, tabby cat', 0.2417825), ('Persian cat', 0.18471399), ('lynx, catamount', 0.11543496), ('Egyptian cat', 0.025188642)]

Results for http://cl.staticflickr.com/3/2602/3977203168_b9d02a0233.jpg:
[('tabby, tabby cat', 0.75482476), ('tiger cat', 0.13780454), ('Egyptian cat', 0.05675489), ('Siamese cat, Siamese', 0.02073992), ('lynx, catamount', 0.010187127)]

Results for http://cl.staticflickr.com/8/7401/16393044637_72e93d96b6_n.jpg:
[('Egyptian cat', 0.67294717), ('tiger cat', 0.18149199), ('tabby, tabby cat', 0.0952419), ('lynx, catamount', 0.025225954), ('candle, taper, wax light', 0.003860443)]

Results for http://cl.staticflickr.com/9/8110/8594699278_dd256c10fd_m.jpg:
[('tabby, tabby cat', 0.5829553), ('Egyptian cat', 0.15930973), ('tiger cat', 0.12964381), ('lynx, catamount', 0.11114485), ('plastic bag', 0.006467772)]

Results for http://cl.staticflickr.com/8/7023/6581178955_7e23af8bf9_m.jpg:
[('tabby, tabby cat', 0.28574014), ('Egyptian cat', 0.190615), ('plastic bag', 0.17165014), ('lynx, catamount', 0.101593874), ('tiger cat', 0.040527806)]



- **Egyptian cat:** 0.4644194
- **tiger cat:** 0.1485573
- **tabby, tabby cat:** 0.09759513
- **plastic bag:** 0.03814263
- **Siamese cat, Siamese:** 0.033892646



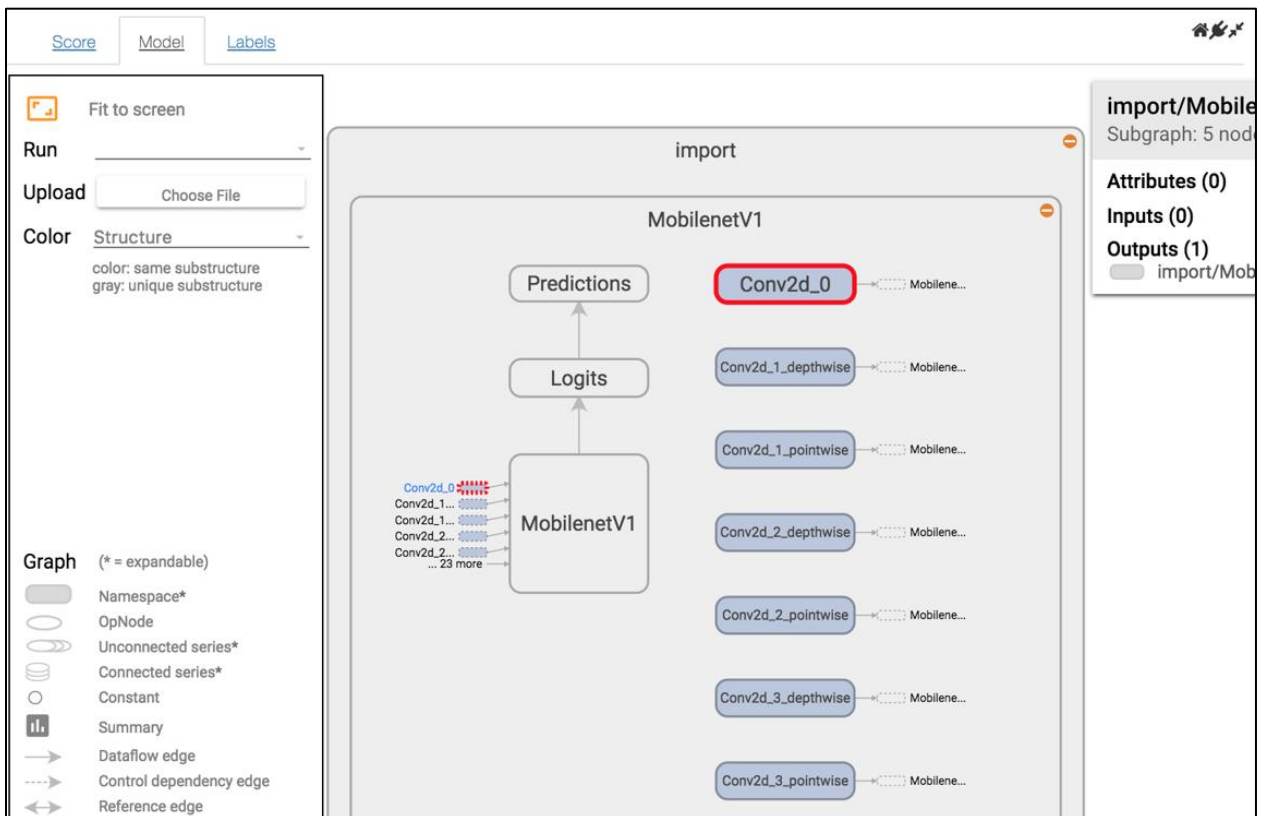
- **tabby, tabby cat:** 0.7330132
- **Egyptian cat:** 0.14256532
- **tiger cat:** 0.11719289
- **plastic bag:** 0.0028653105
- **bow tie, bow-tie, bowtie:** 0.00082955



- **Persian cat:** 0.607673
- **Angora, Angora rabbit:** 0.20204937
- **hamster:** 0.02988311
- **Egyptian cat:** 0.027227053
- **lynx, catamount:** 0.018035706



- **Egyptian cat:** 0.5786173
- **tabby, tabby cat:** 0.27942237
- **tiger cat:** 0.11966114
- **lynx, catamount:** 0.016066141
- **plastic bag:** 0.002206809



[Score](#)[Model](#)[Labels](#)

Showing 1001 of 1001 rows

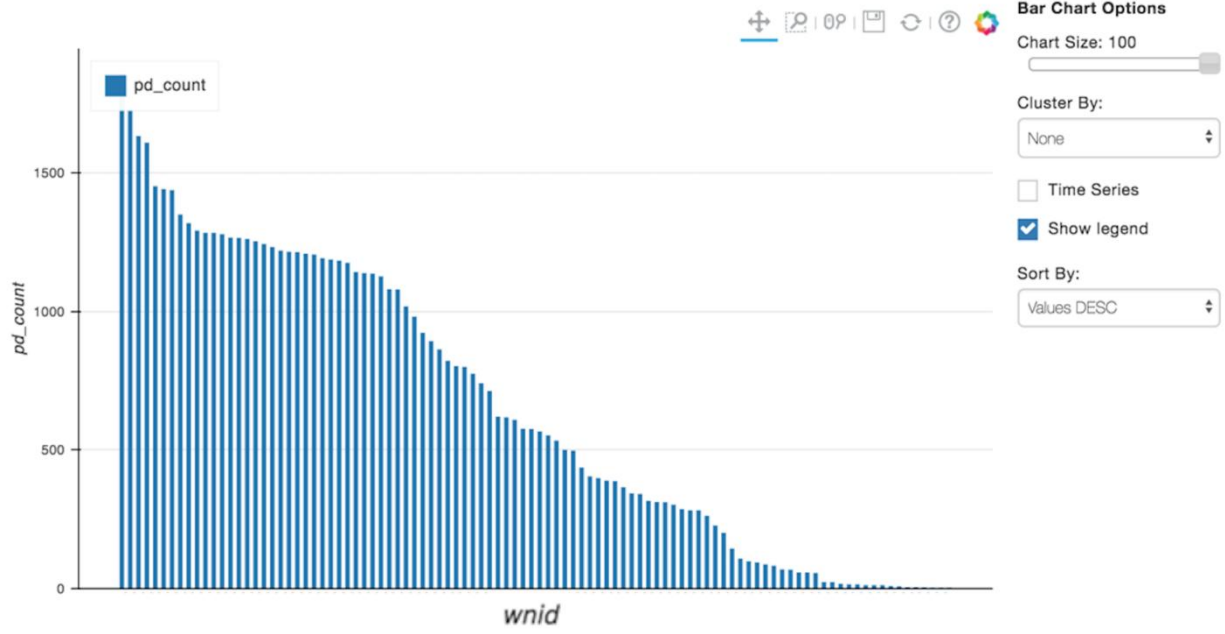
index	label
0	background
1	tench, Tinca tinca
2	goldfish, Carassius auratus
3	great white shark, white shark, man-eater, man-eating shark, Carcharodon carcharias
4	tiger shark, Galeocerdo cuvieri
5	hammerhead, hammerhead shark
6	electric ray, crampfish, numbfish, torpedo
7	stingray
8	cock
9	hen
10	ostrich, Struthio camelus
11	brambling, Fringilla montifringilla
12	goldfinch, Carduelis carduelis
13	house finch, linnet, Carpodacus mexicanus
14	junco, snowbird
15	indigo bunting, indigo finch, indigo bird, Passerina cyanea
16	robin, American robin, Turdus migratorius
17	bulbul
18	jay
19	magpie

```
1 import pixiedust
2 display(wnid_to_urls)
```

Grid, Line, Bar, Download, Filter icons

Options Share

Renderer: bokeh



Score Model Labels

Select a model to display: MobileNet Custom

Fit to screen

Run

Upload Choose File

Color Structure

color: same substructure
gray: unique substructure

Graph (* = expandable)

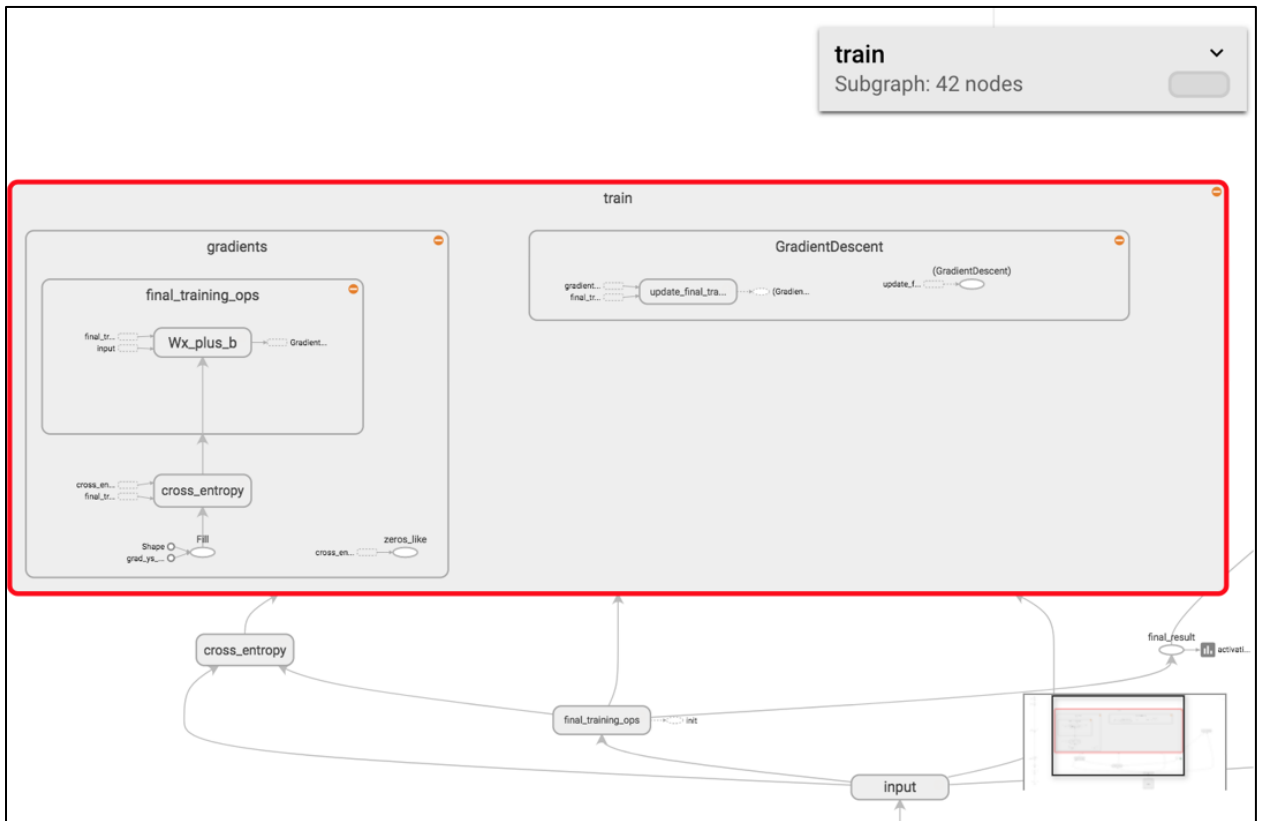
- Namespace*
- OpNode
- Unconnected series*
- Connected series*
- Constant
- Summary
- Dataflow edge
- Control dependency edge
- Reference edge

input
Subgraph: 2 nodes

Attributes (0)

Inputs (1)
import

Outputs (4)
final_training
cross_entropy
train
accuracy



Score Model Labels

Select a model to display: MobileNet Custom

Search table

Showing 4 of 4 rows

index	label
0	apple
1	banana
2	orange
3	pear



mobilenet

- tennis ball: 0.13539861
- pill bottle: 0.076574124
- flagpole, flagstaff: 0.04011826
- digital clock: 0.03465906
- ping-pong ball: 0.028417857

custom

- apple: 0.2542891
- pear: 0.25327364
- banana: 0.25127187
- orange: 0.24116533

mobilenet

- nail: 0.034935154
- screw: 0.03144558
- puck, hockey puck: 0.03032596
- envelope: 0.0285034
- Band Aid: 0.027891463

custom

- orange: 0.25914687
- pear: 0.2566236
- banana: 0.25299639
- apple: 0.23123315



mobilenet

- hermit crab: 0.18837029
- leaf beetle, chrysomelid: 0.1475566
- tick: 0.10854873
- isopod: 0.09526852
- plate rack: 0.06880734

custom

- banana: 0.26398942
- pear: 0.2596709
- orange: 0.24081315
- apple: 0.23552652



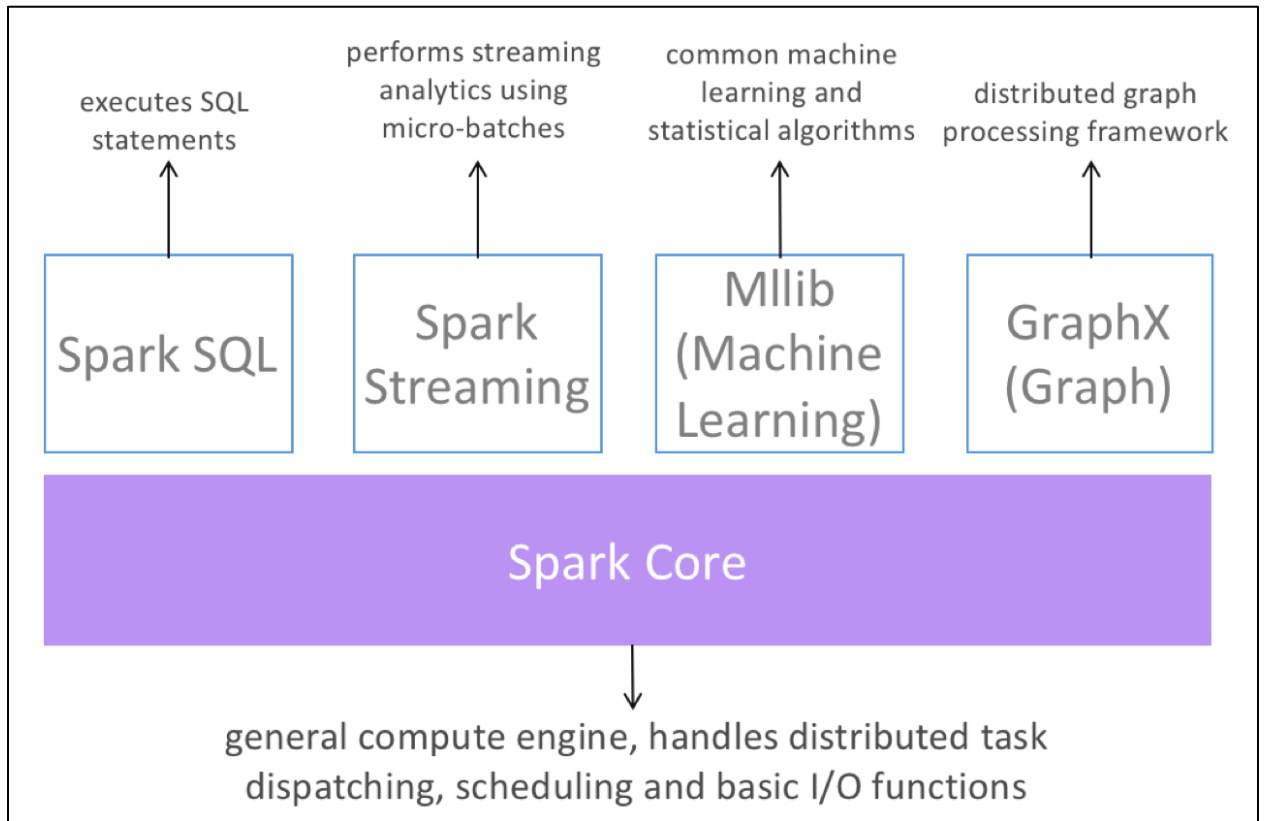
mobilenet

- banana: 0.97425306
- orange: 0.01109866
- mixing bowl: 0.005623936
- mortar: 0.0017813725
- lemon: 0.0013110363

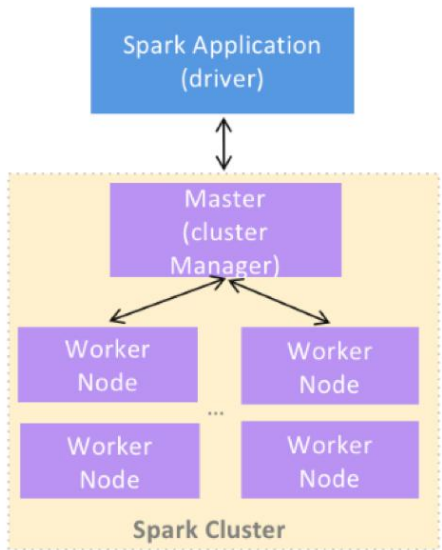
custom

- banana: 0.259731
- apple: 0.25198358
- pear: 0.24437287
- orange: 0.24391253

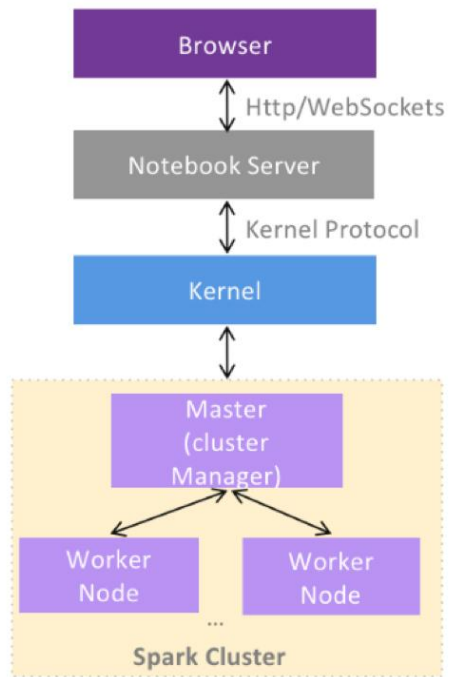
Chapter 7: Big Data Twitter Sentiment Analysis



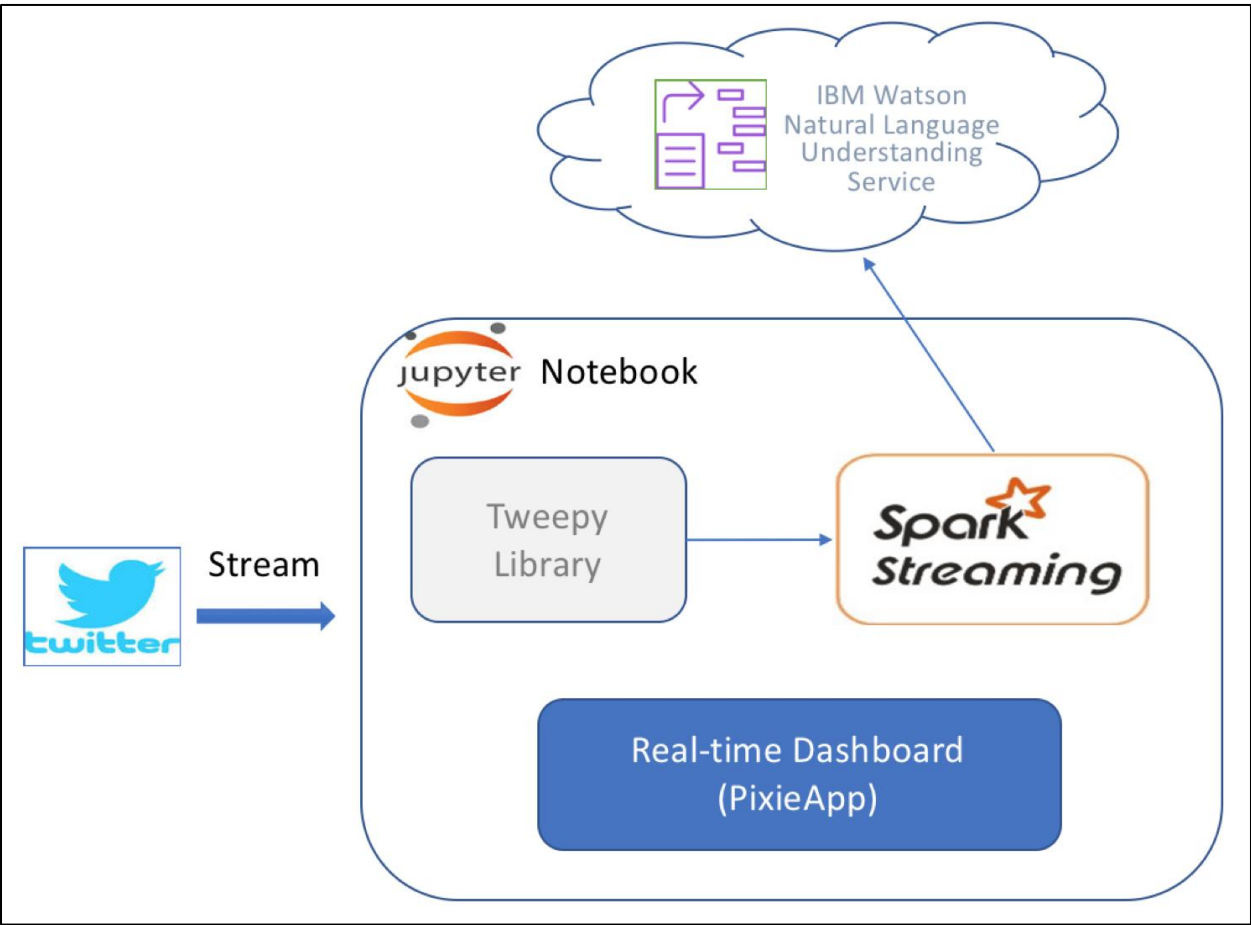
Batch Job (Spark-Submit)

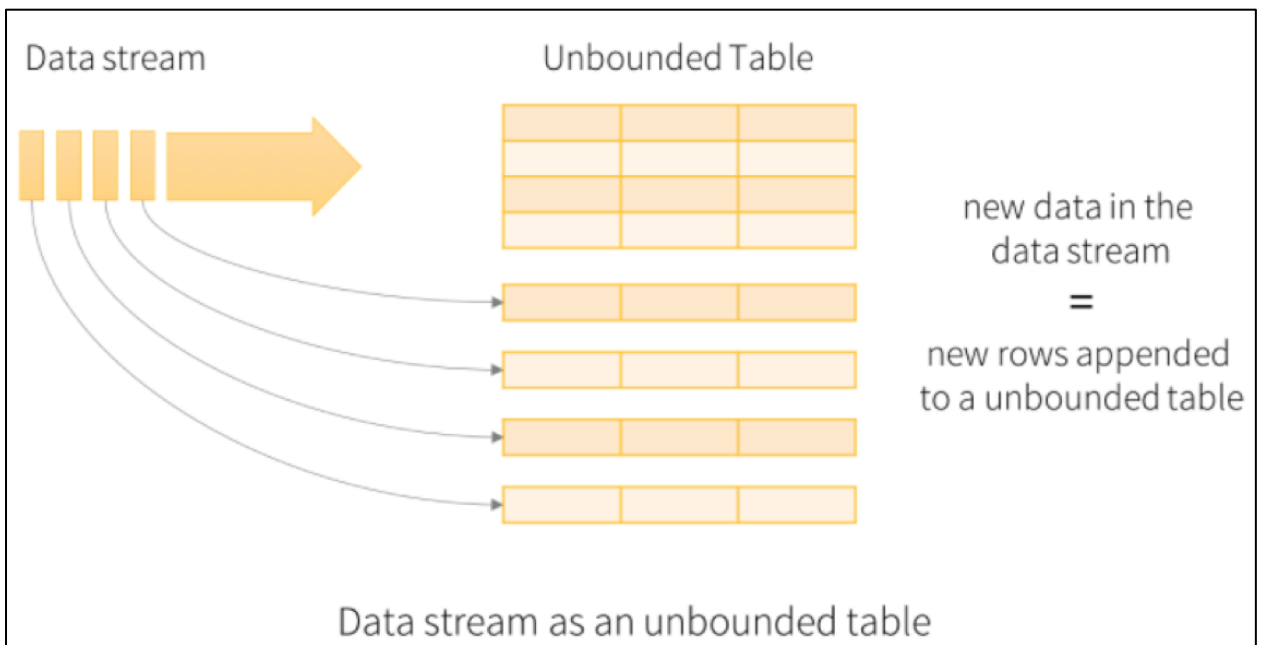
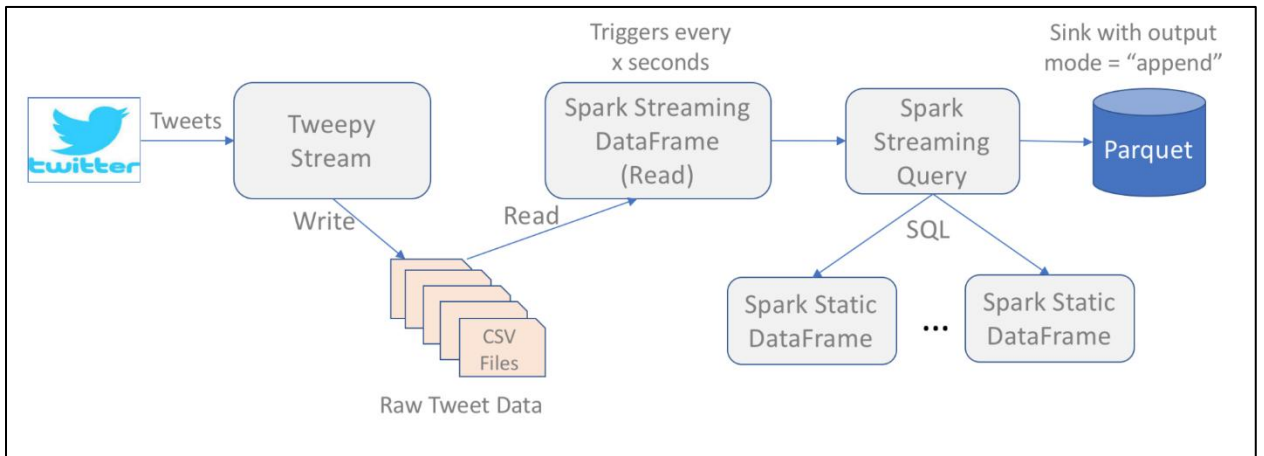


Interactive Notebook



- RDD Partitioning
- Task packaging and dispatching
- Worker node scheduling





PixieDust: Bar Chart Options



Chart Title:

Top 10 sources of tweets

Fields:

Show only numeric columns

Keys: ?

Search/Filter Fields

created_at *date/time*

source *string*

text *string*

source x

Values: ?

PixieDust will automatically use count aggregation for each key

Aggregation:

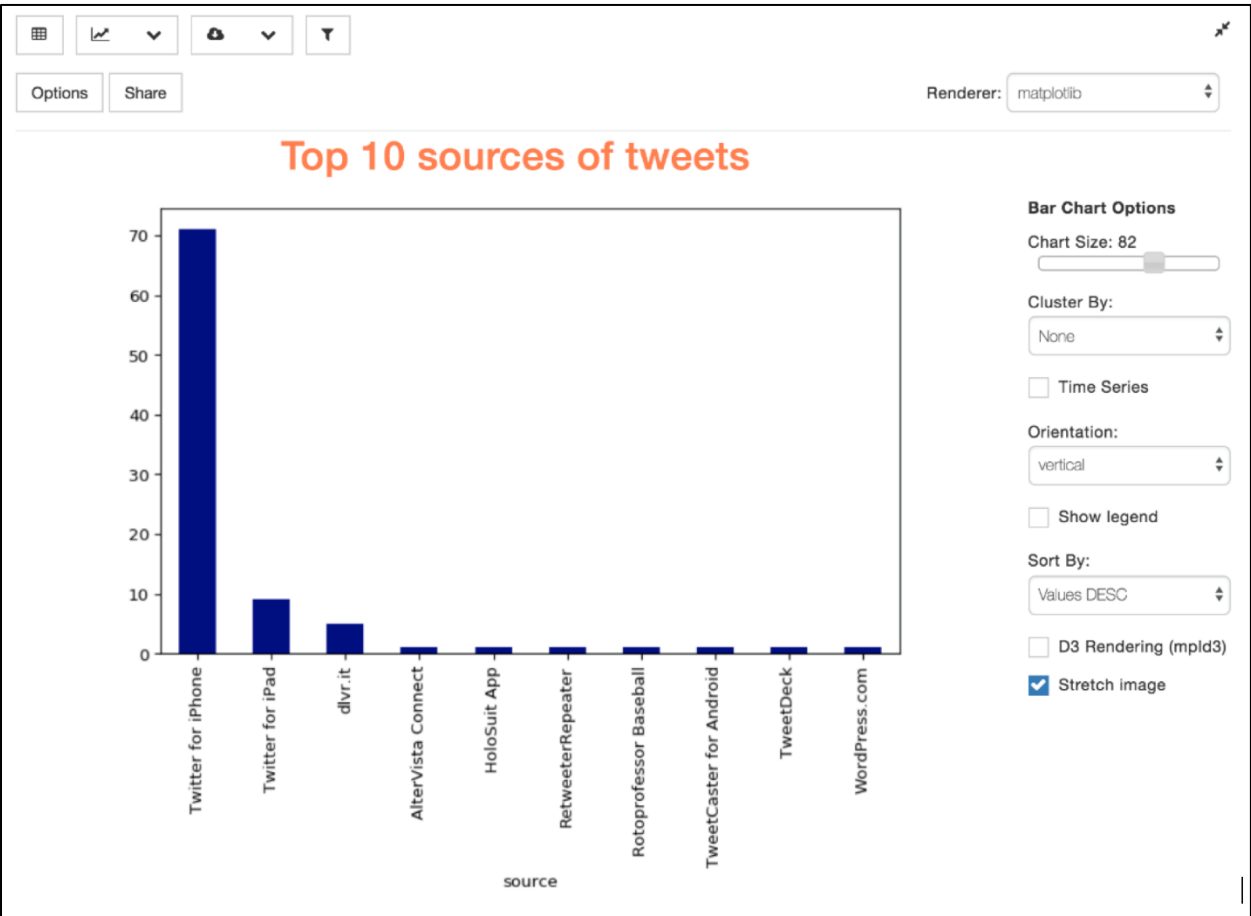
AVG


of Rows to Display:

10

OK

Cancel



 **Natural Language Understanding**

Platform

Watson

Build cognitive apps that help enhance, scale, and accelerate human expertise.



Knowledge Studio

Build custom models to teach Watson the language of your domain.

IBM



Natural Language Understanding

Analyze text to extract meta-data from content such as concepts,

Lite

IBM

Watson /

Natural Language Understanding-ho

Location: US South Org: david_taieb@us.ibm.com Space: dev

Service credentials

Credentials are provided in JSON format. The JSON snippet lists credentials, such as the API key and secret, as well as connection information for the service.

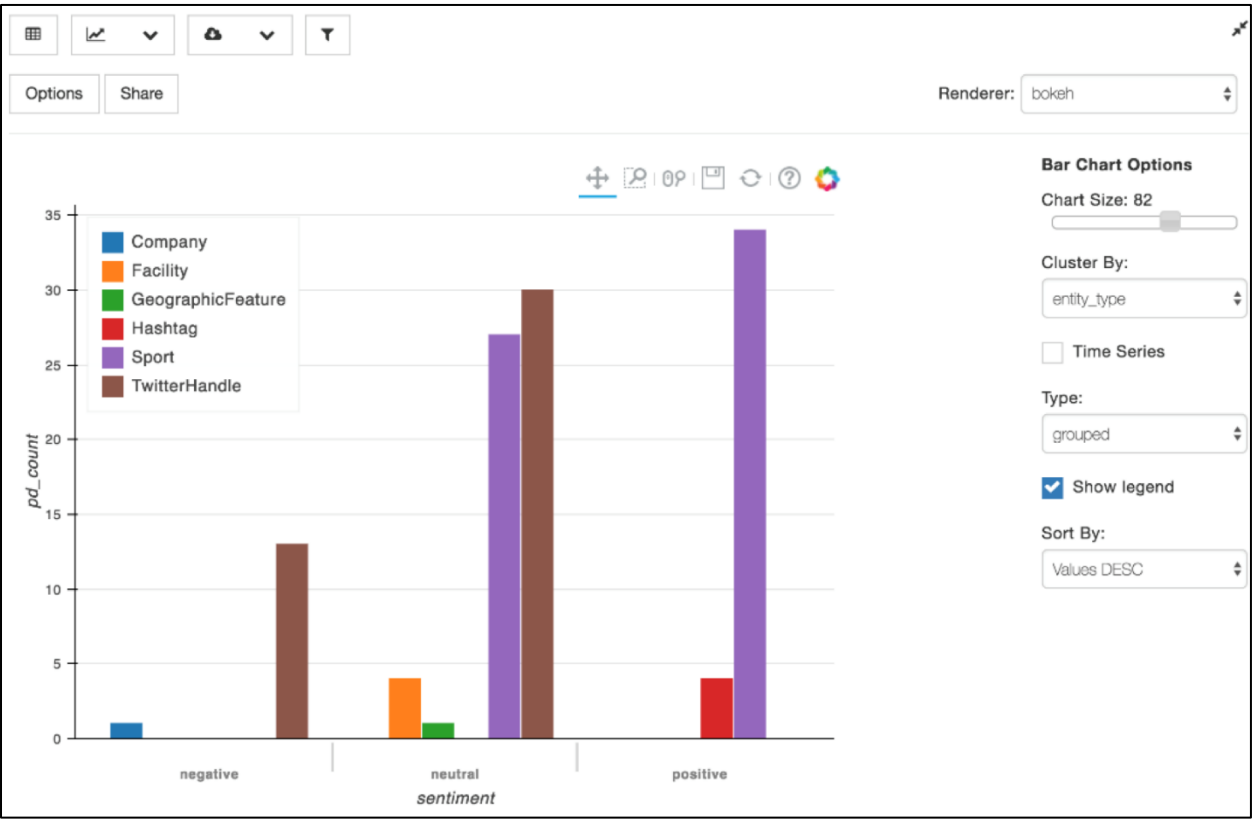
[View More](#)

Service credentials New credential +

10 Items per page | 1-1 of 1 items 1 of 1 pages < 1 >

<input type="checkbox"/> KEY NAME	DATE CREATED	ACTIONS
<input type="checkbox"/> Credentials-1	Apr 13, 2018 - 10:50:35	View credentials ▲

```
{
  "url": "https://gateway.watsonplatform.net/natural-language-understanding/api",
  "username": " ",
  "password": " "
}
```





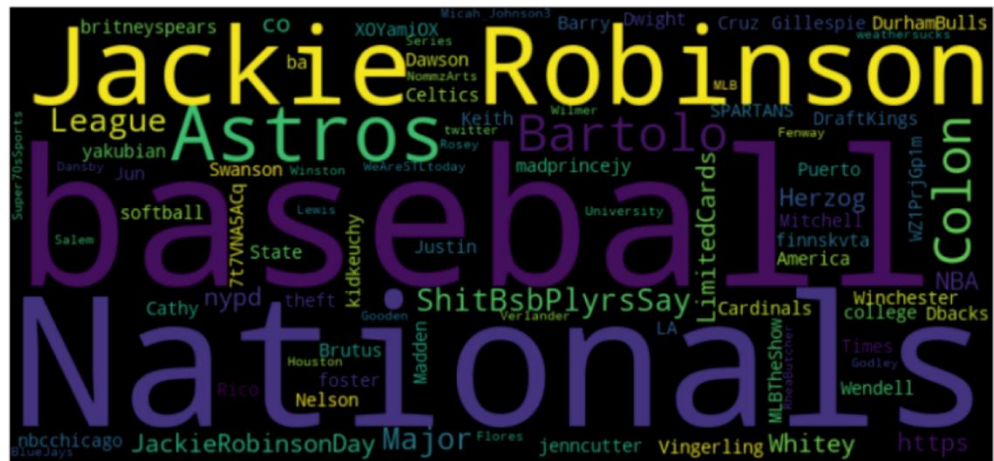
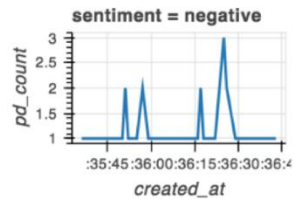
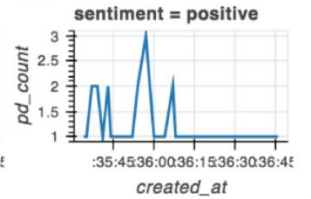
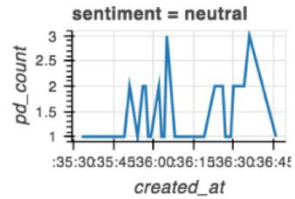
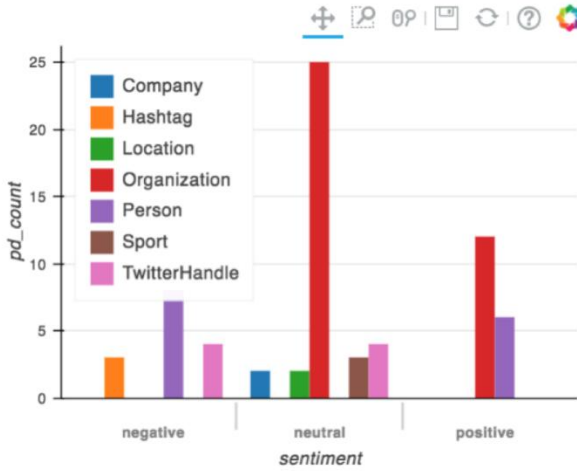
Enter a search query (e.g. baseball)

Go

Tweets Insights

Streaming Queries

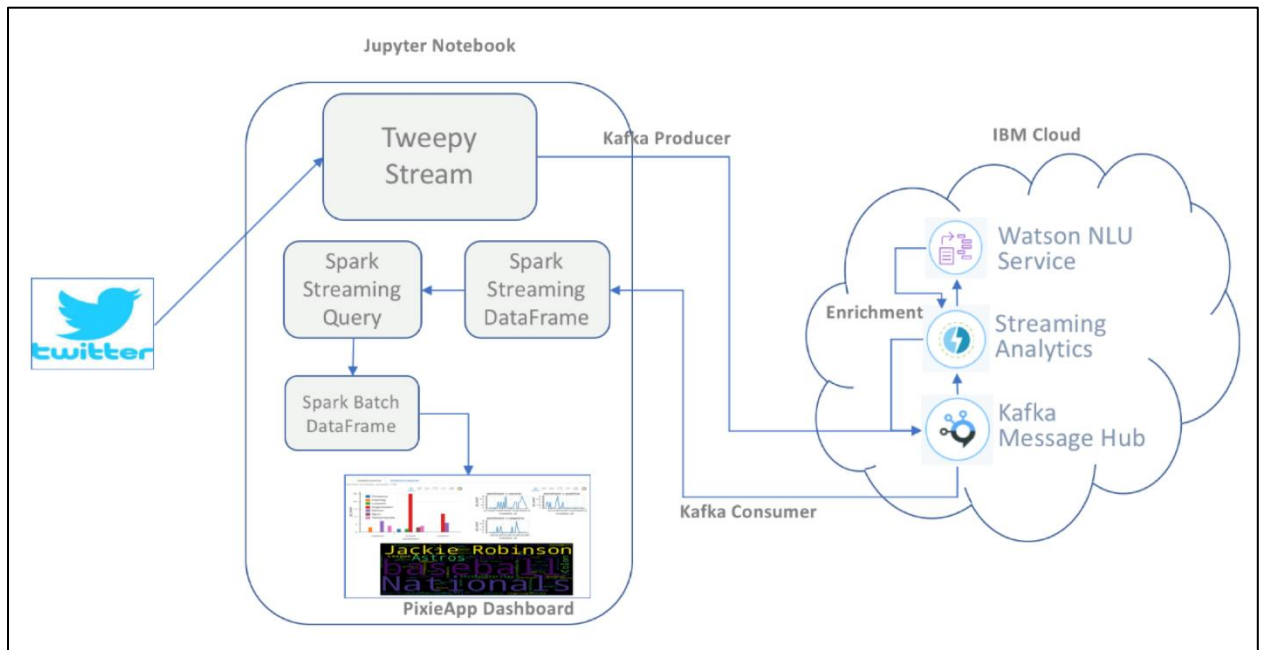
Number of tweets received: 135





Progress Report for Spark Stream: 2646f75f-4a13-44b5-a7aa-25e4047bd749

metric	value
timestamp	2018-04-15T19:41:02.005Z
batchId	19
sink	{'description': 'FileSink[/Users/dtaieb/cdsdev/notebookdev/Pixiedust/book/Chapter7/output/output_parquet]'}
sources	[{'description': 'FileStreamSource[file:/Users/dtaieb/cdsdev/notebookdev/Pixiedust/book/Chapter7/output/raw]', 'processedRowsPerSecond': 0.0, 'endOffset': {'logOffset': 18}, 'startOffset': {'logOffset': 18}, 'inputRowsPerSecond': 0.0, 'numInputRows': 0}]
stateOperators	[]
processedRowsPerSecond	0.0
durationMs	{'getOffset': 6, 'triggerExecution': 6}
runId	795f576c-2a5e-42b5-88eb-2b3aB48c55a7
inputRowsPerSecond	0.0
numInputRows	0
id	2646f75f-4a13-44b5-a7aa-25e4047bd749
name	None



Application Services / **Message Hub-y8**

Location: US South Org: david_taleb@us.ibm.com Space: dev

Credentials are provided in JSON format. The JSON snippet lists credentials, such as the API key and secret, as well as connection information for the service. [View More](#)

Service credentials New credential +

10 Items per page | 1-2 of 2 items 1 of 1 pages

KEY NAME	DATE CREATED	ACTIONS
<input type="checkbox"/> Credentials-1	Apr 16, 2018 - 12:12:17	View credentials ▲ Copy


```












{
  "instance_id": "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
  "mqlight_lookup_url": "https://mqlight-lookup-prod02.messagehub.services.us-south.bluemix.net/Lookup?serv
iceId=xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
  "api_key": "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
  "kafka_admin_url": "https://kafka-admin-prod02.messagehub.services.us-south.bluemix.net:443",
  "kafka_rest_url": "https://kafka-rest-prod02.messagehub.services.us-south.bluemix.net:443",
  "kafka_brokers_sasl": [














```


Associated services + Add service

NAME	SERVICE TYPE	PLAN	ACTIONS
streaming-analytics-twitter-sentiment	Streaming Analytics		⋮











Search 


          

NODES	ASSETS
 SOURCES 	
 TARGETS 	
 PROCESSING AND ANALY... 	
 Aggregation	
 Python Machine Learning	
 Code	
 Filter	
 Geofence	
 ALERTS 	



```
graph LR; A[Source Message] --> B[Enrichment]; B --> C[Target Message]
```

Attribute Name*	Type*	Path* 	 Add Attribute
<input type="text" value="created_at"/>	<input type="text" value="Text"/> 	<input type="text" value="/created_at"/>	  
<input type="text" value="source"/>	<input type="text" value="Text"/> 	<input type="text" value="/source"/>	  

 Hide Preview

Formatted Stream Data	Raw Stream Data	
CREATED_AT	SOURCE	TEXT
Mon Apr 16 2...	Twitter for An...	RT @RealKen...
Mon Apr 16 2...	Twitter for An...	RT @baseball...
Mon Apr 16 2...	Twitter for iPh...	RT @holly_hu...

Settings

General

Environment

Streaming Analytics service*

streaming-analytics-oj



Python packages

Preinstalled packages

alabaster (0.7.8)
anaconda-client (1.4.0)
anaconda-navigator (1.2.1)
argcomplete (1.0.0)
astropy (1.2.1)
Babel (2.3.3)
backports.shutil-get-terminal-size (1.0.0)



























User-installed packages



watson_developer_cloud

Add

Attribute Name*	Type*	⊕ Add Attribute
created_at	Text 	  
source	Text 	  
text	Text 	  
sentiment	Text 	  
entity	Text 	  
entity_type	Text 	  

Use Incoming Schema

Save

Cancel

Twitter Sentiment
Status: running

Shows the events payload before they are processed by the code operator

Shows the events payload enriched with sentiment and entity after they are processed by the code operator

Flow of Events Message Hub → Code
Last Updated: 16 Jun 2018, 7:22:06 PM

CREATED_AT	SOURCE	TEXT
Sat Jun 16 23...	Twitter for An...	RT @andrewe...
Sat Jun 16 23...	Twit Analysis ...	RT @cballpro...
Sat Jun 16 23...	IFTTT	'Giants' Long...

Twitter Sentiment Ingest Rate
Events per Second

Message Hub Throughput
Events per Second

Flow of Events Code → Message Hub
Last Updated: 16 Jun 2018, 7:22:06 PM

CREATED_AT	SOURCE	TEXT	SENTIMENT	ENTITY	ENTITY_TY
Sat Jun 16 23...	Twitter for An...	RT @andrewe...	negative	University of ...	Organizatio
Sat Jun 16 23...	Twit Analysis ...	RT @cballpro...	negative	@cballproduct	TwitterHan
Sat Jun 16 23...	IFTTT	'Giants' Longo...	neutral	Longoria	Person

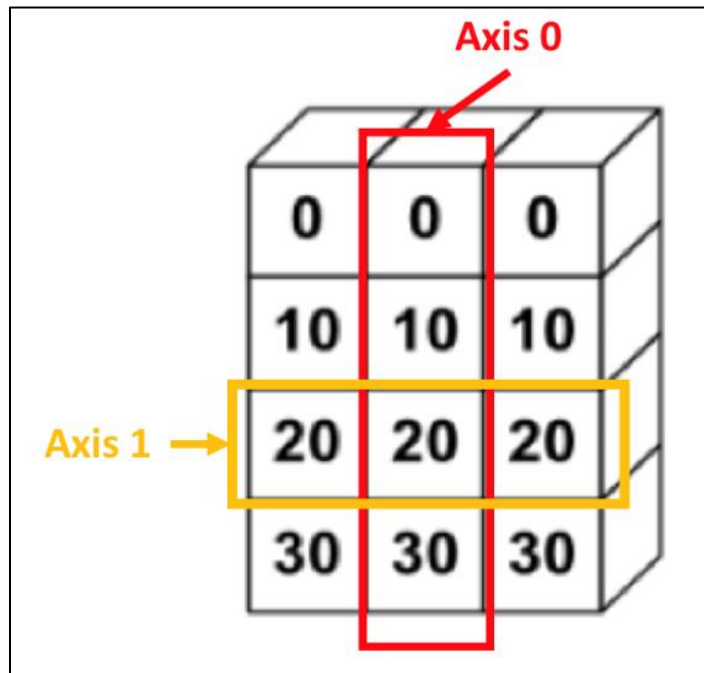
Chapter 8: Financial Time Series Analysis and Forecasting

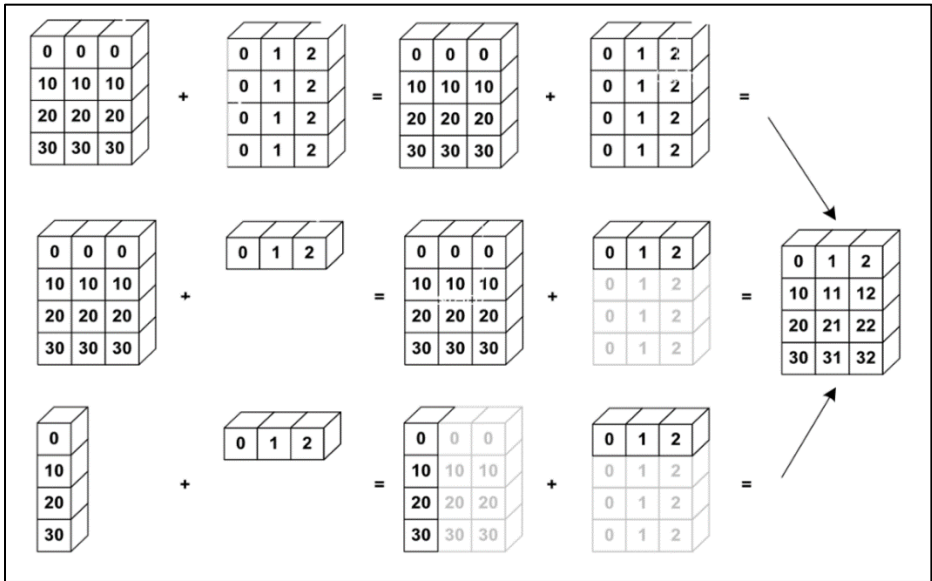
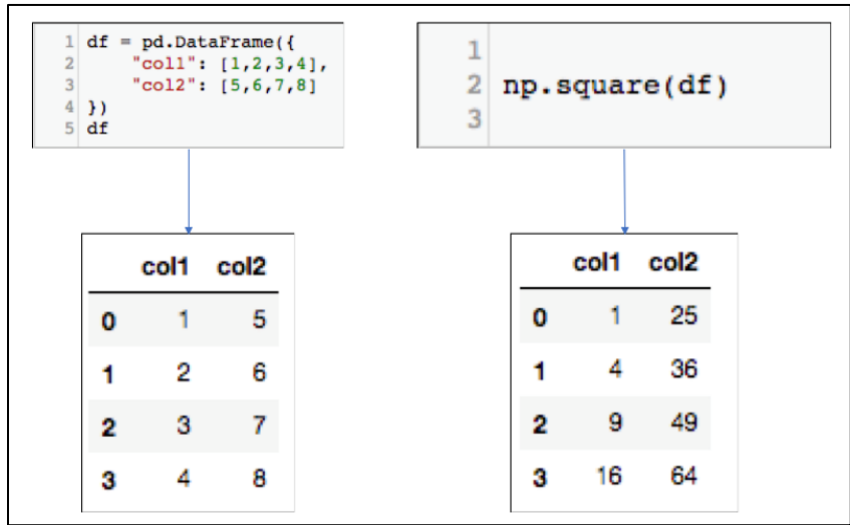
```
1 np.average
```

Signature: `np.average(a, axis=None, weights=None, returned=False)`
Docstring:
Compute the weighted average along the specified axis.

Parameters

a : `array_like`
Array containing data to be averaged. If `a` is not an array, a conversion is attempted.
axis : `None` or `int` or `tuple of ints`, optional





🏠
📊
▼
⌵
✖

Filter:

datasets_count
=
Enter value
Apply
Clear

▼ **Statistics: datasets_count**

Summary	Frequents
count	274
mean	43817.33
std	186996.33
min	0.00
max	1580736.00

Options
Share

Schema

Table

Showing 274 of 274 rows

database_code	datasets_count	description	downloads	favorite	id	image
BUNDESBANK	49358	Data on the German economy, money and capital markets, public finances, banking, households, Euro-area aggregates, trade and external debt.	43209922	False	231	https://quandl-prod...
URC	27	Advance and decline data for the NYSE, AMEX, and NASDAQ stock exchanges. From various publicly-available sources	215032	False	382	http://d360wc4uc6n...

Table View Options

Hide Schema

Hide Search

Hide Row Count

Show Rows: 🟡

All

Schema

Table

stock New York

Showing 1 of 274 rows

database_code	datasets_count	description	downloads	favorite	id	image
XNYS	29891	Professional-grade EOD stock prices, dividends, adjustments and splits for all New York Stock Exchange stocks. Updated daily. History to 2007. Data from Exchange Data International.	77549929	False	15066	https://quandl-production-data-upload.s3.amazonaws.com/yjlc

Table View Options

- Hide Schema
- Hide Search
- Hide Row Count

Show Rows: 🔍

All ⌵

Schema	
Table	
Search table	
Showing 3198 of 3198 rows	
WIKI/AAPL	Apple Inc (AAPL) Prices, Dividends, Splits and Trading Volume
WIKI/ABC	AmerisourceBergen Corp. (ABC) Prices, Dividends, Splits and Trading Volume
WIKI/AA	Alcoa Inc. (AA) Prices, Dividends, Splits and Trading Volume
WIKI/ABBV	AbbVie Inc. (ABBV) Prices, Dividends, Splits and Trading Volume
WIKI/ACE	ACE Ltd (ACE) Prices, Dividends, Splits and Trading Volume
WIKI/AGN	Allergan Inc. (AGN) Prices, Dividends, Splits and Trading Volume
WIKI/ADP	Automatic Data Processing Inc. (ADP) Prices, Dividends, Splits and Trading Volume
WIKI/ADSK	Autodesk Inc. (ADSK) Prices, Dividends, Splits and Trading Volume
WIKI/ABT	Abbott Laboratories (ABT) Prices, Dividends, Splits and Trading Volume
WIKI/AEE	Ameren Corp. (AEE) Prices, Dividends, Splits and Trading Volume
WIKI/ACN	Accenture plc (ACN) Prices, Dividends, Splits and Trading Volume
WIKI/AEP	American Electric Power Company (AEP) Prices, Dividends, Splits and Trading Volume
WIKI/ADBE	Adobe Systems Incorporated (ADBE) Prices, Dividends, Splits and Trading Volume
WIKI/AET	Aetna Inc. (AET) Prices, Dividends, Splits and Trading Volume
WIKI/ADI	Analog Devices Inc. (ADI) Prices, Dividends, Splits and Trading Volume
WIKI/ADM	Archer Daniels Midland Co. (ADM) Prices, Dividends, Splits and Trading Volume
WIKI/ADS	Alliance Data Systems Corp. (ADS) Prices, Dividends, Splits and Trading Volume
WIKI/AIV	Apartment Investment & Management Co. (AIV) Prices, Dividends, Splits and Trading Volume
WIKI/ADT	ADT Corp (ADT) Prices, Dividends, Splits and Trading Volume
WIKI/ALL	Allstate Corp. (ALL) Prices, Dividends, Splits and Trading Volume
WIKI/AES	AES Corp. (AES) Prices, Dividends, Splits and Trading Volume
WIKI/ALTR	Altera Corporation (ALTR) Prices, Dividends, Splits and Trading Volume
WIKI/ALXN	Alexion Pharmaceuticals Inc. (ALXN) Prices, Dividends, Splits and Trading Volume
WIKI/AFL	American Family Life Assurance Co. of Columbus (AFL) Prices, Dividends, Splits and Trading Volume

Table View Options

- Hide Schema
- Hide Search
- Hide Row Count

Show Rows: 0

All

PixieDust: Line Chart Options

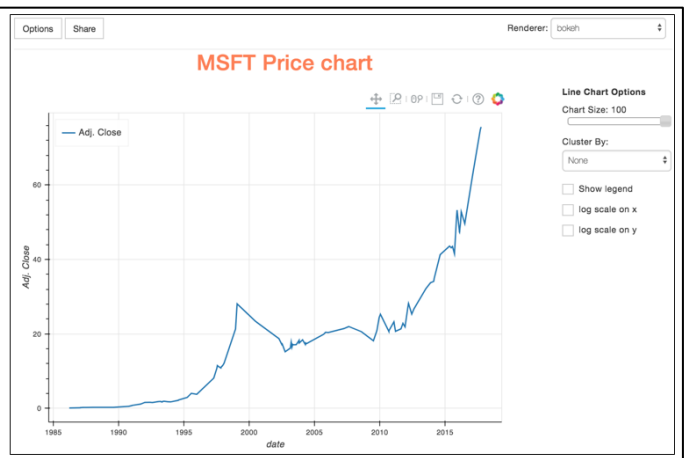
Chart Title: MSFT Price chart

Fields: Show only numeric columns

Field	Type
Adj. Close	numeric
Adj. High	numeric
Adj. Low	numeric
Adj. Open	numeric
Adj. Volume	numeric
Close	numeric
Ex-Dividend	numeric
High	numeric
Low	numeric

Aggregation: AVG # of Rows to Display: 100

OK Cancel



PixieDust: Line Chart Options

Chart Title: Daily Spread

Fields: Show only numeric columns

Adj. Close	numeric
Adj. High	numeric
Adj. Low	numeric
Adj. Open	numeric
Adj. Volume	numeric
Close	numeric
Date	date/time
Ex-Dividend	numeric
High	numeric

Keys: **Q**

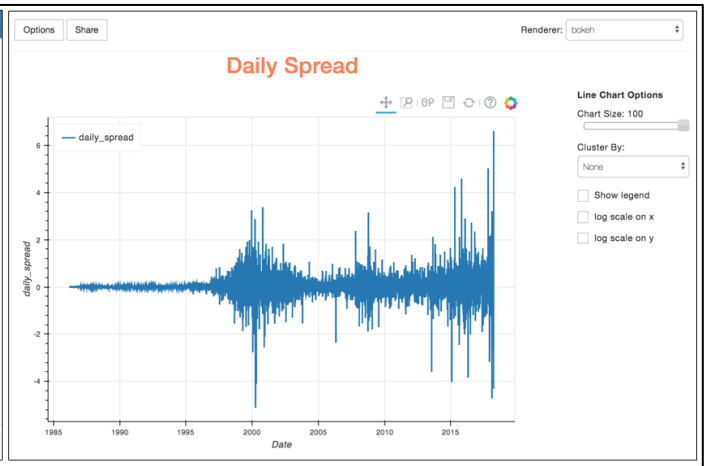
Date

Values: **Q**

daily_spread

Aggregation: AVG # of Rows to Display: 10000

OK Cancel



PixieDust: Line Chart Options

Chart Title: Hypothetical portfolio growth

Fields: Show only numeric columns

Date	date/time
daily_spread	numeric

Keys: **Q**

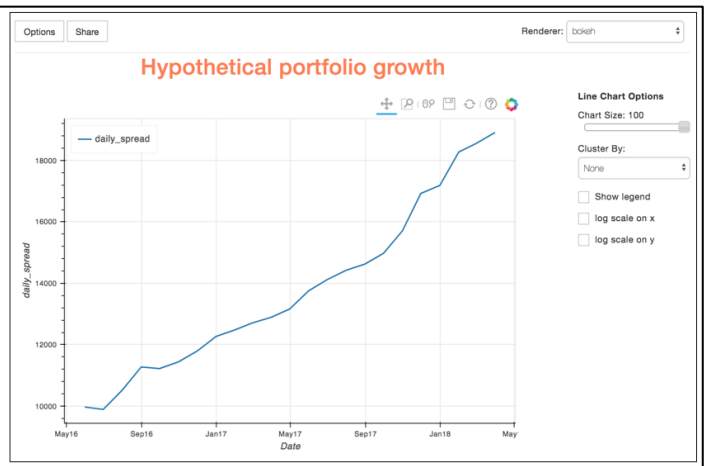
Date

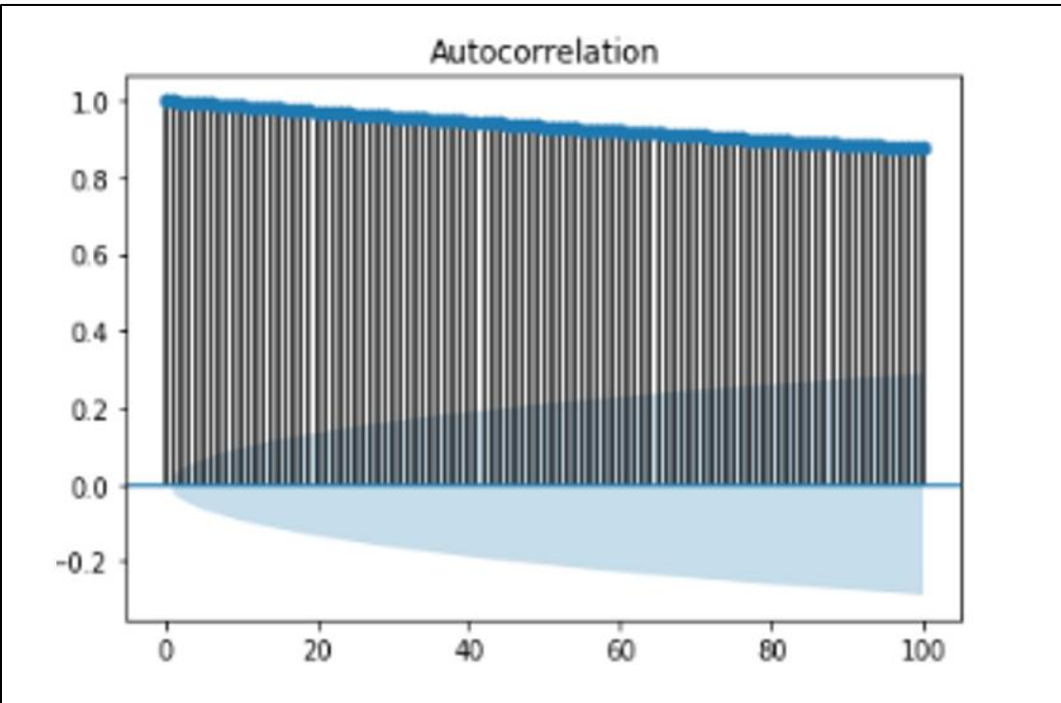
Values: **Q**

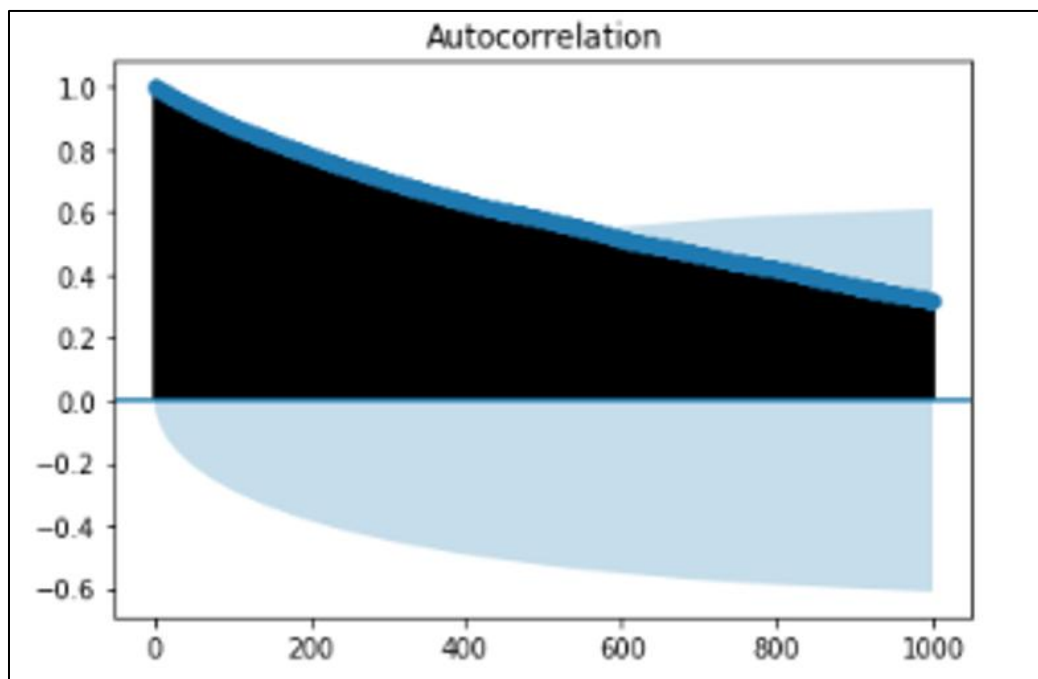
daily_spread

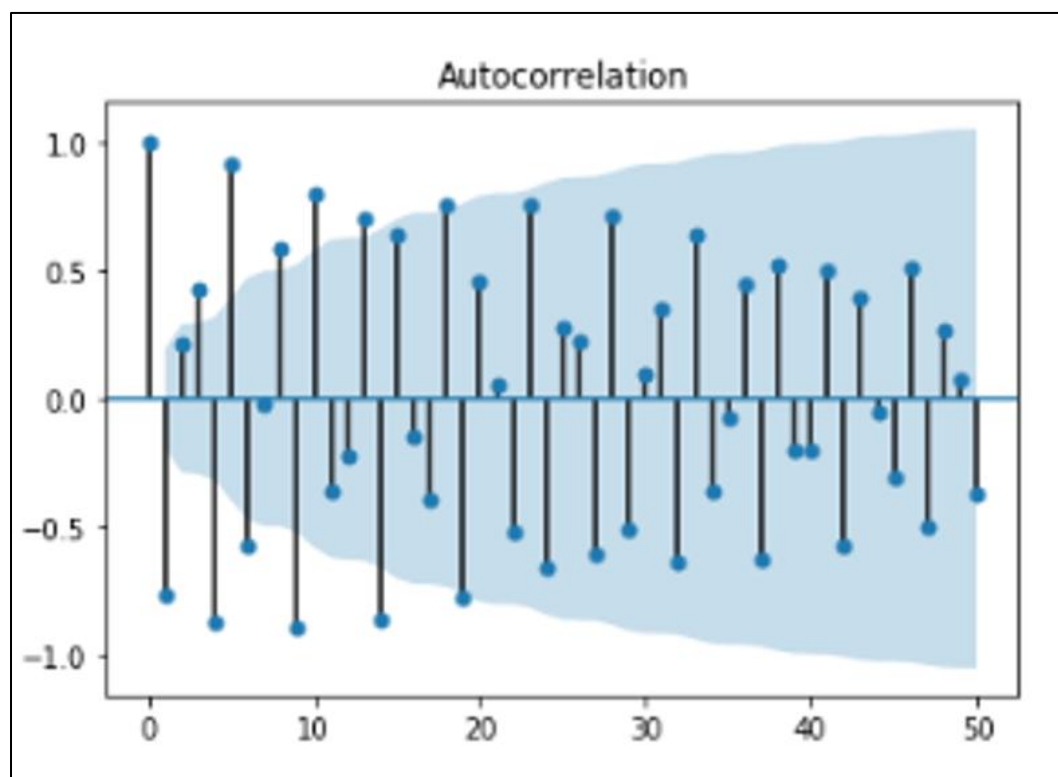
Aggregation: AVG # of Rows to Display: 10000

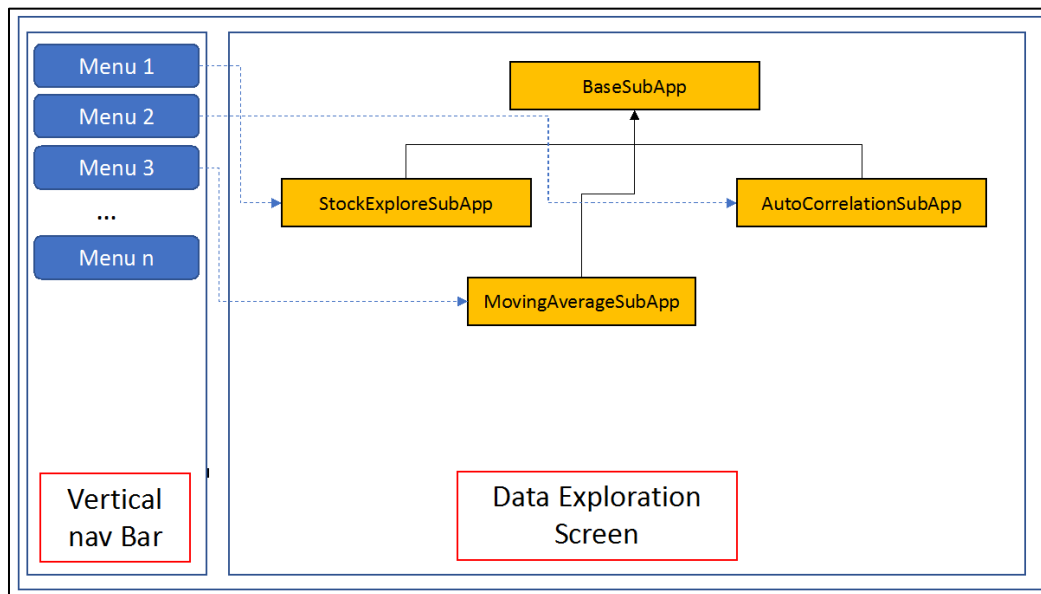
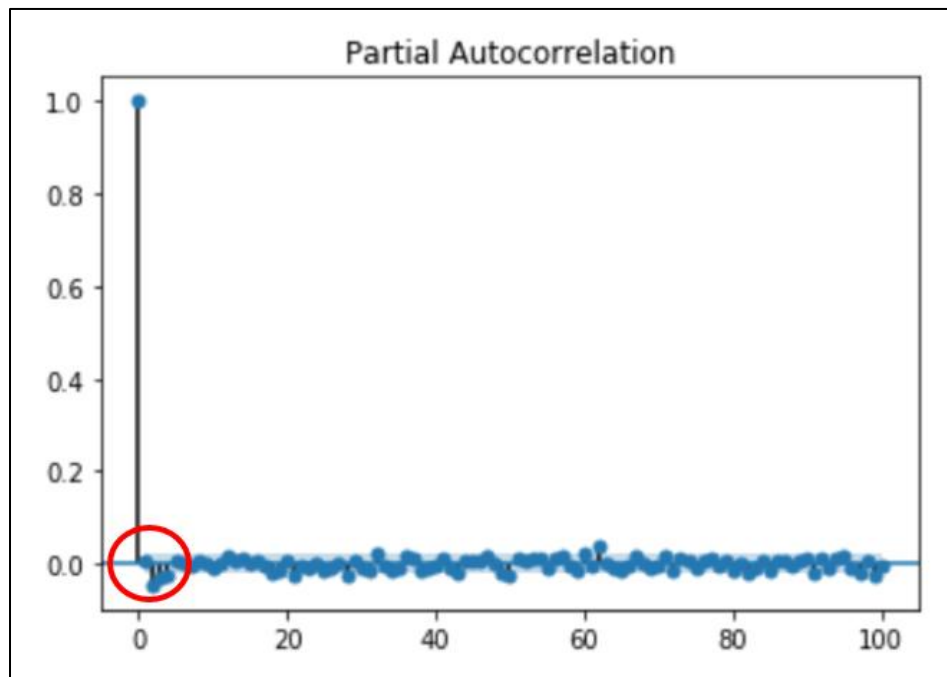
OK Cancel

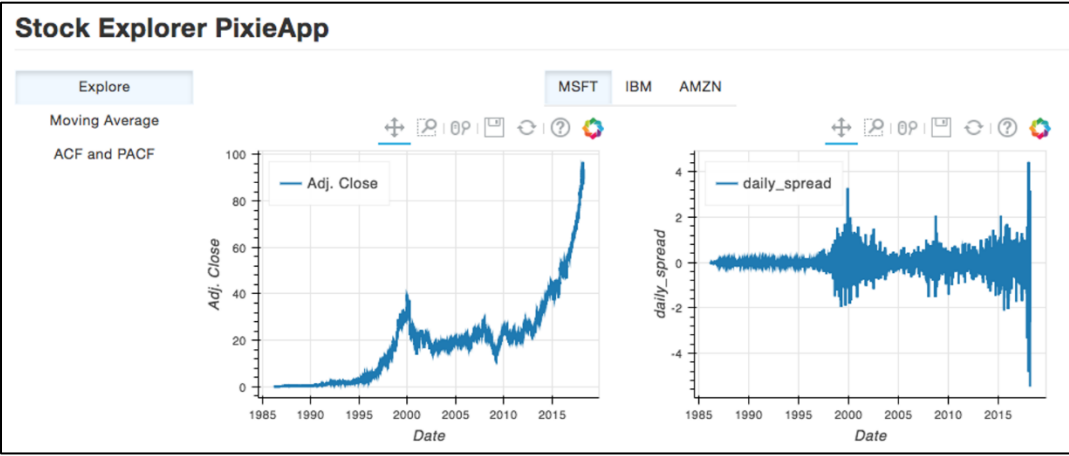












Stock Explorer PixieApp

Explore

MSFT

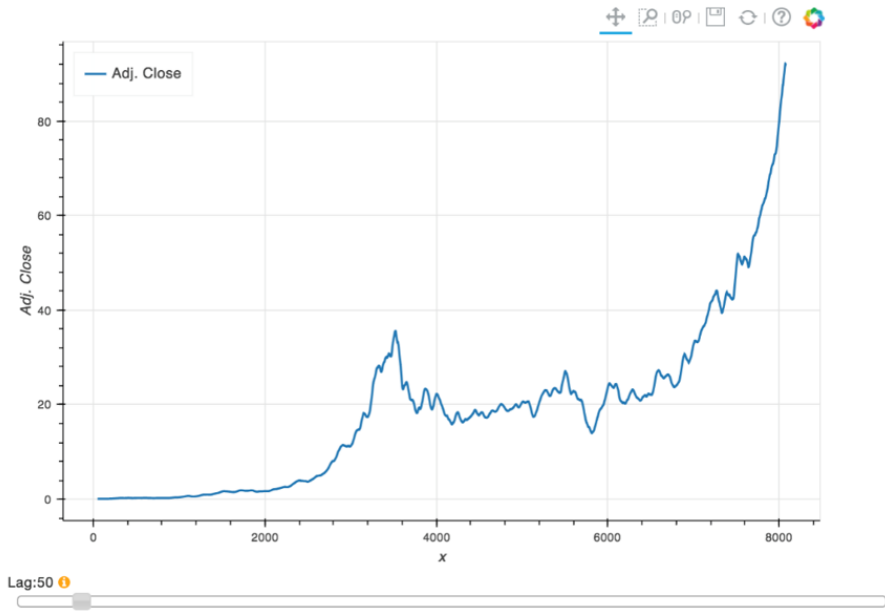
IBM

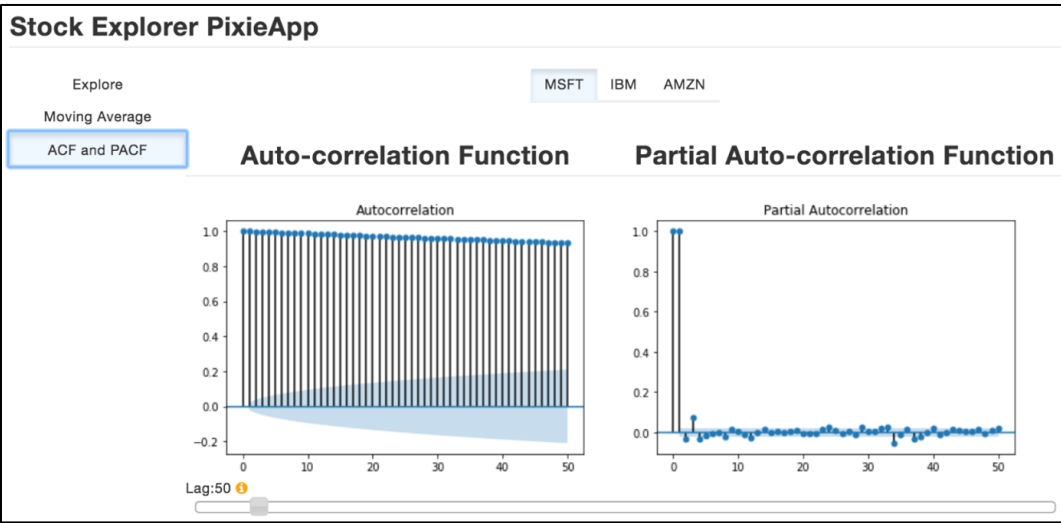
AMZN

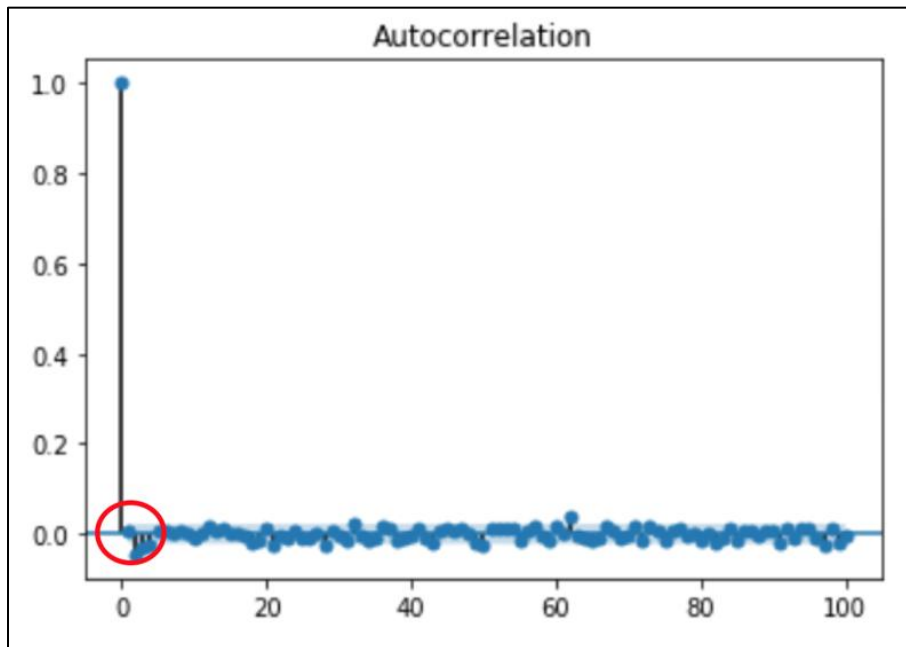
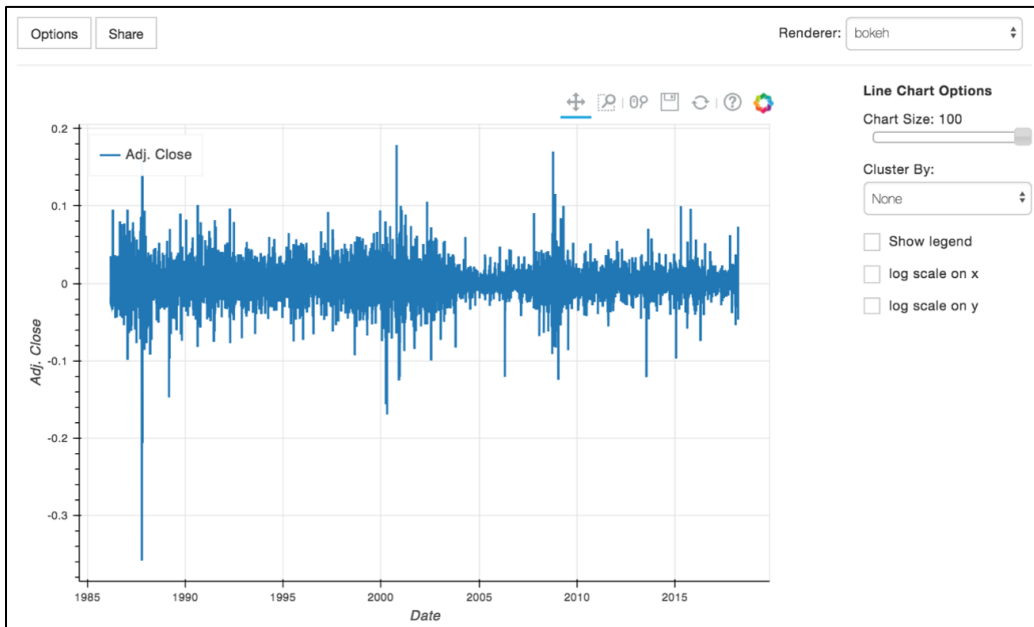
Moving Average

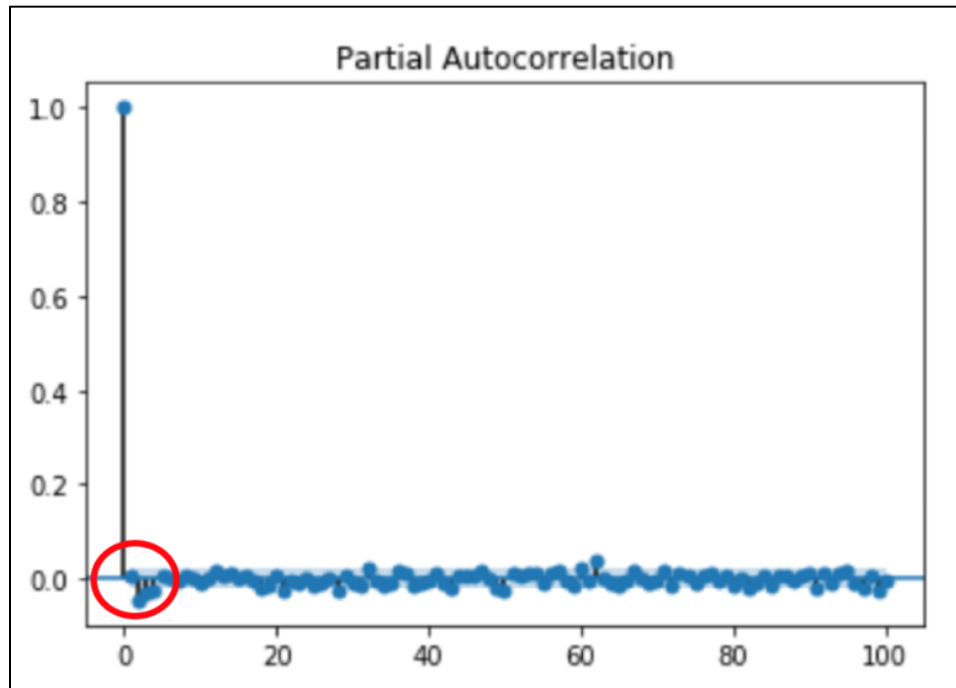
ACF and PACF

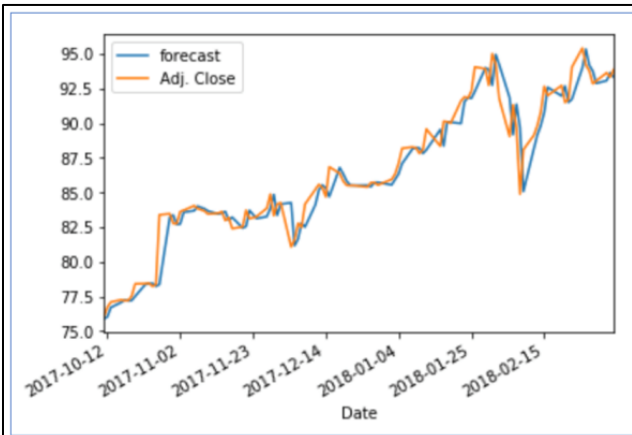
Moving Average for MSFT



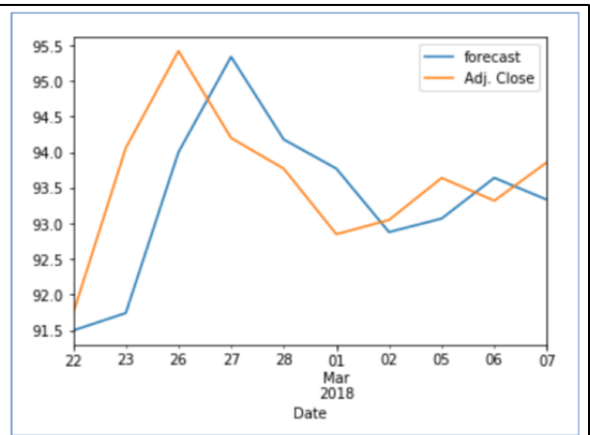




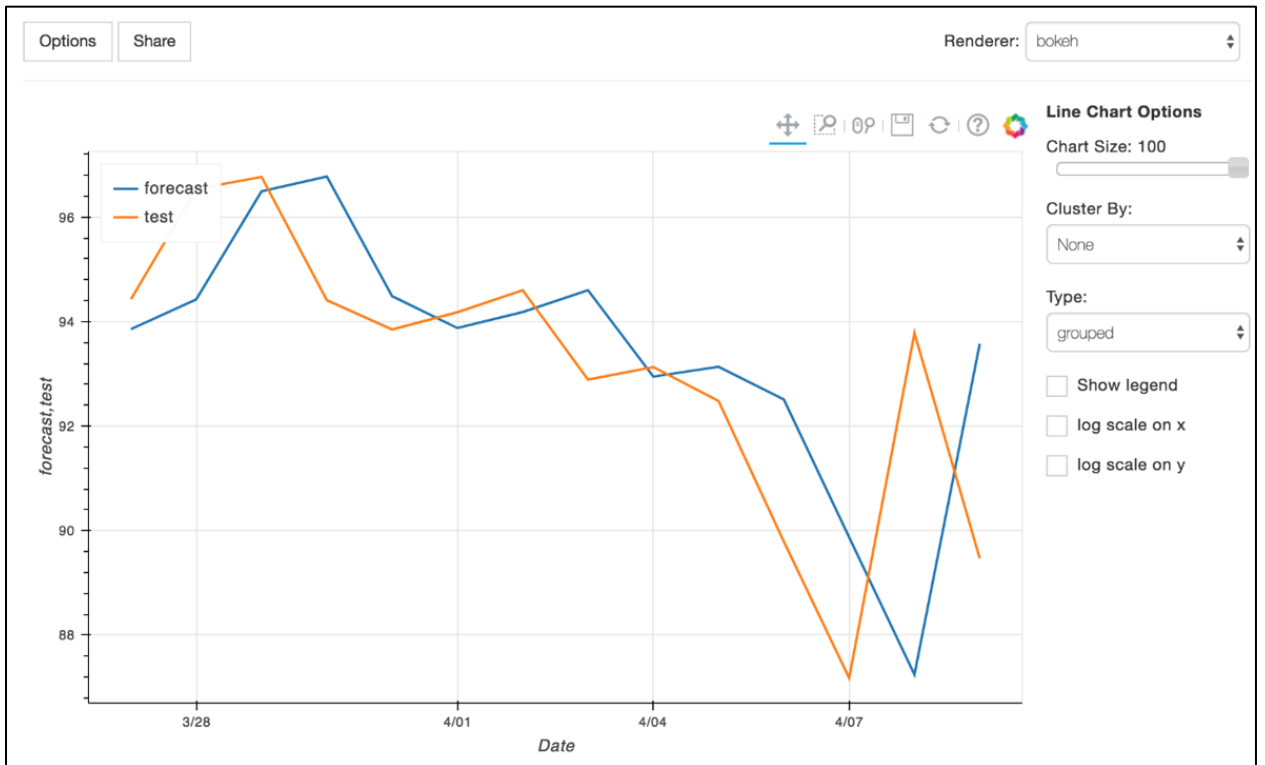




Predictions with 100 observations



Predictions with 10 observations



Stock Explorer PixieApp

Explore

MSFT AMZN IBM

Moving Average

ACF and PACF

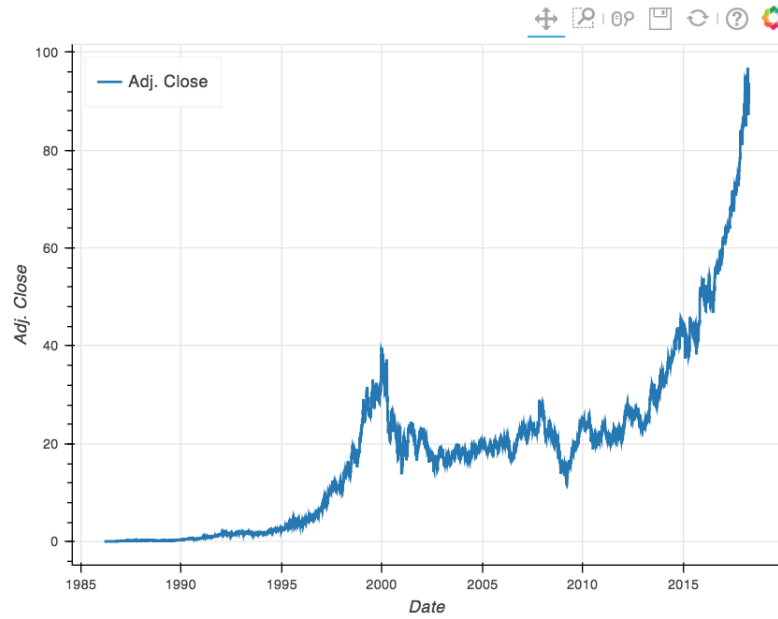
Forecast with ARIMA

1. Data Exploration to test for Stationarity

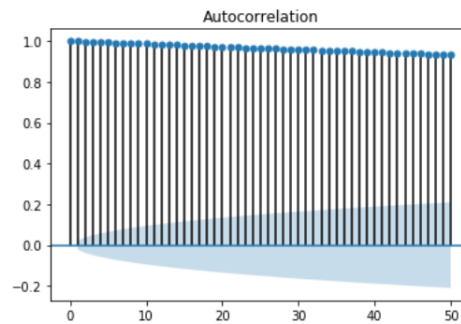
Add differencing

Continue to Forecast

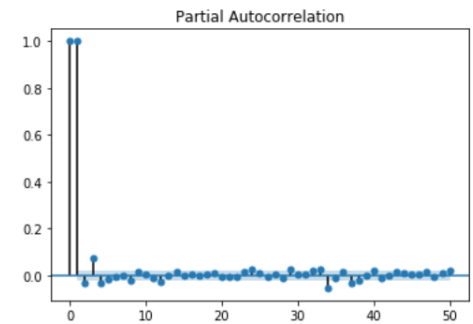
Time Series



Auto-correlation Function



Partial Auto-correlation Function



Stock Explorer PixieApp

Explore

MSFT

AMZN

IBM

Moving Average

ACF and PACF

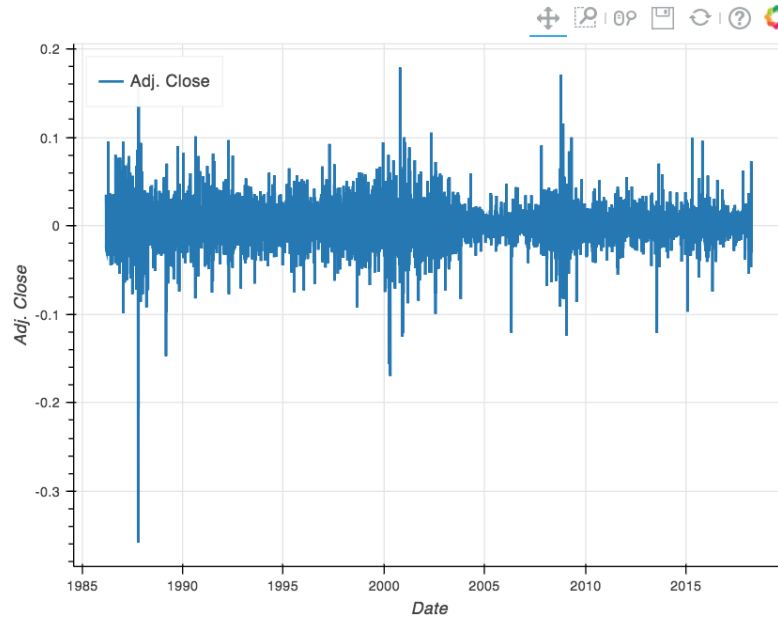
Forecast with ARIMA

1. Data Exploration to test for Stationarity

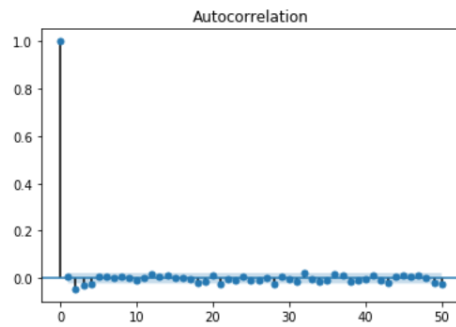
Remove differencing

Continue to Forecast

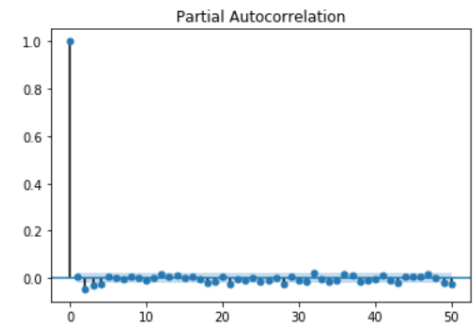
Time Series



Auto-correlation Function



Partial Auto-correlation Function



Stock Explorer PixieApp

Explore

IBM

AMZN

MSFT

Moving Average

ACF and PACF

Forecast with ARIMA

2. Build Arima model

Diagnose Model

Enter the p,d,q order for the ARIMA model you want to build

Enter the p order for the AR model:

Enter the d order for the Integrated step:

Enter the q order for the MA model:

Go

Stock Explorer PixieApp

Explore

IBM AMZN MSFT

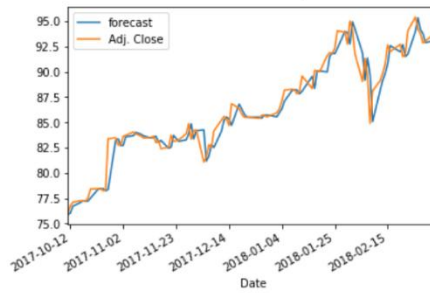
Moving Average

ACF and PACF

Forecast with ARIMA

2. Build Arima model Diagnose Model

ARIMA Model successfully created



Predicted values against the train set

index	0
count	8061.0
mean	-5.785532887093114e-07
std	0.4198119342295512
min	-5.118914984330149
25%	-0.10611327823528935
50%	-0.0118445243787303
75%	0.09848486058333034
max	5.023380148778333

Residual errors statistics

Stock Explorer PixieApp

Explore

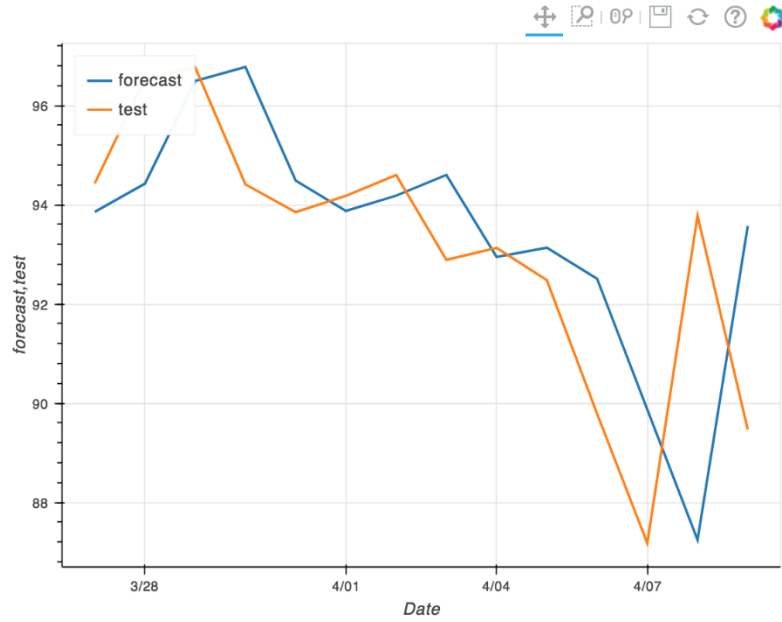
IBM AMZN MSFT

Moving Average

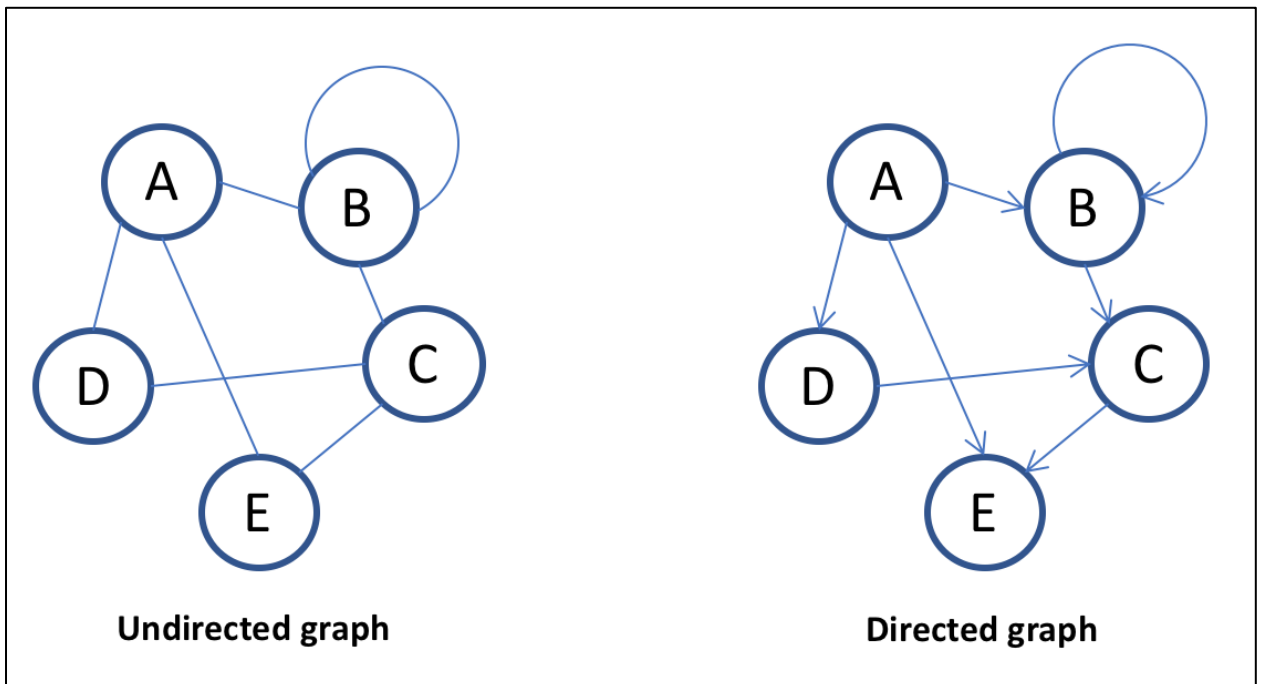
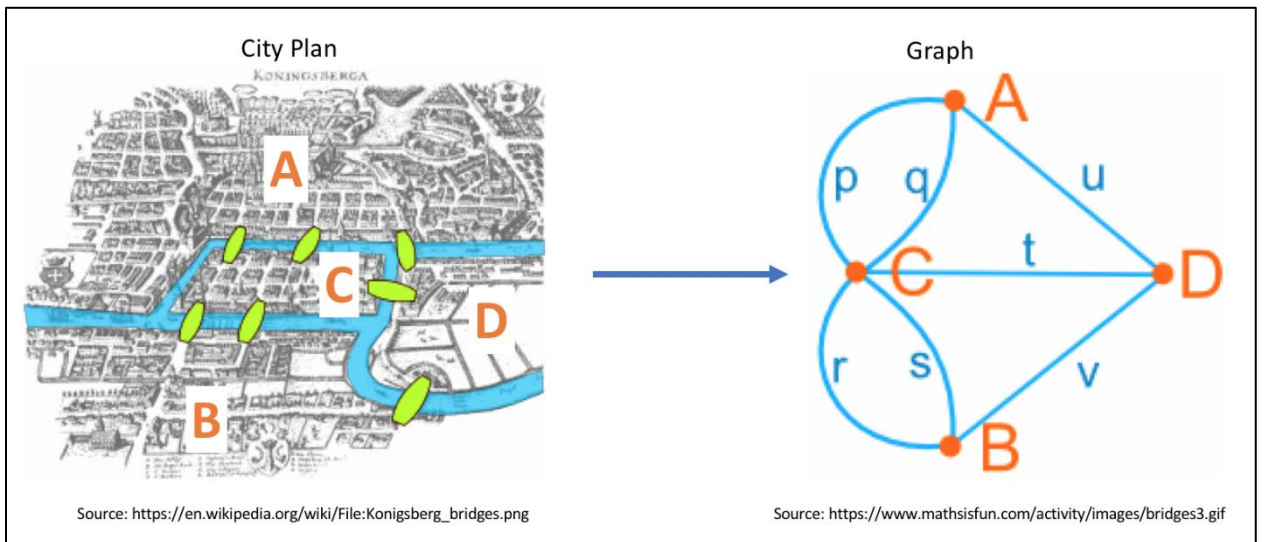
ACF and PACF

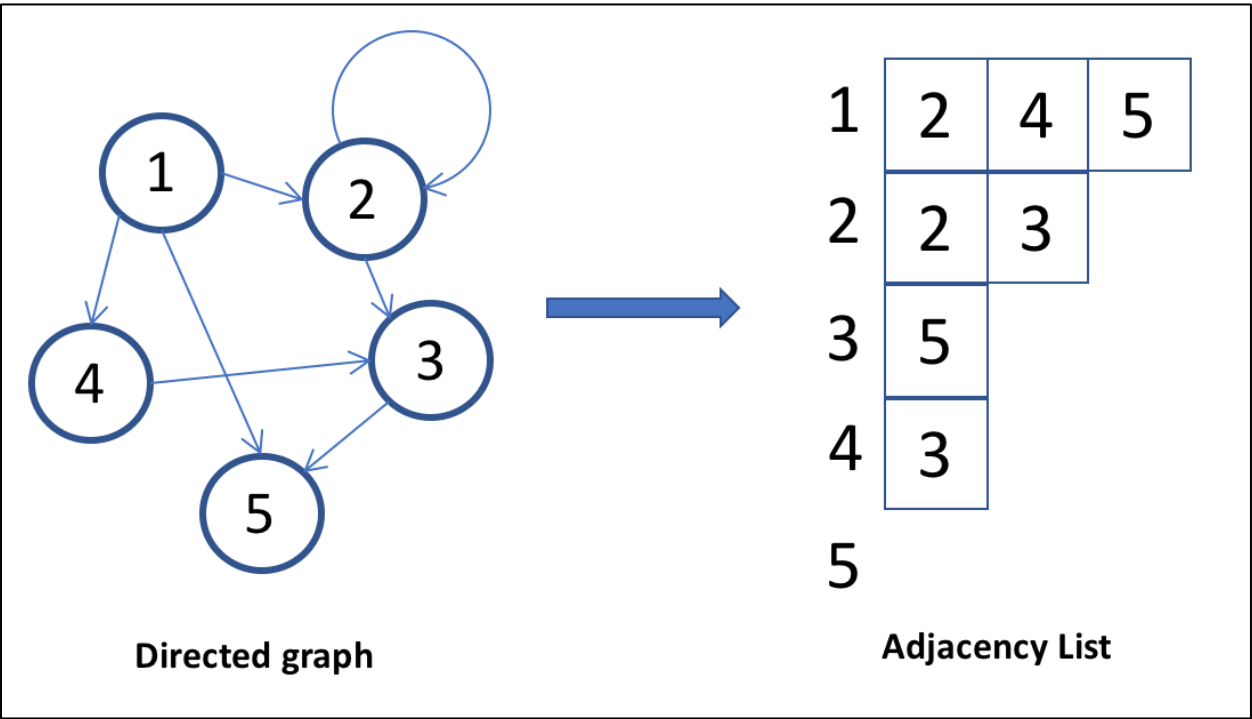
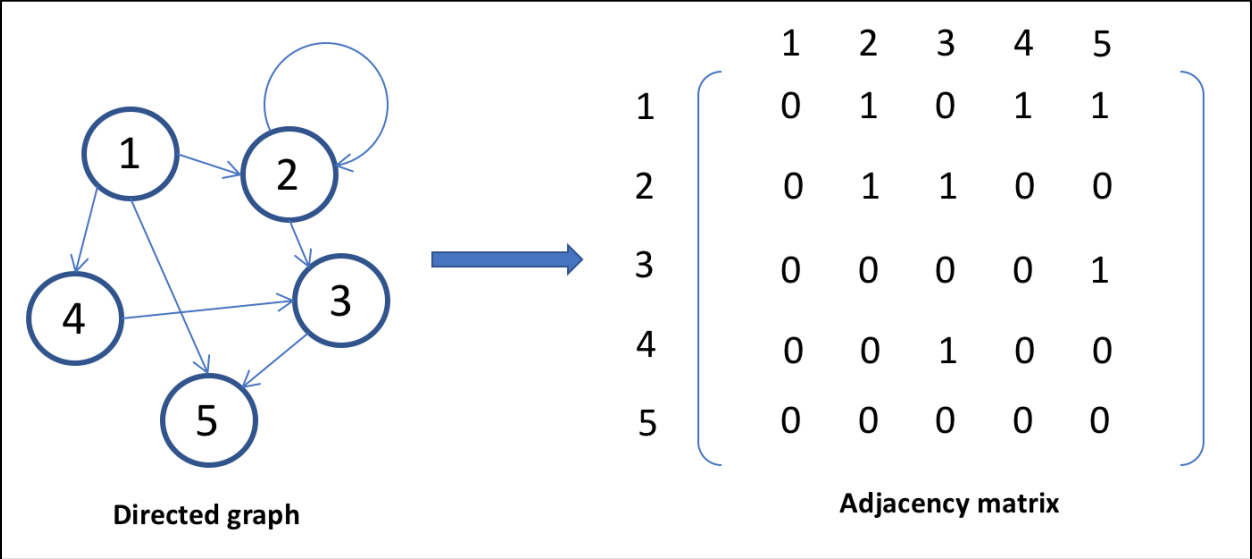
Forecast with ARIMA

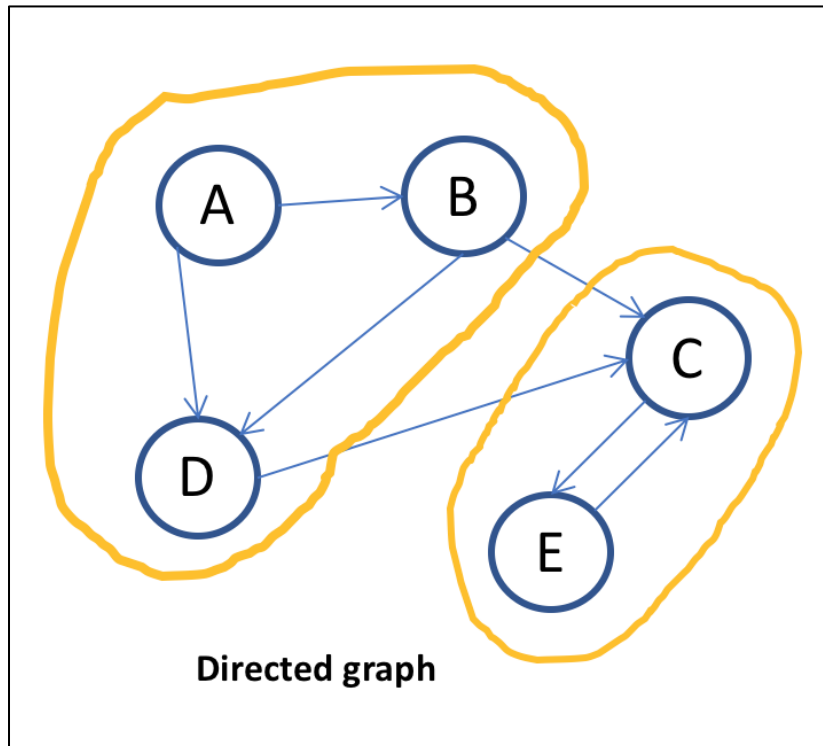
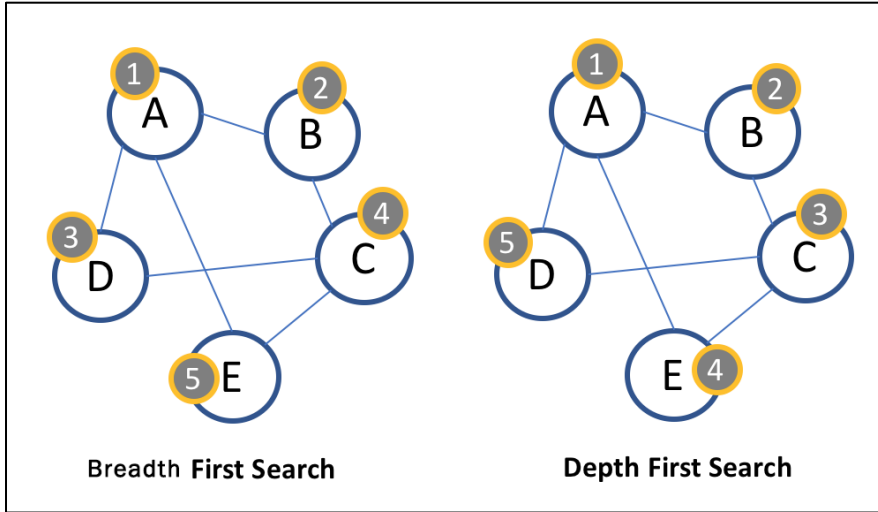
3. Diagnose the model against the test set

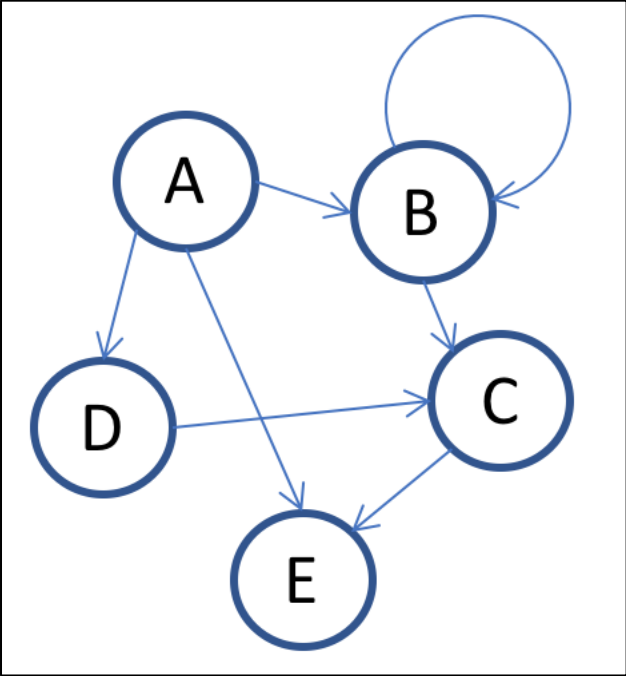


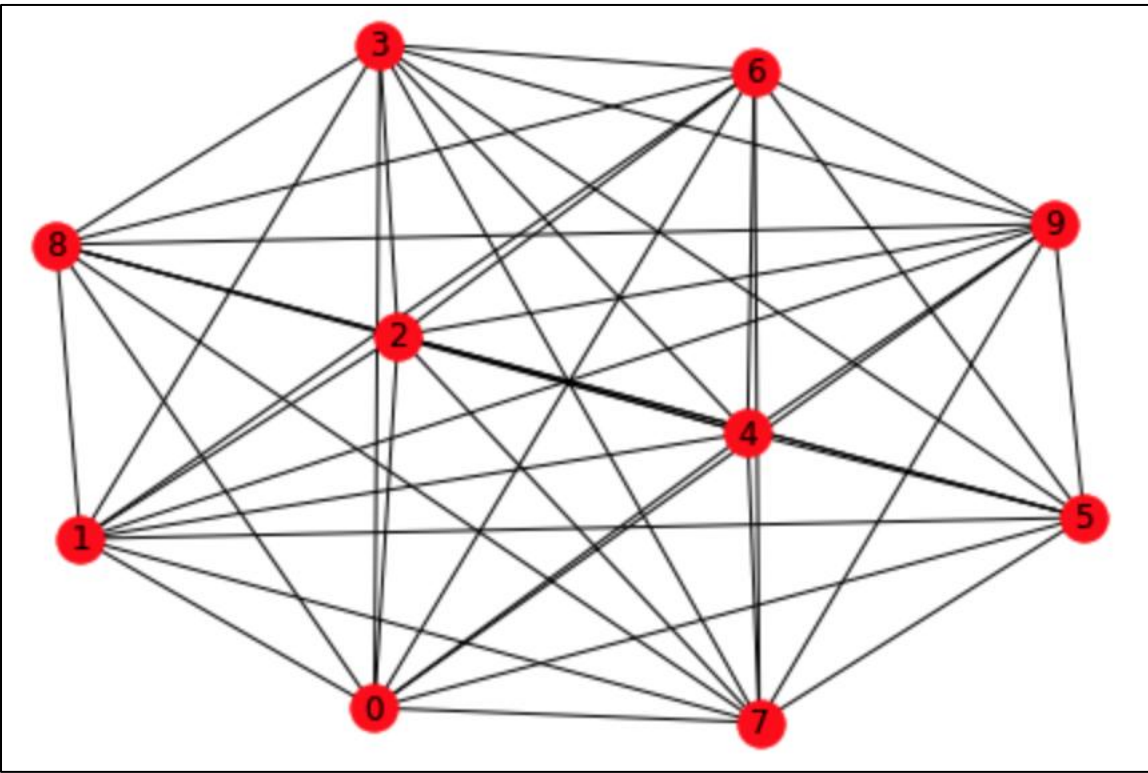
Chapter 9: US Domestic Flight Data Analysis Using Graphs





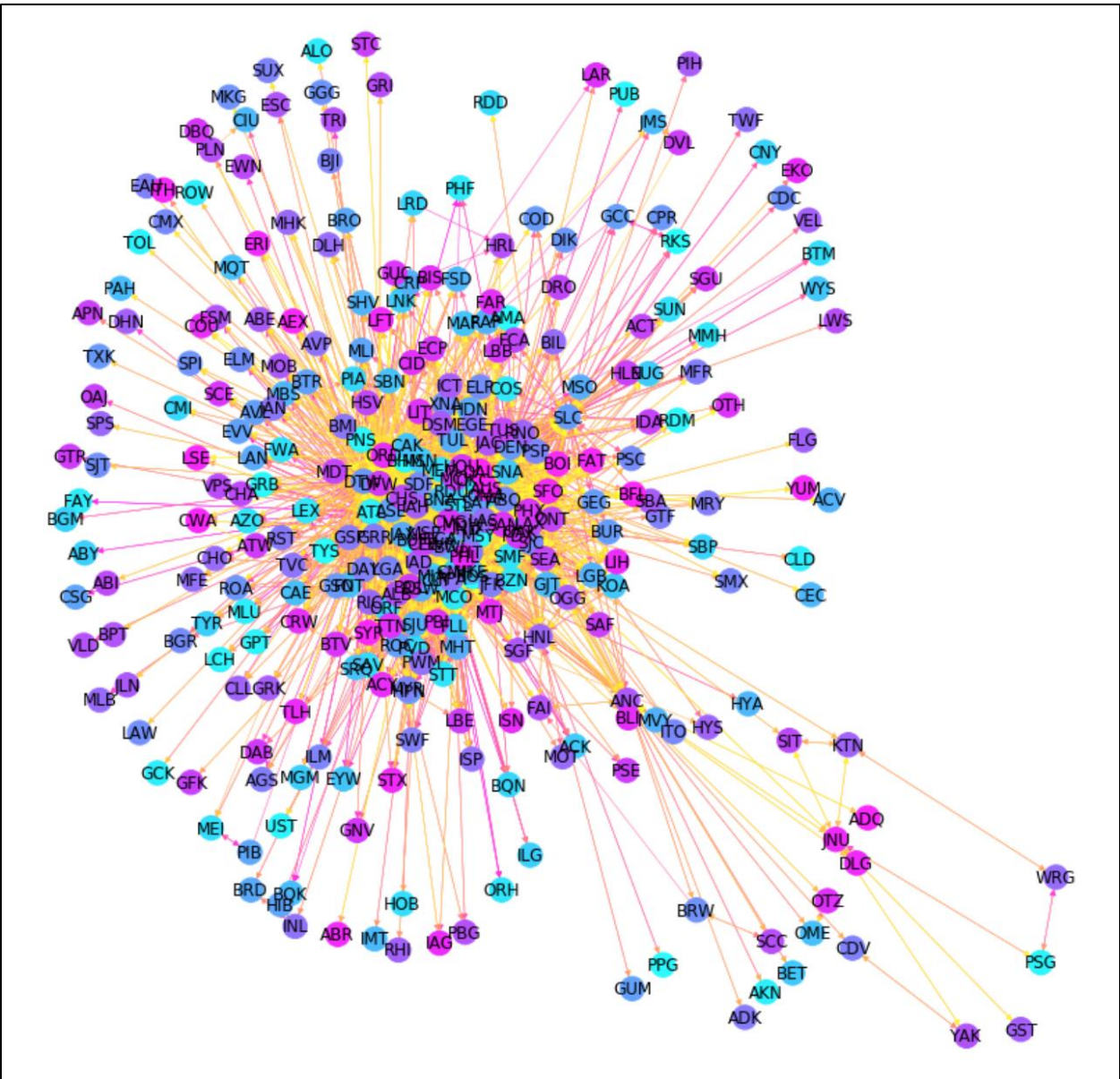


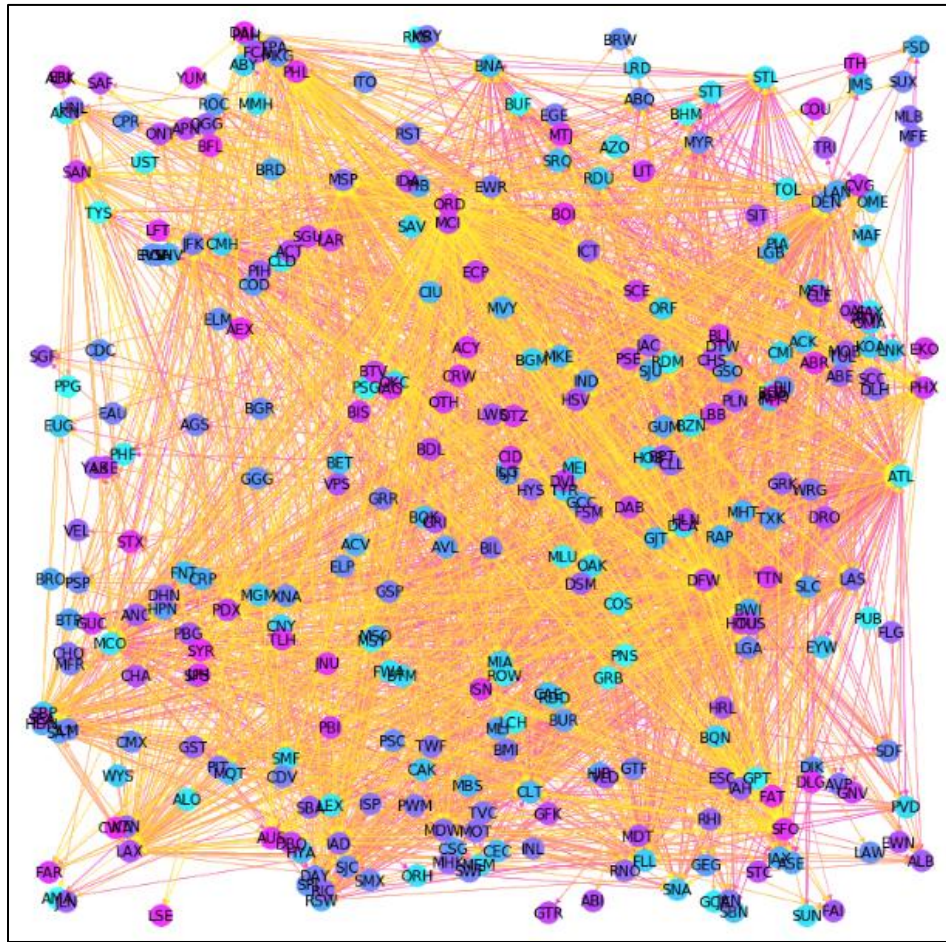


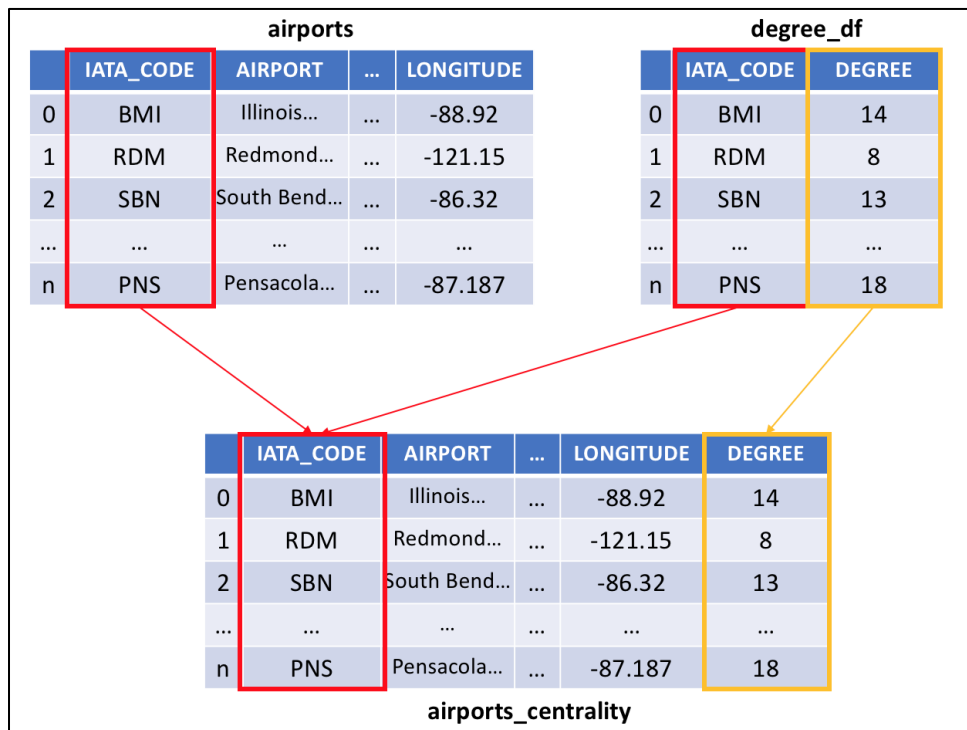


		ELAPSED_TIME
ORIGIN_AIRPORT	DESTINATION_AIRPORT	
ABE	ATL	127.415350
	DTW	101.923741
	ORD	130.298762
ABI	DFW	53.951591
ABQ	ATL	174.822278
	BWI	215.028112
	CLT	193.168421
	DAL	95.107051
	DEN	75.268199
	DFW	103.641714
	HOU	115.464363
	IAH	125.548387
	JFK	232.306273
	LAS	88.696897
	LAX	120.412549
	MCI	106.373802
	MCO	213.412371
MDW	155.709375	
MSP	147.079070	

ORIGIN_AIRPORT	DESTINATION_AIRPORT	ELAPSED_TIME	
0	ABE	ATL	127.415350
1	ABE	DTW	101.923741
2	ABE	ORD	130.298762
3	ABI	DFW	53.951591
4	ABQ	ATL	174.822278
5	ABQ	BWI	215.028112
6	ABQ	CLT	193.168421
7	ABQ	DAL	95.107051
8	ABQ	DEN	75.268199
9	ABQ	DFW	103.641714
10	ABQ	HOU	115.464363
11	ABQ	IAH	125.548387
12	ABQ	JFK	232.306273
13	ABQ	LAS	88.696897
14	ABQ	LAX	120.412549
15	ABQ	MCI	106.373802
16	ABQ	MCO	213.412371







	IATA_CODE	AIRPORT	CITY	STATE	COUNTRY	LATITUDE	LONGITUDE	DEGREE
0	ABE	Lehigh Valley International Airport	Allentown	PA	USA	40.65236	-75.44040	7
1	ABI	Abilene Regional Airport	Abilene	TX	USA	32.41132	-99.68190	2
2	ABQ	Albuquerque International Sunport	Albuquerque	NM	USA	35.04022	-106.60919	46
3	ABR	Aberdeen Regional Airport	Aberdeen	SD	USA	45.44906	-98.42183	2
4	ABY	Southwest Georgia Regional Airport	Albany	GA	USA	31.53552	-84.19447	2
5	ACK	Nantucket Memorial Airport	Nantucket	MA	USA	41.25305	-70.06018	6
6	ACT	Waco Regional Airport	Waco	TX	USA	31.61129	-97.23052	2
7	ACV	Arcata Airport	Arcata/Eureka	CA	USA	40.97812	-124.10862	2
8	ACY	Atlantic City International Airport	Atlantic City	NJ	USA	39.45758	-74.57717	20
9	ADK	Adak Airport	Adak	AK	USA	51.87796	-176.64603	2
10	ADQ	Kodiak Airport	Kodiak	AK	USA	57.74997	-152.49386	2
11	AEX	Alexandria International Airport	Alexandria	LA	USA	31.32737	-92.54856	6
12	AGS	Augusta Regional Airport (Bush Field)	Augusta	GA	USA	33.36996	-81.96450	5

PixieDust: Map View Options



Chart Title:

Fields:

Show only numeric columns

AIRPORT	<i>string</i>
CITY	<i>string</i>
COUNTRY	<i>string</i>
DEGREE	<i>numeric</i>
IATA_CODE	<i>string</i>
LATITUDE	<i>numeric</i>
LONGITUDE	<i>numeric</i>
STATE	<i>string</i>

Keys: ⓘ

LATITUDE	x
LONGITUDE	x

Values: ⓘ

DEGREE	x
IATA_CODE	x
AIRPORT	x

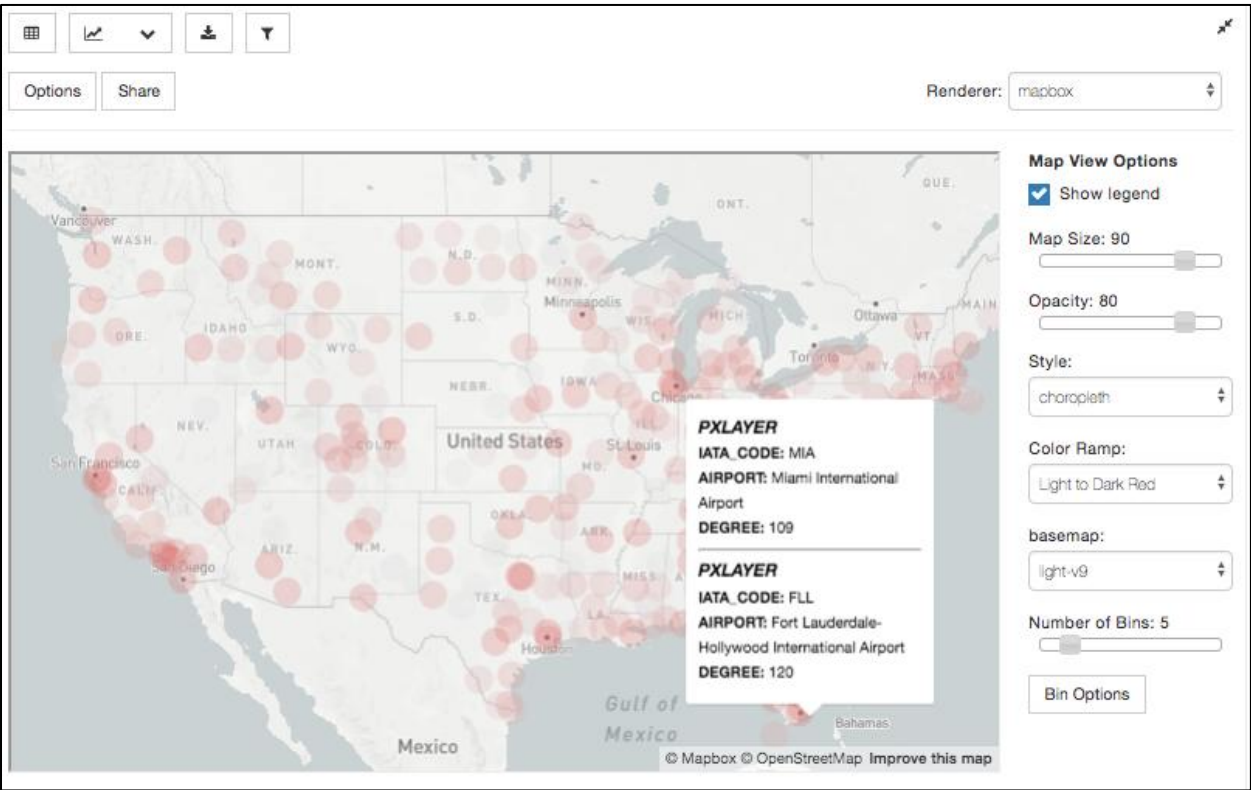
PixieDust will automatically use count aggregation for each key

of Rows to Display:

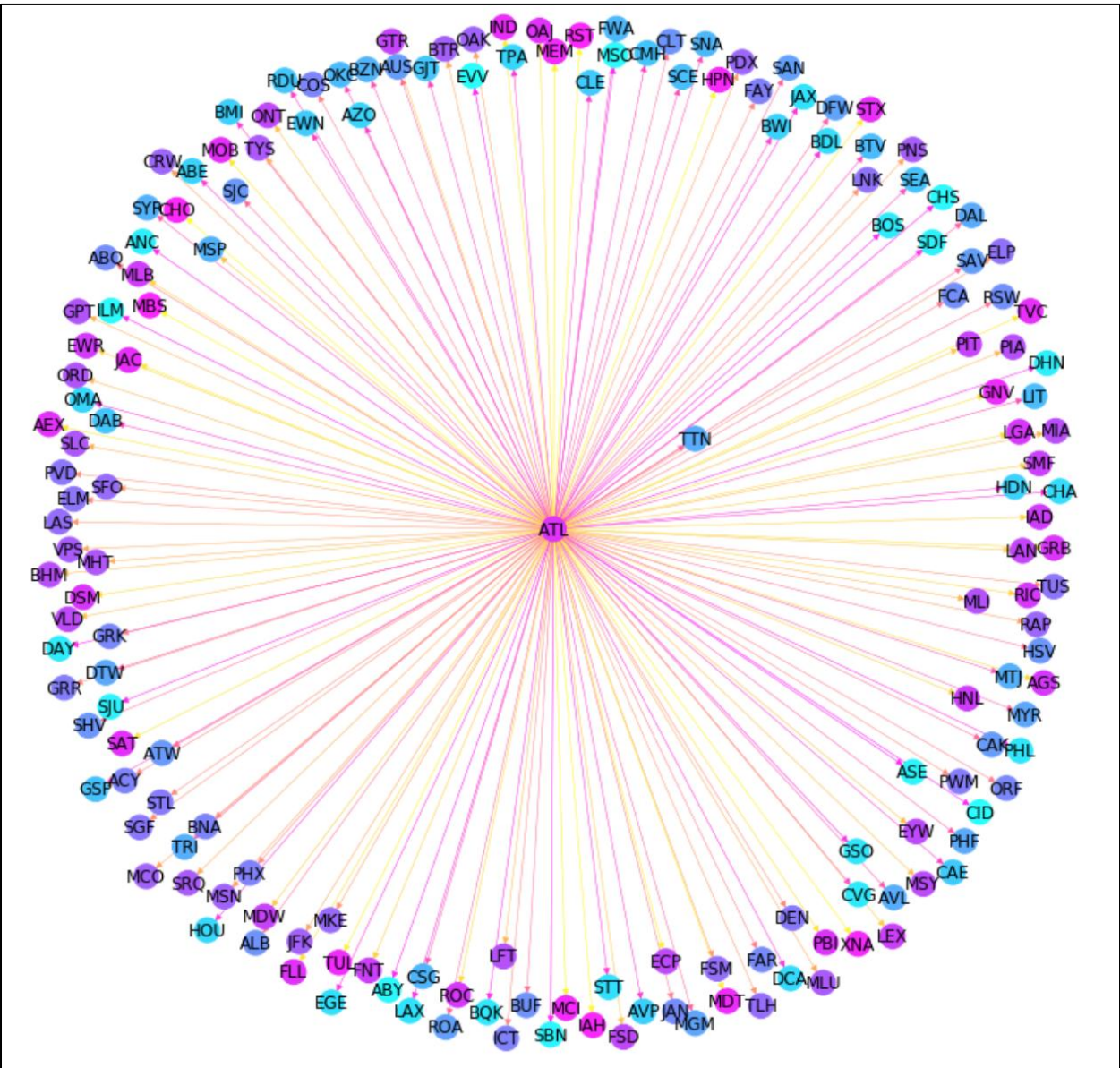
Mapbox Access Token: ⓘ

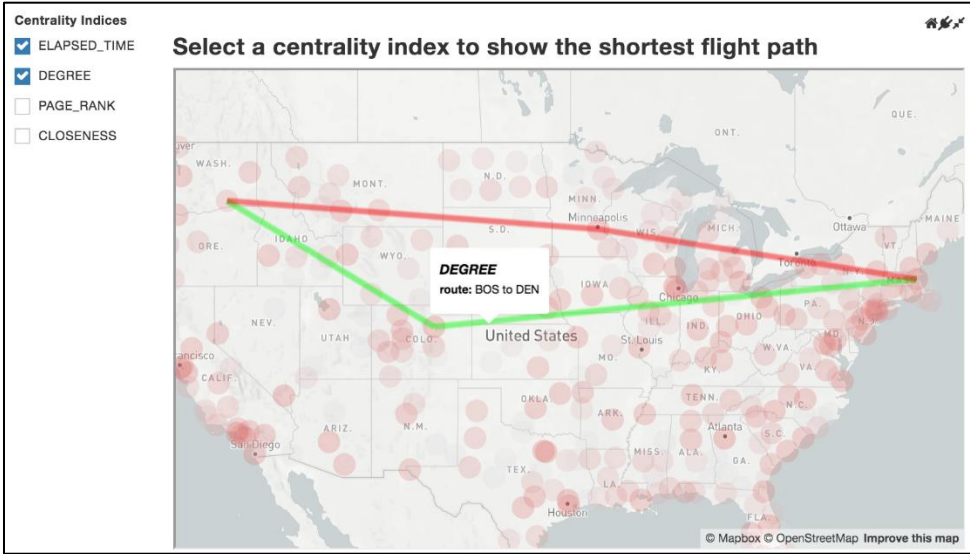
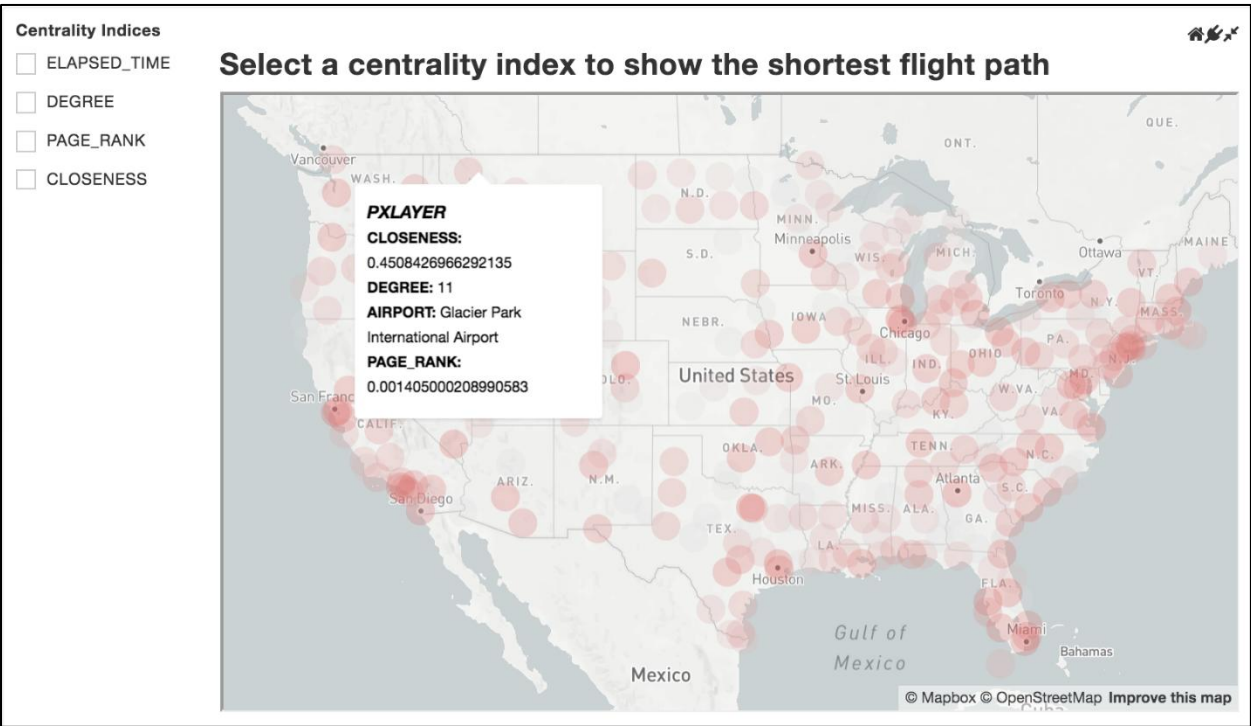
Custom Base Color:

Secondary Custom Base Color:



	IATA_CODE	AIRPORT	CITY	STATE	COUNTRY	LATITUDE	LONGITUDE	DEGREE	PAGE_RANK	CLOSENESS	BETWEENNESS
0	ABE	Lehigh Valley International Airport	Allentown	PA	USA	40.65236	-75.44040	7	0.001152	0.423483	0.000000e+00
1	ABI	Abilene Regional Airport	Abilene	TX	USA	32.41132	-99.68190	2	0.000667	0.392901	0.000000e+00
2	ABQ	Albuquerque International Sunport	Albuquerque	NM	USA	35.04022	-106.60919	46	0.004145	0.497674	6.023268e-05
3	ABR	Aberdeen Regional Airport	Aberdeen	SD	USA	45.44906	-98.42183	2	0.000647	0.379433	0.000000e+00
4	ABY	Southwest Georgia Regional Airport	Albany	GA	USA	31.53552	-84.19447	2	0.000655	0.402760	0.000000e+00
5	ACK	Nantucket Memorial Airport	Nantucket	MA	USA	41.25305	-70.06018	6	0.000912	0.362302	0.000000e+00
6	ACT	Waco Regional Airport	Waco	TX	USA	31.61129	-97.23052	2	0.000667	0.392901	0.000000e+00
7	ACV	Arcata Airport	Arcata/Eureka	CA	USA	40.97812	-124.10862	2	0.000638	0.362712	0.000000e+00
8	ACY	Atlantic City International Airport	Atlantic City	NJ	USA	39.45758	-74.57717	20	0.002094	0.432615	1.968172e-05
9	ADK	Adak Airport	Adak	AK	USA	51.87796	-176.64603	2	0.000753	0.337539	0.000000e+00
10	ADQ	Kodiak Airport	Kodiak	AK	USA	57.74997	-152.49386	2	0.000753	0.337539	0.000000e+00





PixieDust: Line Chart Options ✕

Chart Title:

Fields: Show only numeric columns

Search/Filter Fields

ARRIVAL_DELAY *numeric*

DATE *date/time*

Keys: ?

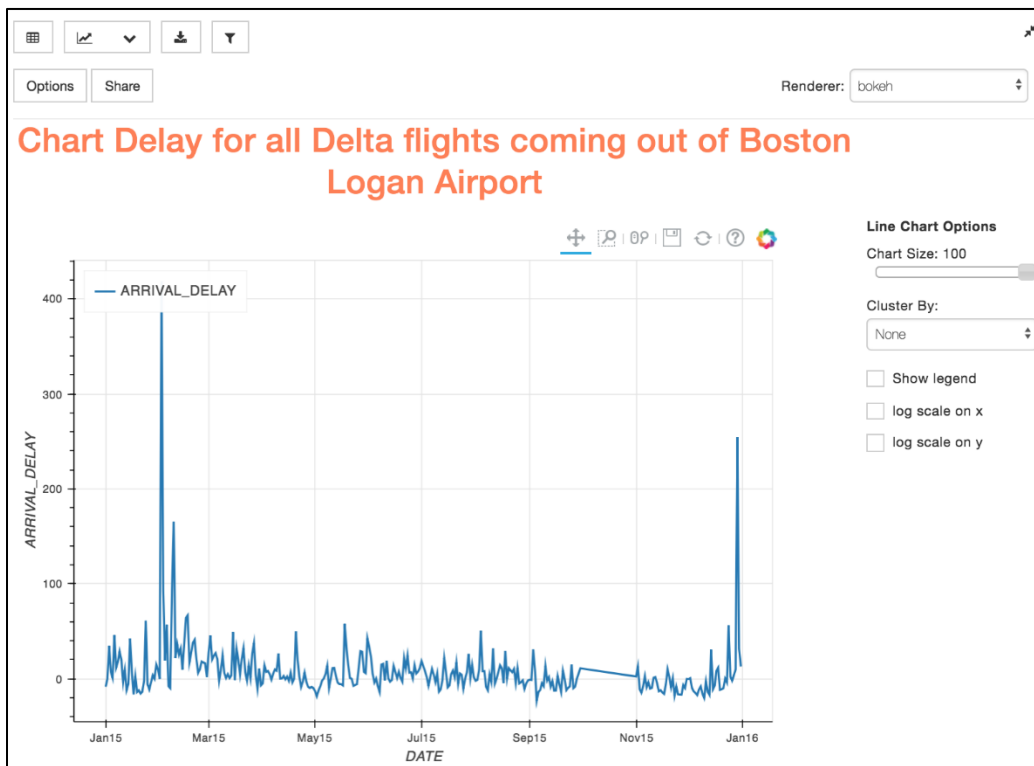
DATE ✕

Values: ?

ARRIVAL_DELAY ✕

Aggregation: ▼

of Rows to Display:



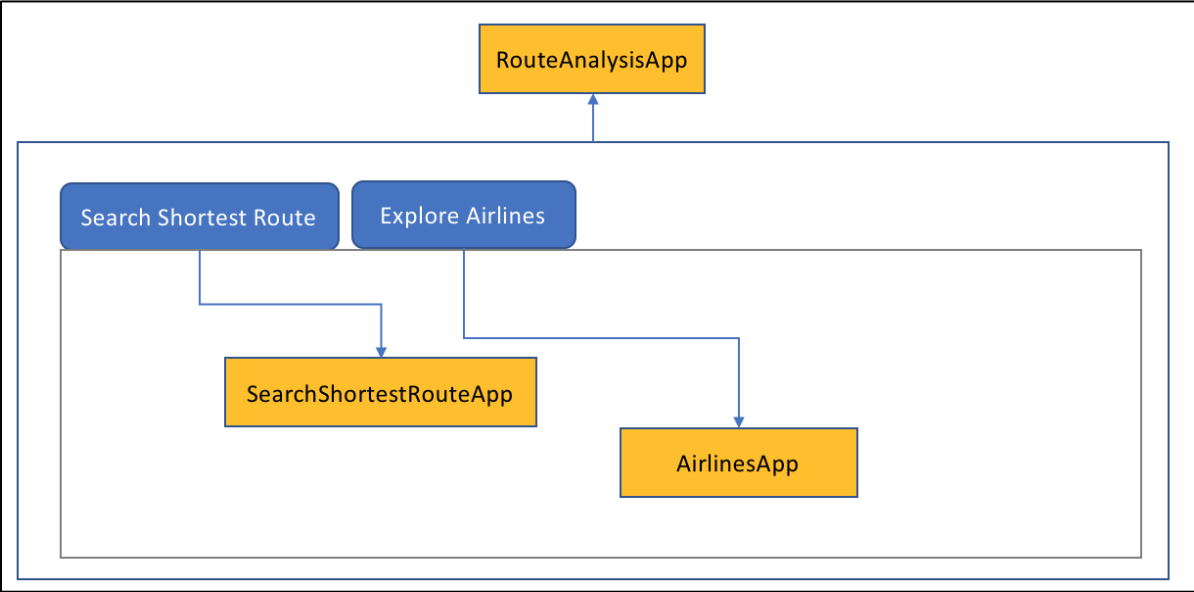
Edit Cell Metadata

Manually edit the JSON below to manipulate the metadata for this cell. We recommend putting custom metadata attributes in an appropriately named substructure, so they don't conflict with those of others.

```

1  {
2    "pixiedust": {
3      "displayParams": {
4        "keyFields": "DATE",
5        "handlerId": "lineChart",
6        "title": "Chart Delay for all Delta flights coming out of Boston Loge
7        "aggregation": "AVG",
8        "rowCount": "10000",
9        "valueFields": "ARRIVAL_DELAY"
10   }
11 }
12 }
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Cancel Edit



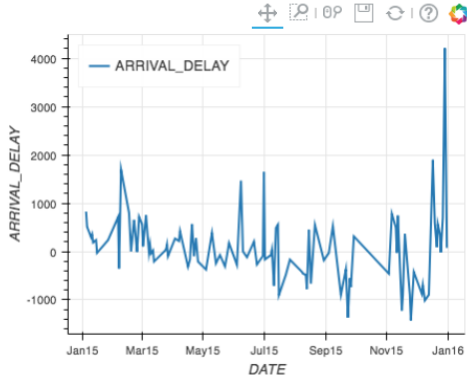
[Search Shortest Route](#)

[Explore Airlines](#)

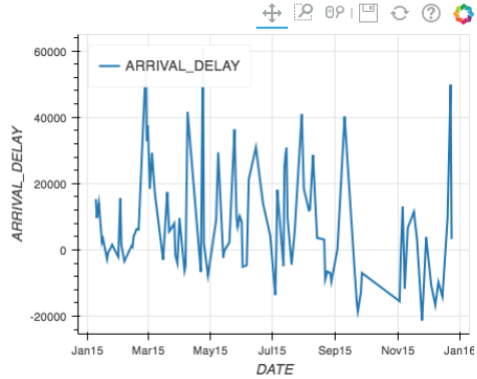


American Airlines Inc.

Delay chart for all flights out of BOS
Average delay: -0.33 minutes

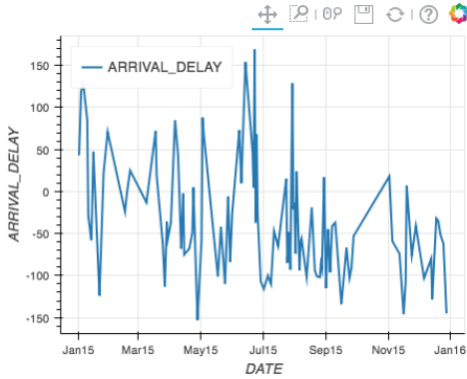


Delay chart for all flights
Average delay: 3.94 minutes

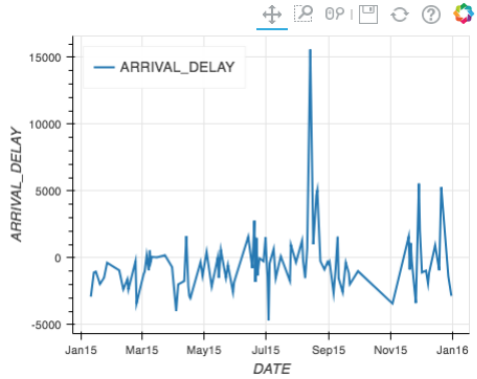


Alaska Airlines Inc.

Delay chart for all flights out of BOS
Average delay: -6.26 minutes



Delay chart for all flights
Average delay: -0.79 minutes



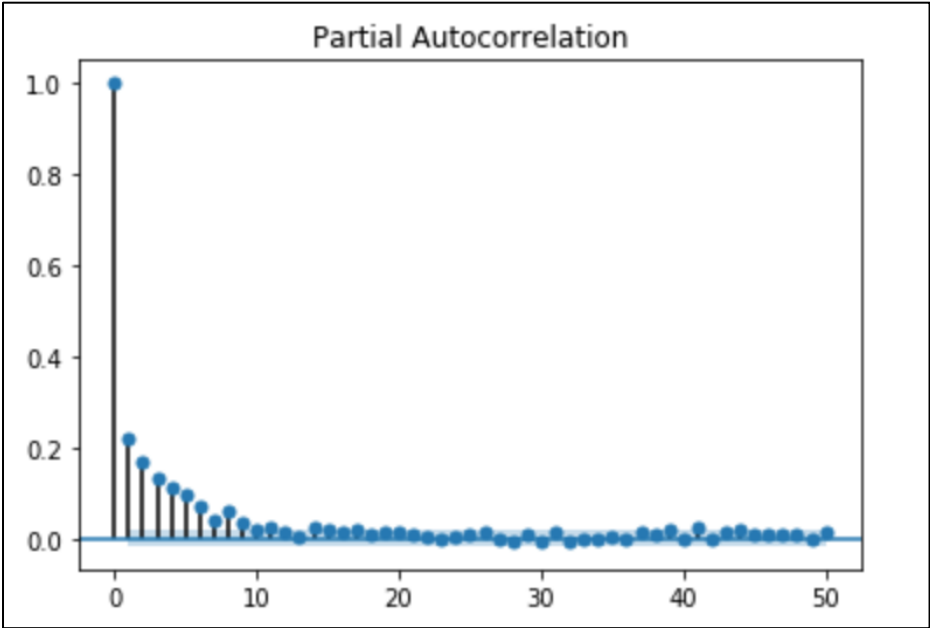
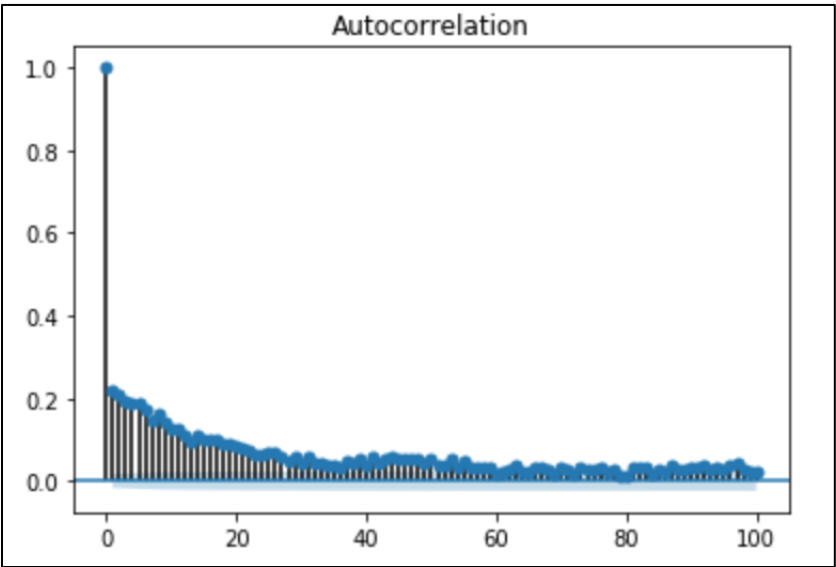
JetBlue Airways

Delay chart for all flights out of BOS
Average delay: 5.42 minutes



Delay chart for all flights
Average delay: 6.95 minutes





PixieDust: Line Chart Options



Chart Title:

Log difference of the ARRIVAL_DELAY

Fields:

Show only numeric columns

Search/Filter Fields

ARRIVAL_DELAY *numeric*

DEPARTURE_TIME *date/time*

Keys: ?

DEPARTURE_TIME x

Values: ?

ARRIVAL_DELAY x

Aggregation:

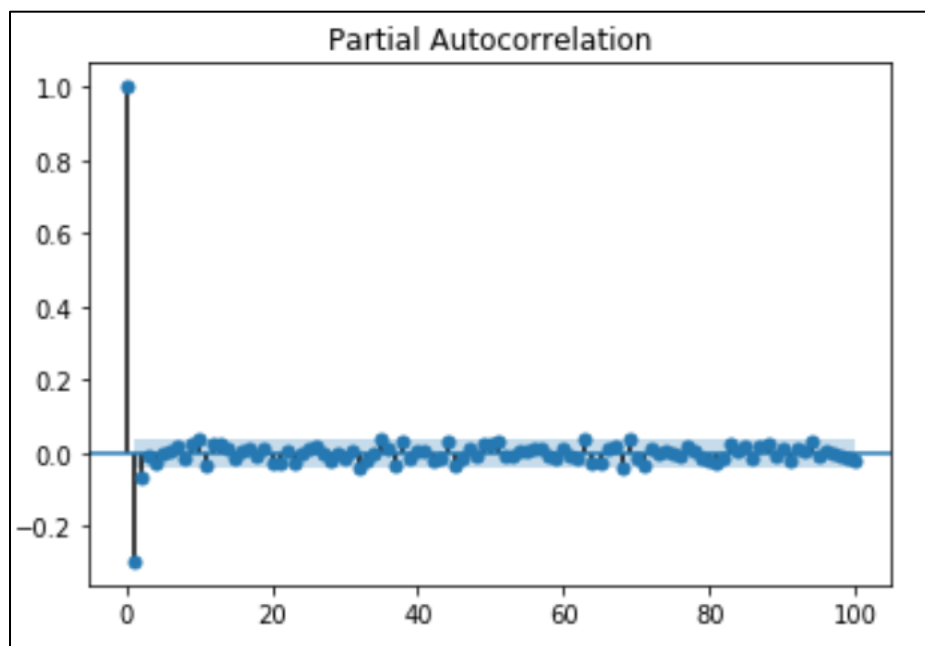
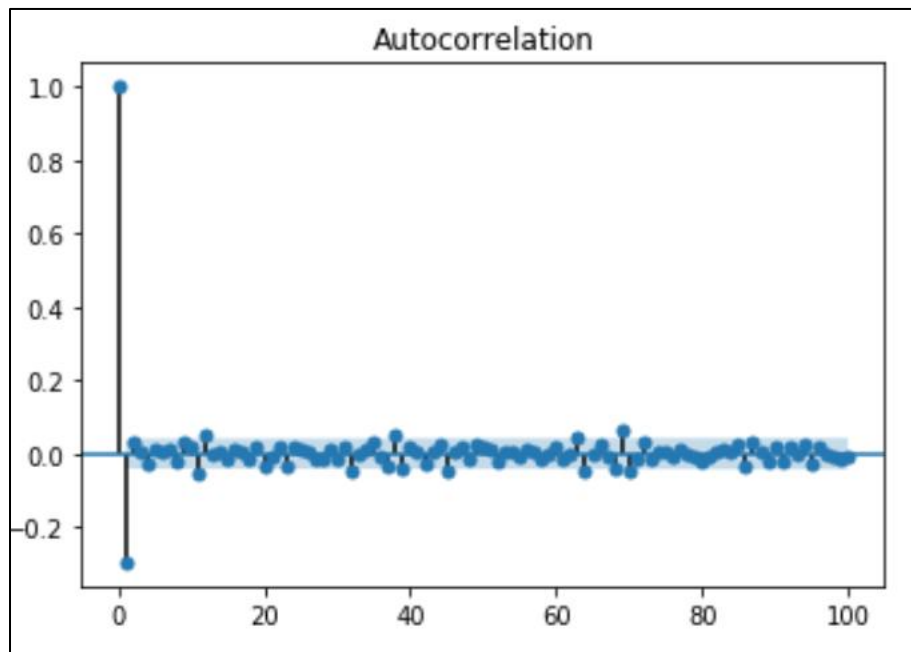
AVG

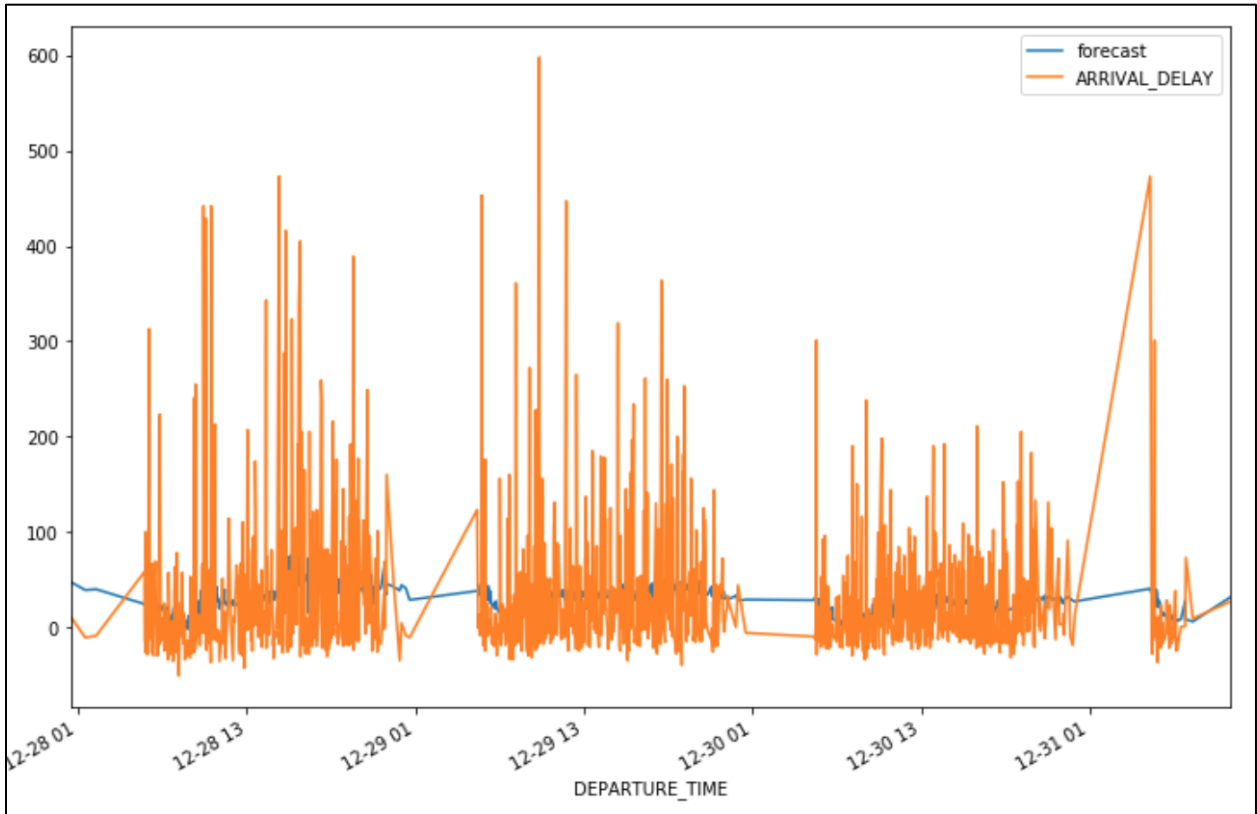
of Rows to Display:

100

OK

Cancel





PixieDust: Line Chart Options ✕

Chart Title:

Forecast vs Test Data

Fields:

Show only numeric columns

Search/Filter Fields

Date	<i>date/time</i>
forecast	<i>numeric</i>
test	<i>numeric</i>

Keys: ⓘ

Date ✕

Values: ⓘ

forecast ✕

test ✕

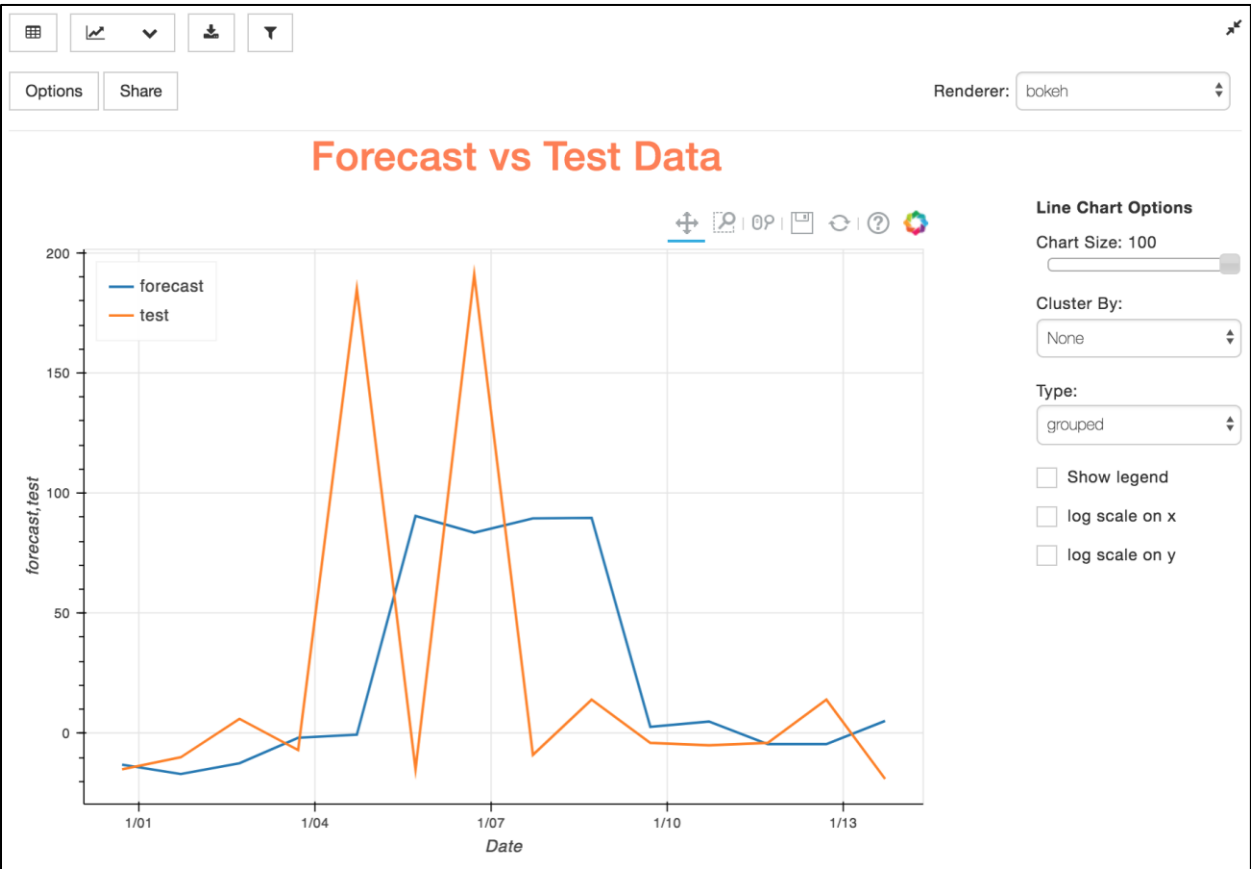
Aggregation:

AVG ⌵

of Rows to Display:

10000

OK Cancel



[Search Shortest Route](#)

[Explore Airlines](#)

Flight Delay Prediction

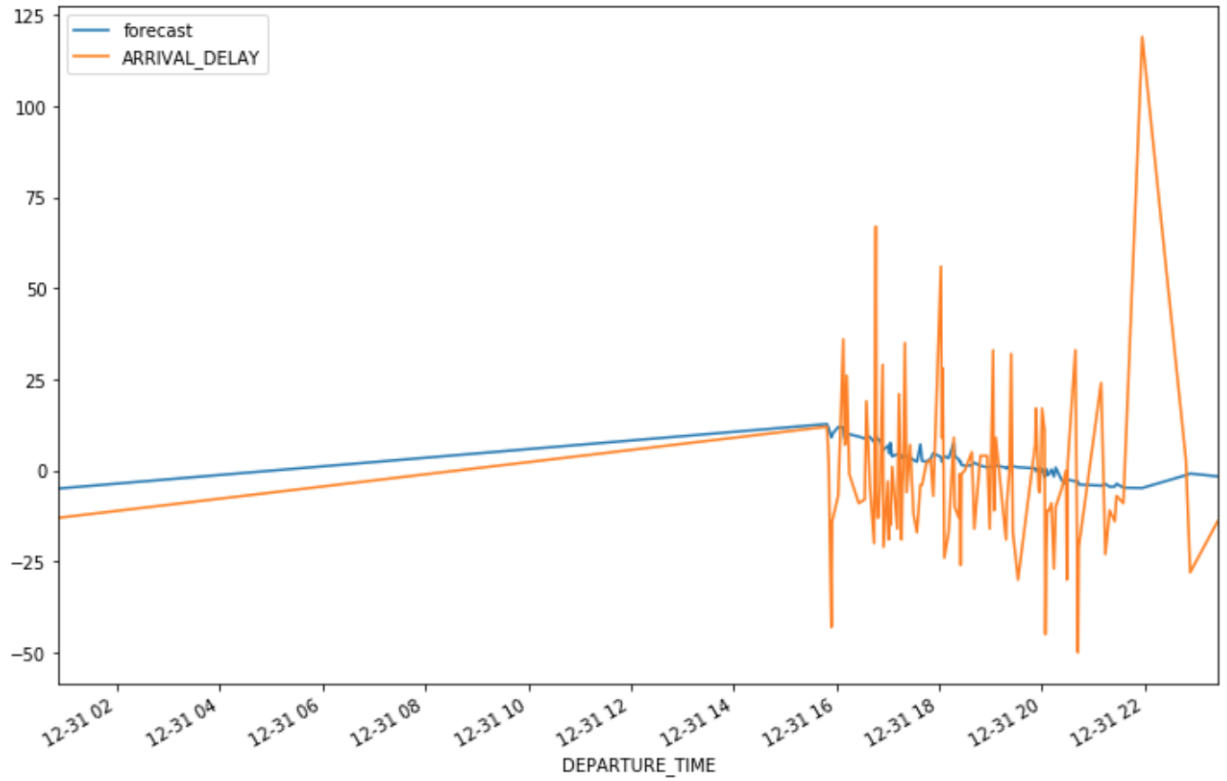


Select a flight segment:

BOS -> DEN

Select an airline:

JetBlue Airways



Chapter 10: Final Thoughts

