

Power BI

for

Data Science and Machine Learning

Rui Quintino, DevScope

(Watch this session recording at <https://youtu.be/gm5nohV30fE>)

AI & Analytics Advisor

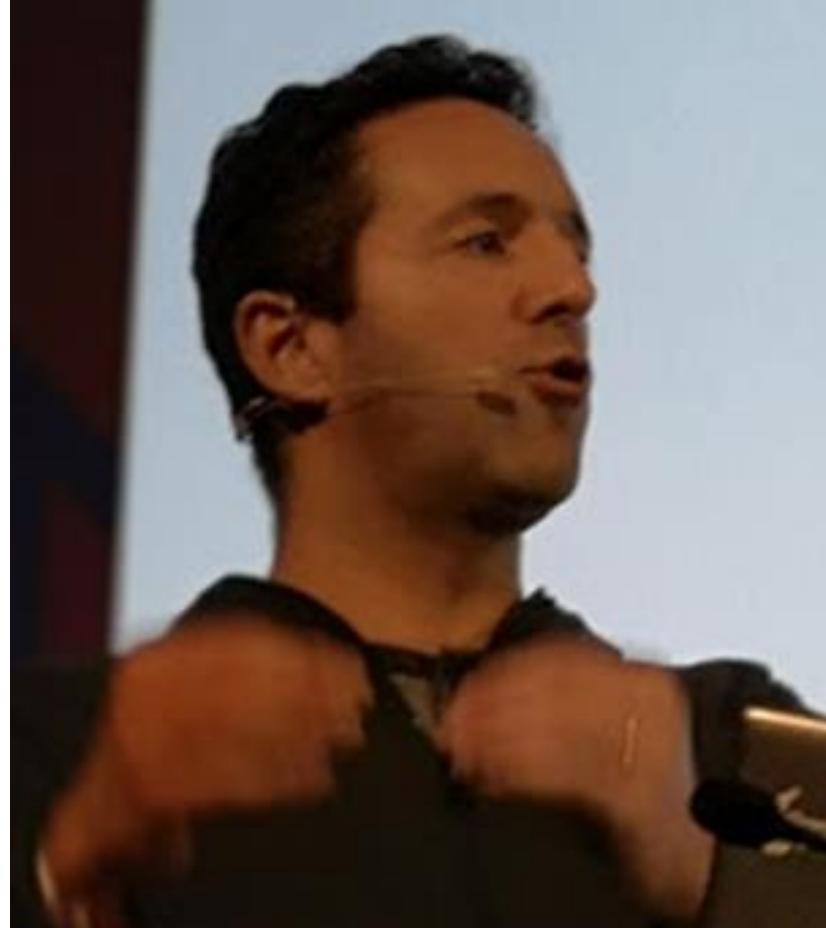
 rui.quintino@devscope.net

 [Linkedin.com/ in/rquintino](https://www.linkedin.com/in/rquintino)

 Twitter [@rquintino](https://twitter.com/@rquintino)

 Medium [/devscope-ai](https://medium.com/devscope-ai)

 Github [/DevScope/ai-lab](https://github.com/DevScope/ai-lab)



What's Power BI anyway?

(Very Successful & Powerful ☺)

*Low/no-code platform
for
Data & Business Understanding*



Pages

Cover Layout

Sales Overview

Company Performance

Purchases

Customer Analysis

Price Analysis

Movements

FAQ

Sales Overview



\$22.63M

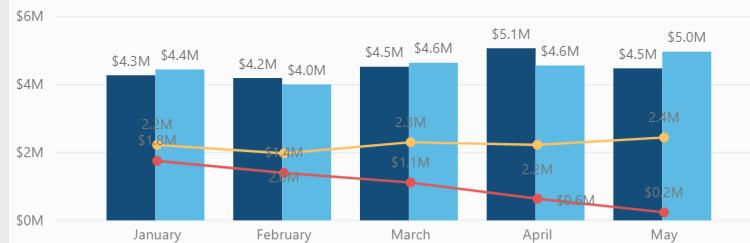


-9.40%



-0.20%

Sales Amount vs LY and Sales Profit by Month

● Sales Amount (ly) ● Sales Amount ● Sales Profit ● Purchase Amount

Sales Profit Forecast



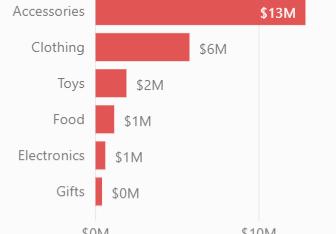
Date

1/1/2016

12/31/2016



Sales Amount by Category



Invoice Status by Customer

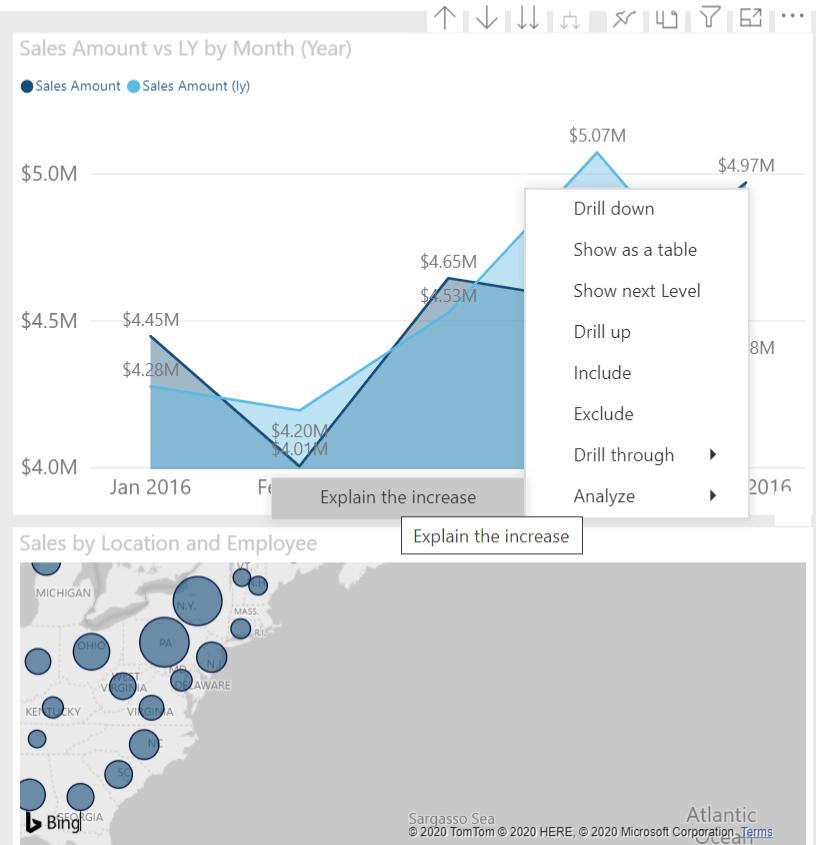
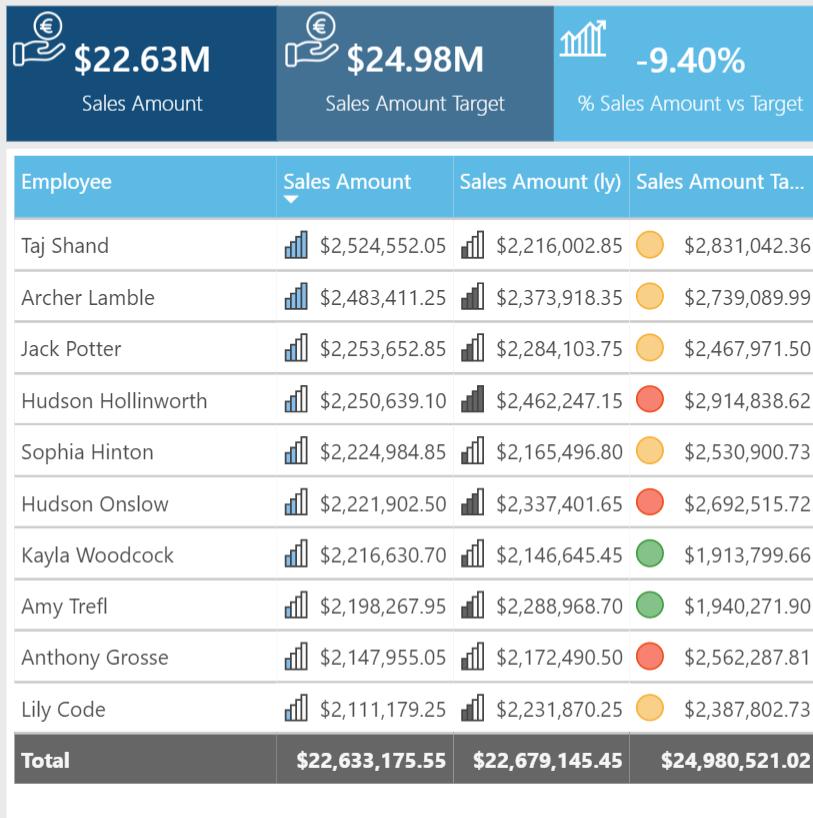
● Invoice St... ● Not Paid ● Paid

Sales Amount by Country, State Province and Category

● Category ● N/A ● Novelty Shop



Company Performance



Análise Mensal do Balanço Social

Trabalhadores por Grupo Profissional

Trabalhadores
122K

Total Trabalhadores por Grupo Profissional	
Enfermeiros	39.217
Assistente...	24.610
Médicos S...	17.096
Assistente...	15.933
Médicos L...	9.408
Técnicos d...	7.702
Outros	6.671
Técnicos S...	1.632

Trabalhadores (homól.)
119K

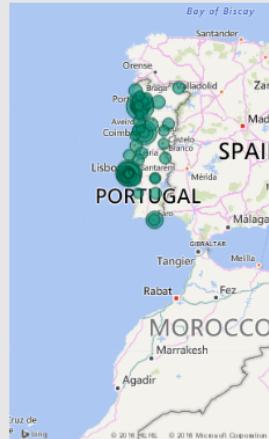
Variação Mensal de Trabalhadores em Valor Absoluto



Trabalhadores (var. homól.)
3K

Nacional

Trabalhadores (var. homól. em perc)
0.00K%



Total Trabalhadores por Região, Instituição



Why so Powerful?

Power BI - Predict Wind Speeds of Tropical Storms - Power Query Editor

File Home Transform Add Column View Tools Help

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Parameters Refresh Preview Properties Advanced Editor Choose Columns Remove Columns Manage Rows Keep Rows Remove Rows Sort Split Column Group By Data Type: Binary Merge Queries Use First Row as Headers Append Queries Combine Files Combine Text Analytics Vision Azure Machine Learning AI Insights

Close New Query Close & Apply

Queries [14]

Content

	Name	Extension	Date accessed
1	20201210-1-avg wind speed.csv	.csv	12/10/2020 8:11:08 PM
2	20201210-2-last-or-avg.csv	.csv	12/10/2020 8:11:08 PM
3	20201210-3-submission_benchmark_gpu.csv	.csv	12/10/2020 8:10:45 PM

Properties

Submissions

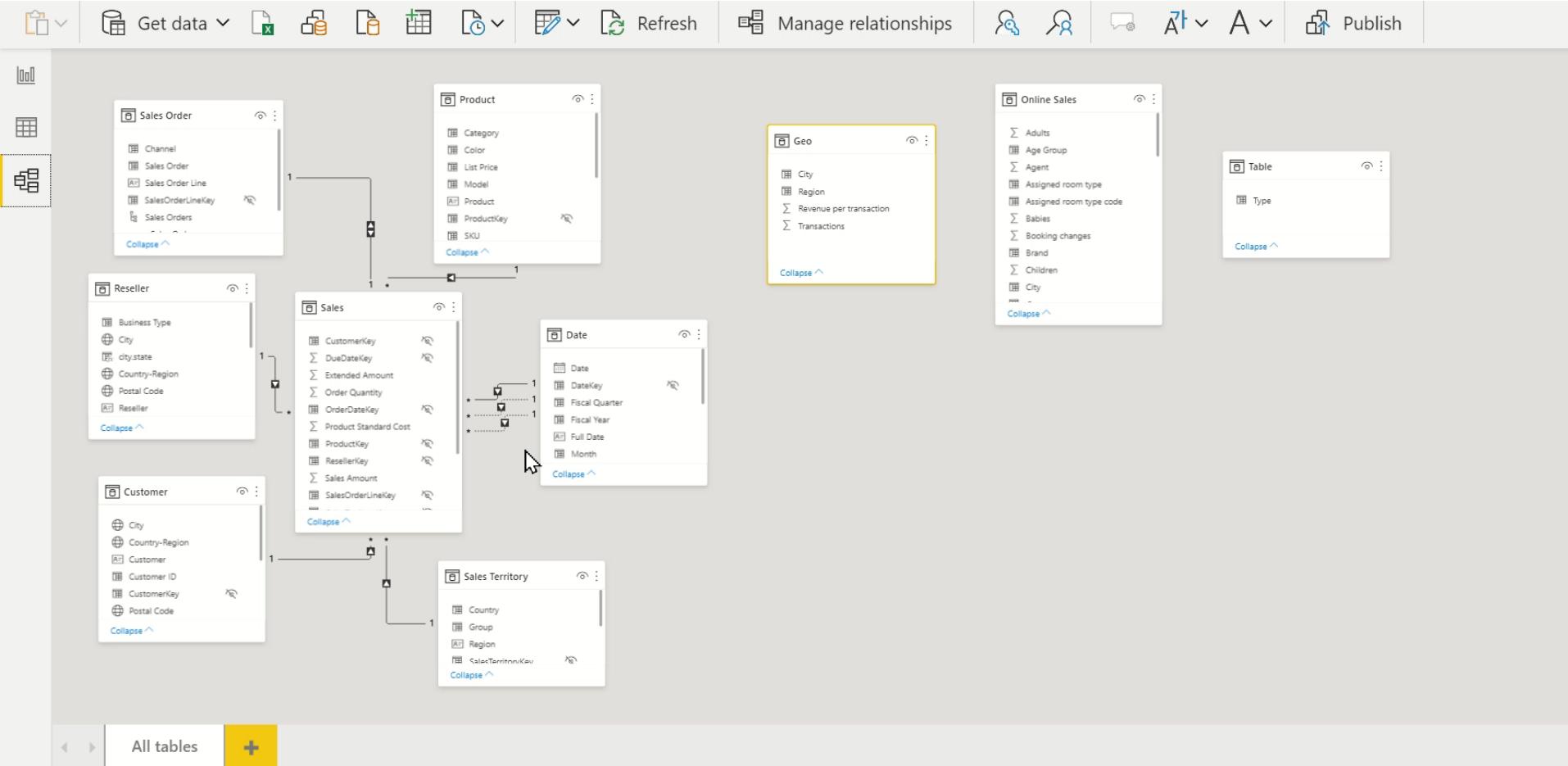
All Properties

Applied Steps

Source

- Filtered Hidden Files1
- Invoke Custom Function1
- Renamed Columns1
- Removed Other Columns1
- Expanded Table Column1
- Changed Type
- Renamed Columns

Visual & Code Data Prep / Intellisense / Profiling / ...



Fast (column store) Semantic Models

2020SU11 Blog Demo - November - Power BI Desktop

Sign in

File Home Insert Modeling View Help External Tools Table tools Measure tools

Name Cancellations Online Sales Format Whole number \$.00 % , .00 0

1 Cancellations = CALCULATE(COUNT('Online Sales'), 'Online Sales'[Status] = "Cancelled")

United States Sales Summary

Sales Amount by Year, Quarter and Month

Month	Sales Amount
2019 Jul	\$1.7M
2019 Aug	\$2.3M
2019 Sep	\$2.3M
2019 Oct	\$1.5M
2019 Nov	\$1.9M
2019 Dec	\$1.8M
2020 Jan	\$1.1M
2020 Feb	\$1.5M
2020 Mar	\$1.5M
2020 Apr	\$1.4M
2020 May	\$1.8M
2020 Jun	\$1.9M

Reseller Search

Select row below to enable drill-through →

Reseller	City	State-Province	Sales Amount
Westside Plaza	Sand City	California	\$534,956.28
Field Trip Store	Loveland	Colorado	\$427,305.59
Brakes and Gears	Tooele	Utah	\$397,237.24
Thorough Parts and Repair Services	Lacey	Washington	\$386,958.19
Rally Master Company Inc	Chandler	Arizona	\$355,141.98
Outdoor Equipment Store	Nashua	New Hampshire	\$314,662.56
Eastside Department Store	Union City	California	\$295,328.92
Totes & Baskets Company	San Antonio	Texas	\$289,777.50
Permanent Finish Products	Reno	Nevada	\$288,088.47
Extraordinary Bike Works	Mesquite	Texas	\$281,844.75
Safe Cycles Shop	Bellevue	Washington	\$277,795.47
Great Bikes	Casper	Wyoming	\$277,495.37
Excellent Riding Supplies	Memphis	Tennessee	\$276,729.43
Area Bike Accessories	Modesto	California	\$275,643.81
Total			\$20,927,177.22

Values

Add data fields here

Drill through

Cross-report

Off

Keep all filters

On

Add drill-through fields here

Visualizations

Fields

Search

Customer

Date

Geo

Online Sales

- Σ Adults
- Age Group
- Σ Agent
- Assigned ro...
- Assigned ro...
- Σ Babies
- Booking ch...
- Brand
- Cancellations
- Σ Children
- City
- Company
- Country
- Σ Customer

Last updated: 9/30/20 10:17 AM

Adventure Works

Introduction Sales Summary Reseller Drill through Visual Zoom Slider Anomaly Detection Page 1

\$20.93M

Sales Amount

\$7.00M

COGS

62K

Order Quantity

Reseller Search

Select row below to enable drill-through →

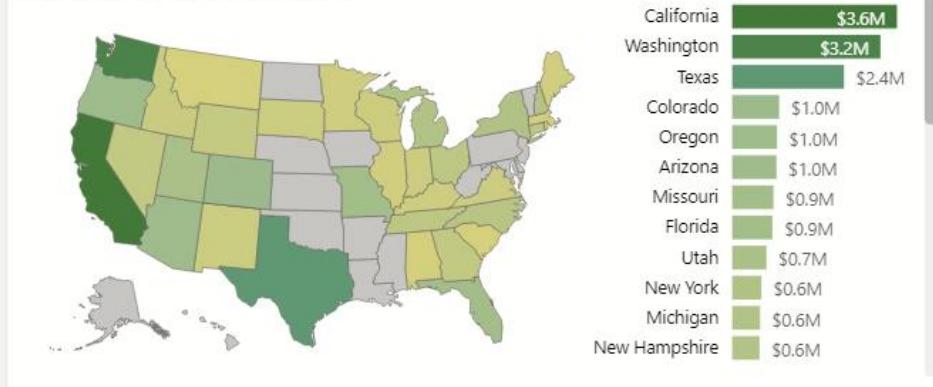
All

Reseller	City	State-Province	Sales Amount
Westside Plaza	Sand City	California	\$534,956.28
Field Trip Store	Loveland	Colorado	\$427,305.59
Brakes and Gears	Tooele	Utah	\$397,237.24
Thororough Parts and Repair Services	Lacey	Washington	\$386,958.19
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Area Bike Accessories	Modesto	California	\$275,643.81
Total			\$20,927,177.22

Sales Amount by Year, Quarter and Month



Sales Amount by State-Province



We don't go EDA from raw data directly!

We prepare a rich semantic model
(reusable relationships, metrics, behaviors, etc)

EDA then reuses this semantic model

Sales & Returns Sample v201912 - Power BI Desktop

Sign in

File Home Insert Modeling View Help External Tools Format Data / Drill

Get data Refresh New visual More visuals

New measure Publish

Microsoft | Skateboard Store Last Refresh: Jun 30th, 2019 / Chicago, IL, USA

Key Influencers Analyzes your data, ranks the factors that matter, and displays them as key influencers.

Decomposition Tree Enables users to drill into any dimension to understand what is driving a key metric.

Category Breakdown

Product	Value
Power BI	\$52K
Word	\$36K
OneNote	\$31K
PowerPoint	\$30K
XBOX	\$27K
PowerApps	\$23K
Excel	\$21K
Skype	\$20K
Publisher	\$19K
XBOX ONE	\$18K
\$0K	\$50K

Store Breakdown

Store	Value
Fama	\$40K
Contoso	\$39K
VanArdsel	\$34K
Aliqui	\$34K
Abbas	\$32K
Barba	\$30K
Leo	\$30K
Pomum	\$30K
Salvus	\$27K
Natura	\$26K
\$0K	\$50K

Net Sales vs net sales PM by date as stacked column chart

Net Sales and Net Sales PM

May 05 Jun 02 Jun 30

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Legal Intro Net Sales Returns Return Rate Market Basket Analysis Net Sales Tooltip Returns To

Visuals Fields

Analysis DAX Design DAX % Return Rate Age Associated Product Association Calendar Customer Issues and Promo... Product Sales STable Store Tooltips Tooltip Info Tooltip Info2

Net Sales

Page 3 of 18

Power BI Desktop – Free, Offline, Feature Rich

Power BI Use Cases for DS/ML

First Tip...

Search...



Select Model

Show 5 entries

Search:

	runId	runDesc	score	cols	alg	gridModels	timeTrain
1	#1	>masterTable	62.37	15	glmnet	31	3.4
2	#1	>features_masterTable_with_Lookup	67.48	23	glmnet	31	4.3
3	#1	>features_TemporalCount	67.14	24	glmnet	31	4
4	#1	>features_Drug_Specialty	67.07	40	glmnet	31	6.4
5	#1	>features_ProcedureGroupgrouping	67.03	33	glmnet	31	5.7

Showing 1 to 5 of 6 entries

Previous 1 2 Next
[Summary](#)
 [Data](#)
 [Insights](#)
 [Reports](#)
 [Test/Predict](#)

Show 5 entries

Search:

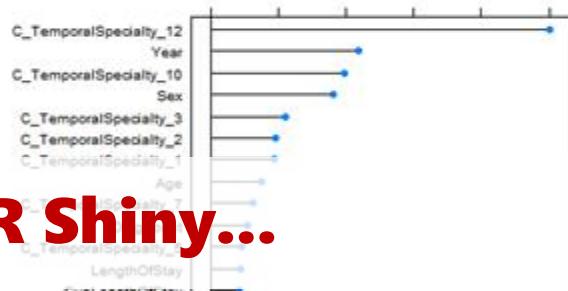
Overall

C_TemporalSpecialty_12 100

Year 43.5540129144048

C_TemporalSpecialty_10 39.3955673471402

Sex 55.9933749126642



Disclaimer: Know a bit of R Shiny...

SHAP Dash! Explanations on Dash - DevScope AI Lab

	Income	SCORE_PR	SCORE_RA	TOP_POS	TOP_NEG
1	>50K.	0.88	1.75	Capital G	Hours pe
2	>50K.	0.87	1.73	Capital G	Occupati
3	>50K.	0.85	1.7	Capital G	Hours pe
4	>50K.	0.82	1.63	Capital G	Hours pe
5	>50K.	0.82	1.65	Educatio	Capital G
6	>50K.	0.82	1.65	Educatio	Capital G
7	>50K.	0.82	1.65	Educatio	Capital G
8	>50K.	0.82	1.64	Educatio	Capital G
9	>50K.	0.82	1.65	Educatio	Capital G
10	>50K.	0.81	1.62	Educatio	Capital G
11	>50K.	0.81	1.61	Marital S	Capital G
12	<=50K.	0.8	1.6	Educatio	Capital G

EXPLAIN **CLEAR**

Age 59 (#)

88.00% Probability

Capital Gain=99999.0

Education-N **Education-Num=15.0** +

js_Married-civ-spouse=1.0

Education_Prof-school=1.0

Upation_Prof-specialty=1.0

Relationship_Husband=1.0

lorkclass_Self-emp-inc=1.0

Status_Never-married=0.0

Age=59.0

Sex=1.0

Hours per week=40.0

elationship_Own-child=0.0

0 0.04567019 0.1

And Python Plotly Dash...

Choose Season:

2020_2021

Choose League:

Bundesliga

Choose Matchday:

1

Choose Match:

Bayern_Schalke_Bundesliga_20...

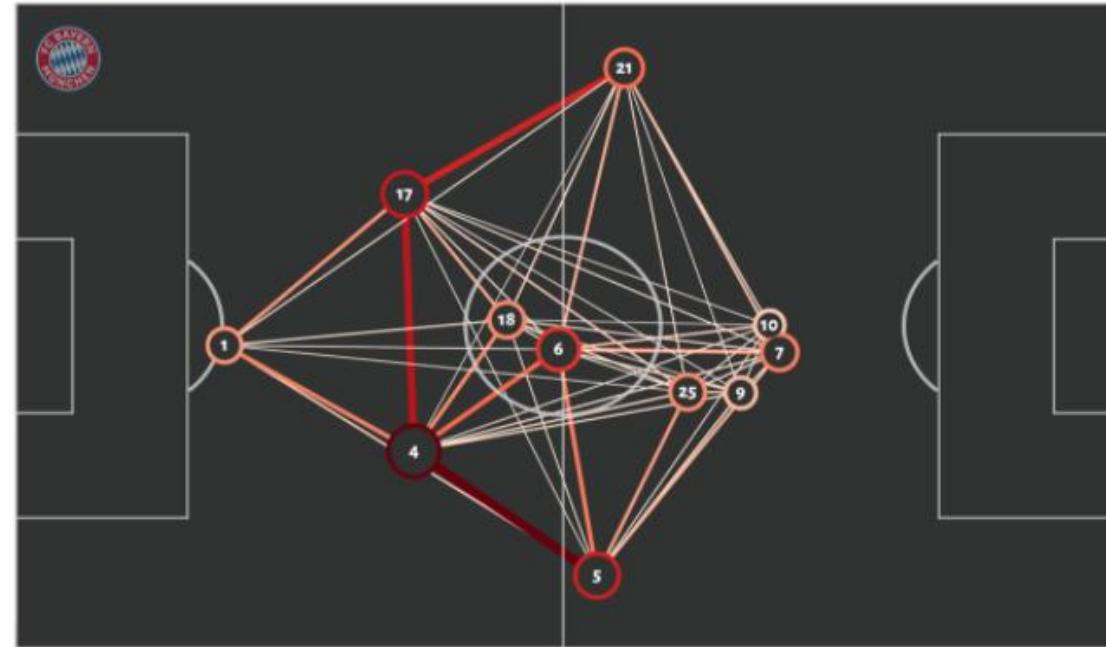
Pick Home Team Color



Pick Away Team Color



Big fans of Python StreamLit... (credits to Luís Costa 😊)



No	Player	Centrality
4	Niklas Süle	0.257
17	Jérôme Boateng	0.194
21	David Alaba	0.178
10	Joshua Kimmich	0.176
13	Sebastian Rudy	0.159

No	Player	Centrality
4	Ozan Kabak	0.232
10	Nabil Bentaleb	0.216
13	Sebastien Haller	0.198
15	Yannick Cahuzac	0.192
18	André Hahn	0.188
25	Sead Kolasinac	0.186
9	Mark Uth	0.182
7	Benjamin Stambouli	0.179
1	Thiago Alcantara	0.178
5	Sebastian Rode	0.176

Returns
\$52.3K

-59.8%
m/m

Units Returned
1,007

-59.8%
m/m

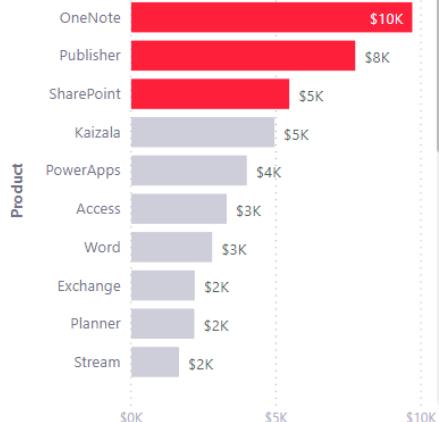
Key Influencers

Analyzes your data, ranks the factors that matter, and displays them as key influencers.

Decomposition Tree

Enables users to drill into any dimension to understand what is driving a key metric.

Category Breakdown



Store Breakdown



Show me Returns Over Time, Only Leo, Contoso, Fama, and Pomum

Store ● Contoso ● Fama ● Leo ● Pomum



Visual

Tabular

Visual

Map

Restart Q&A

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Legal

Intro

Net Sales

Returns

Return Rate

Market Basket Analysis

Net Sales Tooltip

Returns Tooltip

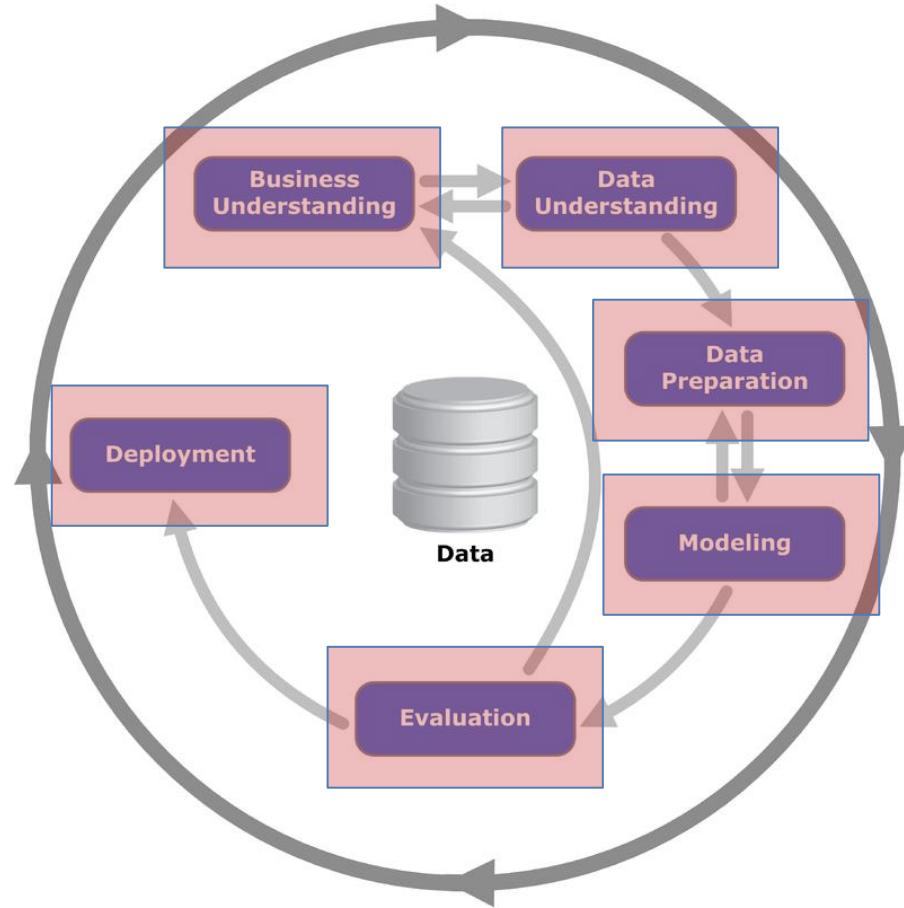
CategoryBreakdown

KeyInfluenc

but... Business Reports/Dashboards with Shiny, Python, StreamLit, just don't!

Where Power BI can help?

Actually...
(with new Auto ML)



https://en.wikipedia.org/wiki/Cross-industry_standard_process_for_data_mining

XBOX
XBOX

Category	XBOX
Color	Green
Price	\$40

[Go Back](#) [Open PowerApp](#)

Market Basket Analysis

Allows users to identify relationships between the items that people buy.

Best Match

XBOX ONE

98.9%
Confidence

219
Support

1.8x
Lift

This app is designed to assist store managers to place orders.

[+](#) [-](#)

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[Legal](#)[Intro](#)[Net Sales](#)[Returns](#)[Return Rate](#)[Market Basket Analysis](#)[Net Sales Tooltip](#)[Returns Tooltip](#)[Category Breakdown](#)[Key Influ](#)

Delivering/Presenting DS/ML Outputs/Insights

Time Series

Metric

Taxi Passengers



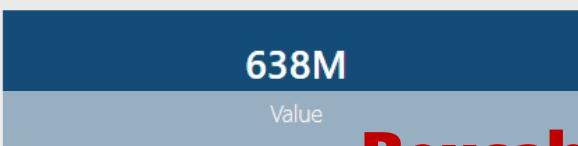
Service, Borough, Zone

All

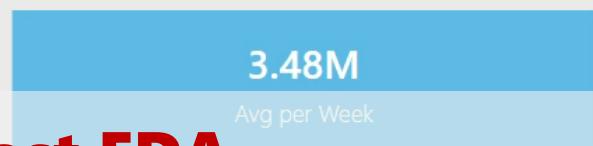
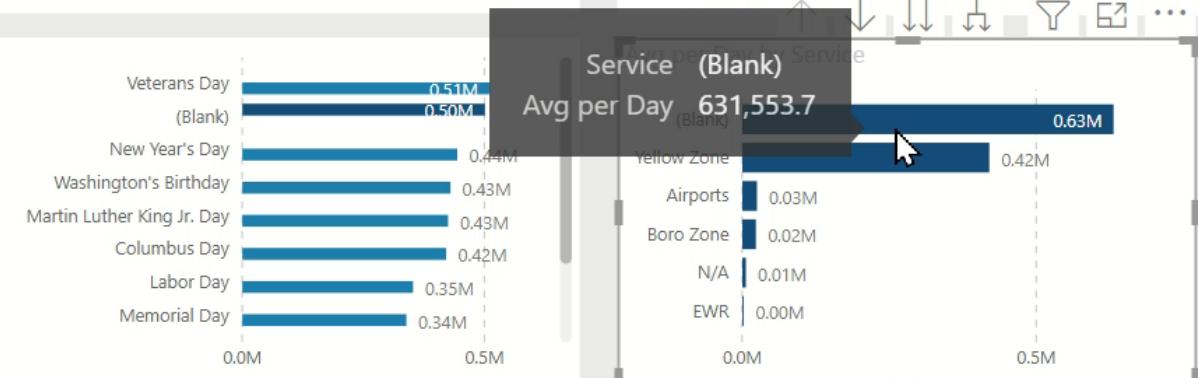
12/28/2015

12/31/2020

devscope



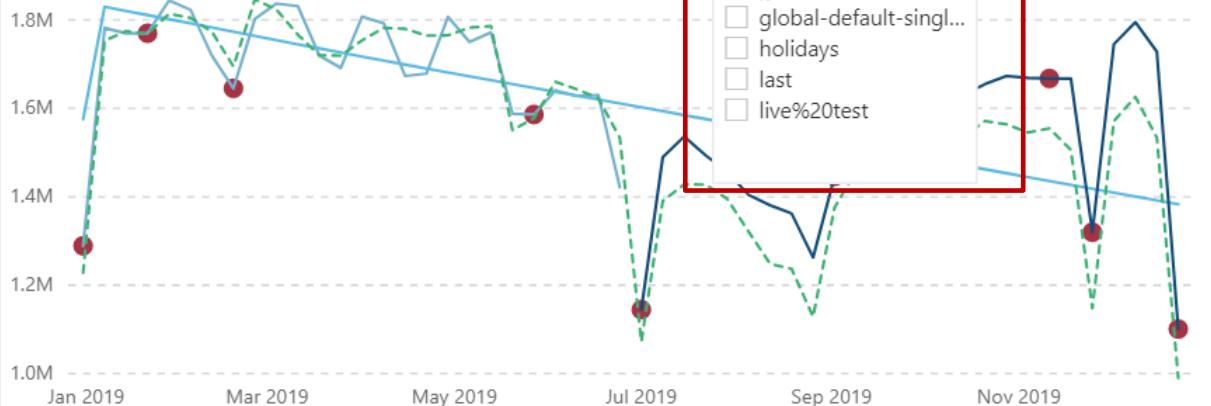
Reusable TimeSeries/Forecast EDA



Forecast

Metric
All Trips (With Test)

Holidays ● Trips ● Adjusted Trend ● Trend ● Forecast ● Adjusted ● Test



Forecast Version
4k_run

- 4k_run
- 8k_run_cutoff_mape
- baseline-default
- global
- global-default-singl...
- holidays
- last
- live%20test

Service, Borough, Zone
All

1/1/2019 12/29/2019

devscope

83,879,351

Year

-17.86%

% Diff (YTD)

84,437,750

Forecast (Simple)

0.67%

Abs. Perc. Error (Simple)

102,399,456

LY

-18.09%

Value % (Δ LY-YTD)

81,021,841

Forecast (Full Year)

3.41%

Abs. Perc. Error (Full Year)

-20.88%

Forecast % (Δ LY)

7.22%

Abs. Perc. Error

8.10%

MAPE (week)

39,587,847

Trips (Test)

36,730,337

Forecast (Test)

7.22%

Abs. Perc. Error

8.10%

MAPE (week)

Trend Adjustment

0.00

Eval performance & behaviors for different models

2020-09-21 10:38:38

Wind-dependent Variables: Predict Wind Speeds of Tropical Storms

HOSTED BY RADIANT EARTH FOUNDATION

Press F11 to exit full screen



Submissions

BEST	CURRENT RANK	# COMPETITORS	SUBS. MADE
8.4739	1	277	1 of 3

LEADERBOARD

SUBMISSION RESTRICTIONS

Competitors are allowed 3 submissions per 1 day.

Your next submission can be on Dec. 16, 2020 UTC.

PRIMARY EVALUATION METRIC

$$\text{Root-mean-square Error} = \sqrt{\frac{1}{N} \sum_{i=0}^N (y_i - \hat{y}_i)^2}$$

Root-mean-square error is the square root of the sum of the squared differences between values and the actual values. The goal is to minimize RMSE.

DATA DOWNLOAD

- submissions
- test
- train
- validation
- local_val_storms.csv
- Power BI - Predict Wind Speeds of Tropical Stor...
- re-test-images.tgz
- re-train-images.tgz

SHARE YOUR WORK!

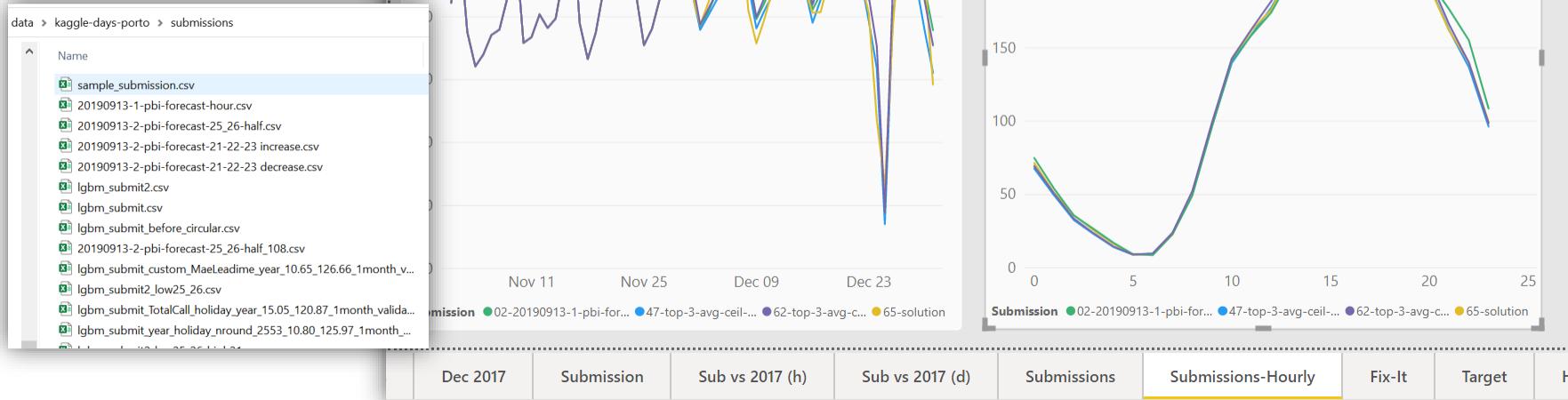
Awesome for ML Competitions (I kid you not! 😊)

Facebook

Twitter

LinkedIn

Email



Leaderboards (ex: submission evaluation/validation)

Machine Learning model governance at scale



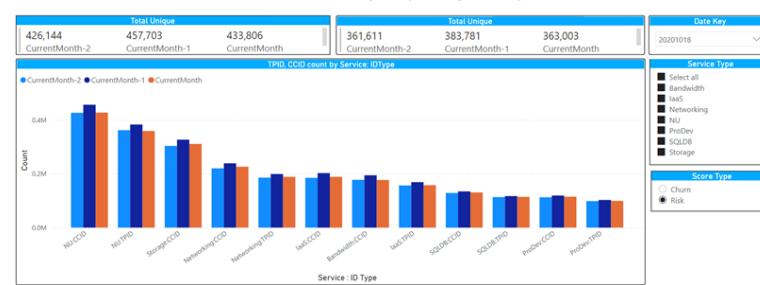
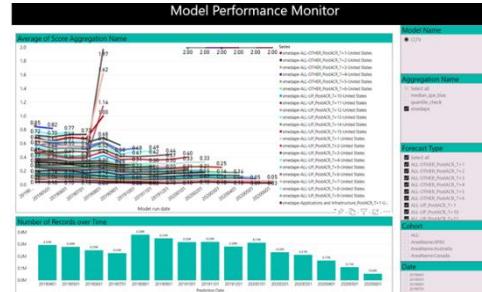
Petersaddow

Follow

Nov 13 · 13 min read

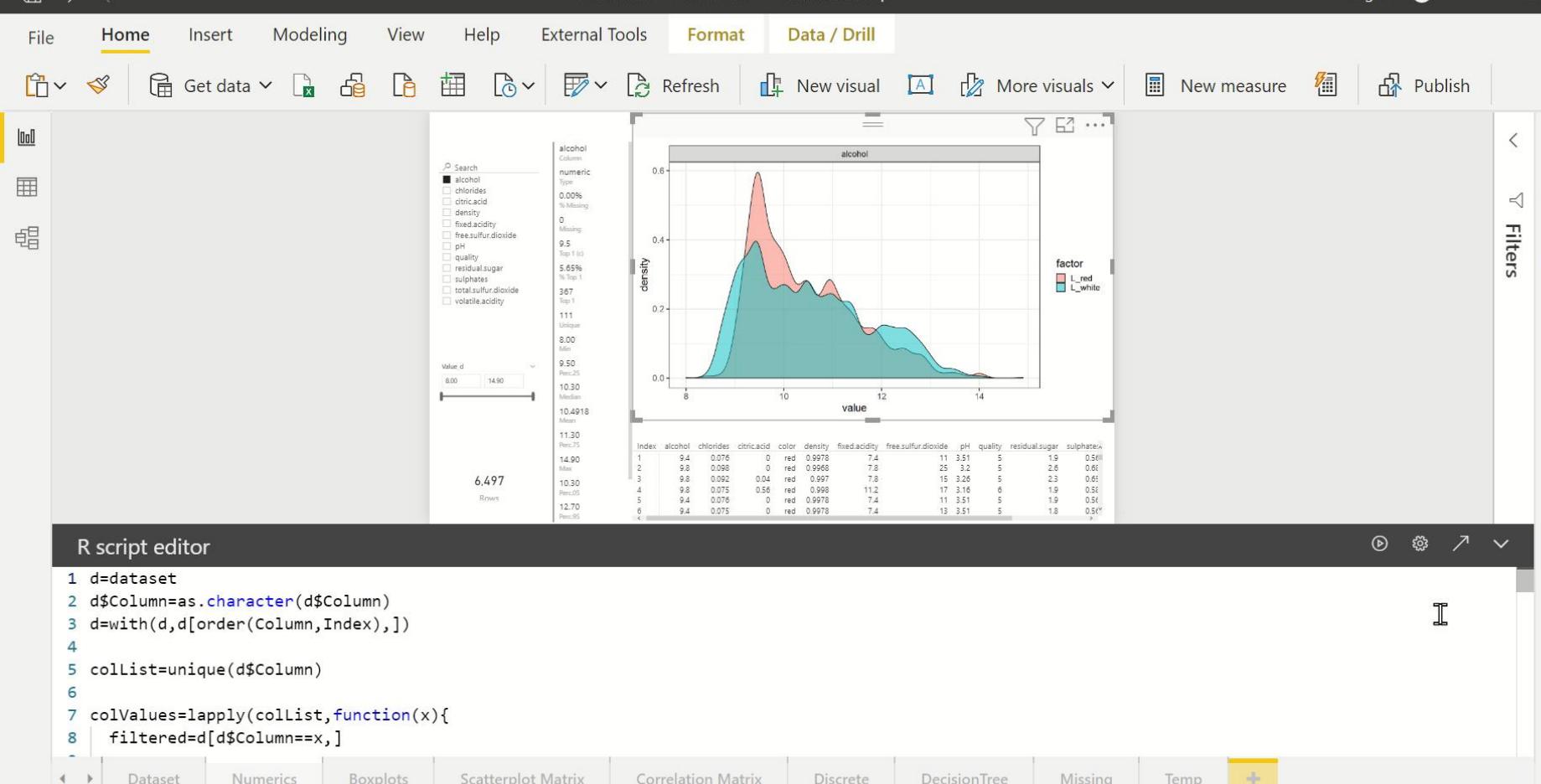


Author Peter Saddow is joined for this article by co-author Daniel Yehdego.



Machine Learning Governance (msft CGA team Cloud+AI)

Advanced features for EDA



Custom R and Python interactive EDA

27

Questions to get you started

From the report author

show me average trip length by date X

show me average trip length for the last year X

top regions by average trip length YoY% X

Other suggestions

Save and close

Cancel

average trip length for 2017 by date

Ask a related question

Clear

Add this question

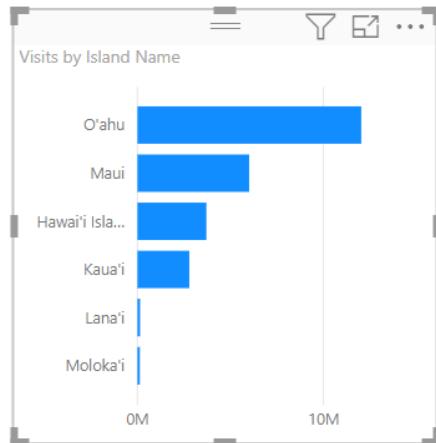
Average Trip Length by Date



Showing dates and average trip length, where year is in 2017

Filters (including highlights) from the source page have been applied.

Use natural language for quick questions & visuals



visits by island

island (Islands)

island weather island

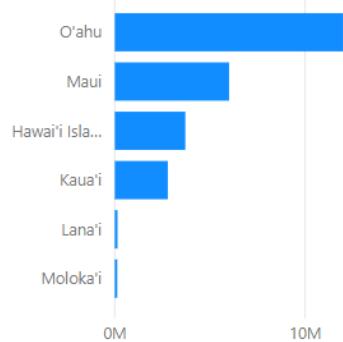
island friendly (Islands > Island Friendly Name)

island name (Islands > Island Name)

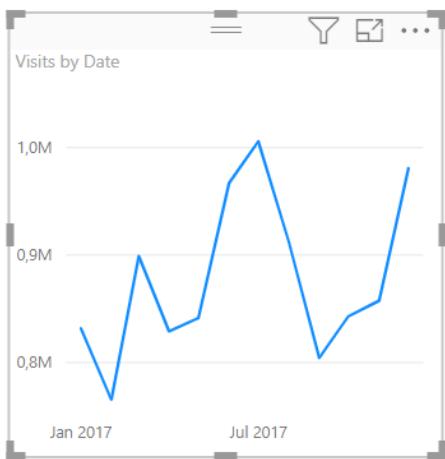
island weather (Island Weather)

Visual creation using Q&A feature

Visits by Island Name



Visits by Date



visits for 2017 by date

€ 20.93M
Total Sales

\$7.00M
COGS

62K
Order Quantity

Reseller Search

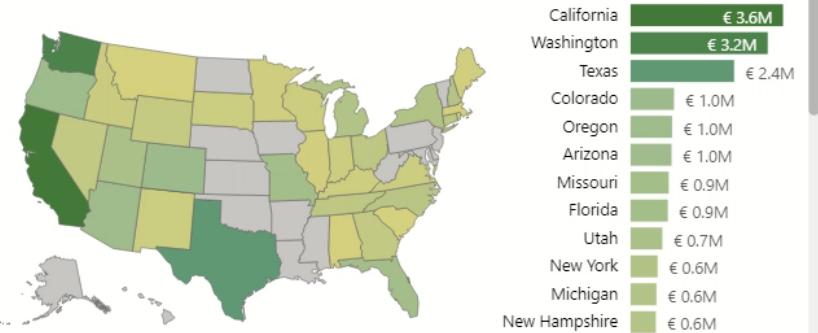
Select row below to enable drill-through →

Reseller	City	State-Province	Total Sales
Westside Plaza	Sand City	California	€ 534,956.28
Field Trip Store	Loveland	Colorado	€ 427,305.59
Brakes and Gears	Tooele	Utah	€ 397,237.24
Thorough Parts and Repair Services	Lacey	Washington	€ 386,958.19
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Excellent Riding Supplies	Memphis	Tennessee	€ 276,729.43
Area Bike Accessories	Modesto	California	€ 275,643.81
Total			€ 20,927,177.22

Total Sales by Year, Quarter and Month



Total Sales by State-Province



Last updated: 9/30/20 10:17 AM



Powerfull & Easily configurable Drill Through Scenarios

Introduction

Sales Summary

Reseller Drill through

Visual Zoom Slider

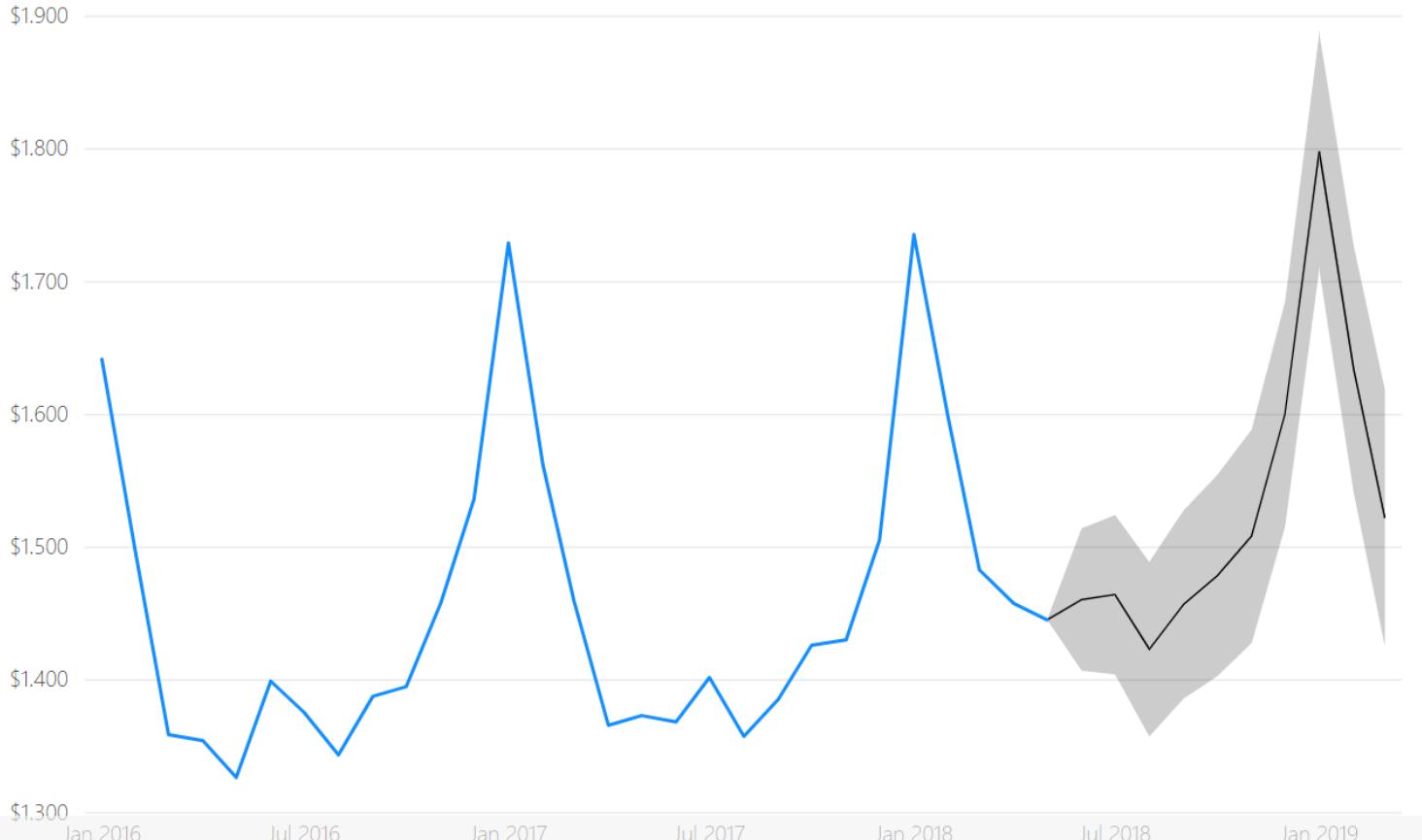
Anomaly Detection

Predictive Model

+

[Back to report](#)

SPENDING PER TRIP (PP)



Native Forecast (ETS based)

VISUALIZATIONS



FILTERS

Search: Forecast 1

Forecast length: 10 Month(s)

Ignore last: 0 Month(s)

Confidence interval: 95%

Seasonality: 12 Point(s)

Apply

Name	Age	Fare	Parents/Children	Siblings/Spouses
Abbing, Mr. Anthony	42	7	0	0
Abbott, Mr. Rossmore Edward	16	20	1	1
Abbott, Mrs. Stanton (Rosa Hunt)	35	20	1	1
Abelson, Mr. Samuel	30	24	0	1
Abelson, Mrs. Samuel (Hannah Wizosky)	28	24	0	1
Adahl, Mr. Mauritz Nils Martin	30	7	0	0
Adams, Mr. John	26	8	0	0
Ahlin, Mrs. Johan (Johanna Persdotter Larsson)	40	9	0	1
Aks, Mrs. Sam (Leah Rosen)	18	9	1	0
Albimona, Mr.				
Alexander, Mr.				
Alhomaki, Mr.				
Ali, Mr. Ahmec				
Ali, Mr. Willian				
Allen, Miss. Eli				
Allen, Mr. Willi				
Allison, Master				
Allison, Miss. H				
Allison, Mrs. H				

Components

Export data
Show data
Remove
Automatically find clusters
Spotlight
Sort descending
Sort ascending

Clusters

Name: Name (clusters) Field: Name

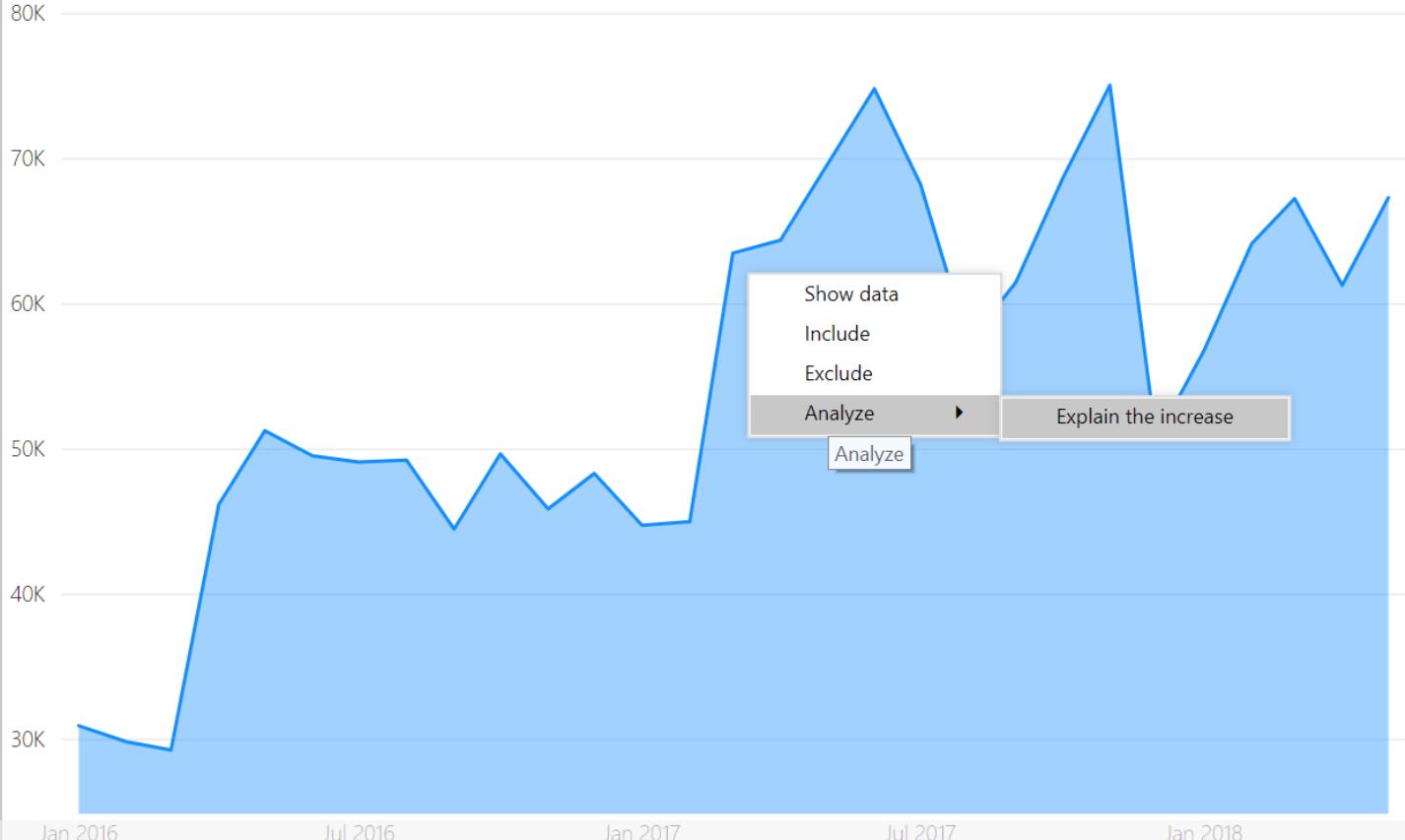
Description: Clusters for Name

Number of clusters: Auto

Built-in Clustering Support

< Back to report

VISITS BY REGION



Root causes (explain the increase/decrease)



[Back to report](#)

VISITS BY REGION

80K

70K

60K

50K

40K

30K

Jan 2016

Jul 2016

Jan 2017

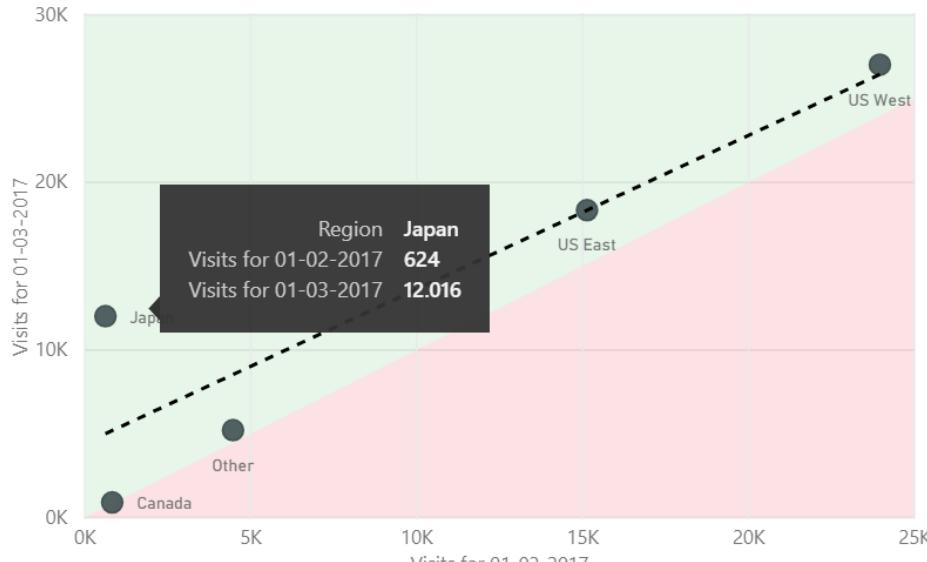
Here's the analysis of the 41.12% increase in Visits between 01-02-2017 and 01-03-2017

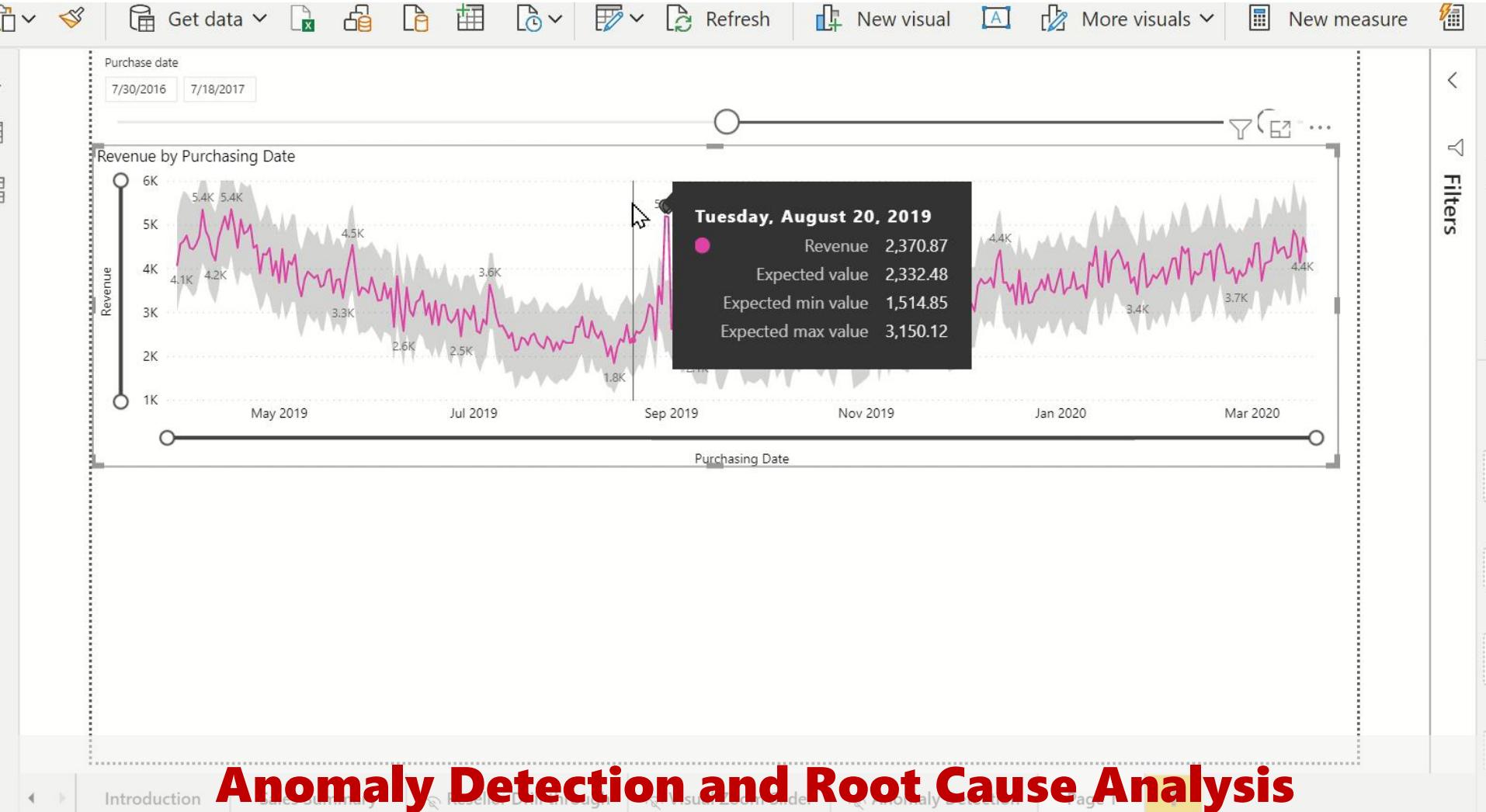


Visits for 01-02-2017 and Visits for 01-03-2017
BY REGION



'Japan' accounted for the majority of the increase among Region. The relative contributions made by 'Japan', 'US West', and 'US East' changed the most.





Passengers # by Survived



FILTERS

PassengerId	Name	Family	Sex	Age	Class	Fare	Parents/Children	Siblings/Spouses	Embarked	Ticket	Cabin	Title	Survived
1	Braund, Mr. Owen Harris	Braund	Male	22	3	7	0	1	Southampton	A/5 21171		Mr.	No
2	Cumings, Mrs. John Bradley (Florence Briggs Thayer)	Cumings	Female	38	1	71	0	1	Cherbourg	PC 17599	C85	Mrs.	Yes
3	Heikkinen, Miss. Laina	Heikkinen	Female	26	3	7	0	0	Southampton	STON/O2. 3101282		Miss.	Yes
4	Futrelle, Mrs. Jacques Heath (Lily May Peel)	Futrelle	Female	35	1	53	0	1	Southampton	113803	C123	Mrs.	Yes
5	Allen, Mr. William Henry	Allen	Male	35	3	8	0	0	Southampton	373450		Mr.	No
6	Moran, Mr. James	Moran	Male	3	8	0	0	0	Queenstown	330877		Mr.	No
7	McCarthy, Mr. Timothy J	McCarthy	Male	54	1	51	0	0	Southampton	17463	E46	Mr.	No
8	Palsson, Master. Gosta Leonard	Palsson	Male	2	3	21	1	3	Southampton	349909		Master.	No
9	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	Johnson	Female	27	3	11	2	0	Southampton	347742		Mrs.	Yes
10	Nasser, Mrs. Nicholas (Adele Achem)	Nasser	Female	14	2	30	0	1	Cherbourg	237736		Mrs.	Yes
11	Sandstrom, Miss. Marguerite Rut	Sandstrom	Female	4	3	16	1	1	Southampton	PP 9549	G6	Miss.	Yes
12	Bonnell, Miss. Elizabeth	Bonnell	Female	58	1	26	0	0	Southampton	113783	C103	Miss.	Yes
13	Saundercock, Mr. William Henry	Saundercock	Male	20	3	8	0	0	Southampton	A/5. 2151		Mr.	No
14	Anderson, Mr. Anders Johan	Anderson	Male	39	3	31	5	1	Southampton	347082		Mr.	No
15	Vestrom, Miss. Hulda Amanda Adolfina	Vestrom	Female	14	3	7	0	0	Southampton	350406		Miss.	No
16	Hewlett, Mrs. (Mary D Kingcome)	Hewlett	Female	55	2	16	0	0	Southampton	248706		Mrs.	Yes
17	Rice, Master. Eugene	Rice	Male	2	3	29	1	4	Queenstown	382652		Master.	No
18	Williams, Mr. Charles Eugene	Williams	Male	2	13	0	0	0	Southampton	244373		Mr.	Yes

Quick glimpse/preview of Key predictors/"influencers"

Titanic Disaster

Influencers

Detail

Clustering



[Back to report](#)

Key influencers Top segments

What influences Survived to be ?

When...

...the likelihood of Survived being Yes increases by

Gender is Female

3.93x

Title is Mrs.

2.50x

Title is Miss.

2.30x

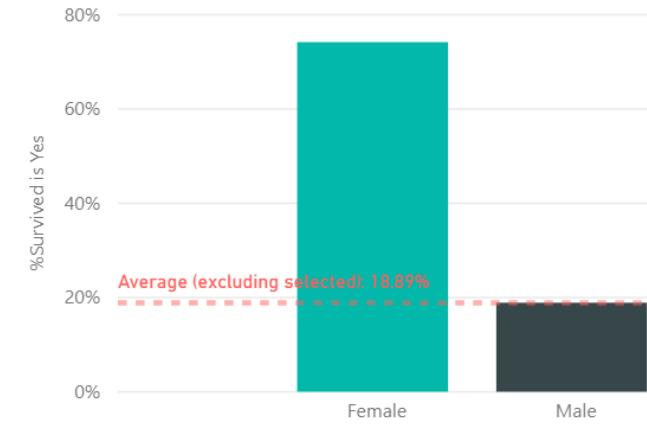
Fare is more than 73

2.26x

Class is 1

2.06x

← Survived is more likely to be Yes when Gender is Female than otherwise (on average)



Only show values that are influencers

Key “influencers” visual

[Back to report](#)

VISITS BY REGION (YTD)

300K

250K

200K

150K

100K

50K

0K

2016

287K

188K

317K

- See Records
- Show data
- Group
- Include
- Exclude
- Analyze

Explain the increase

Find where this distribution is different

Distribution drivers & outliers

FILTERS

VISUALIZATIONS



Axis

Year

Legend

Add data fields here

Value

Visits

Toolips

Add data fields here

DRILLTHROUGH

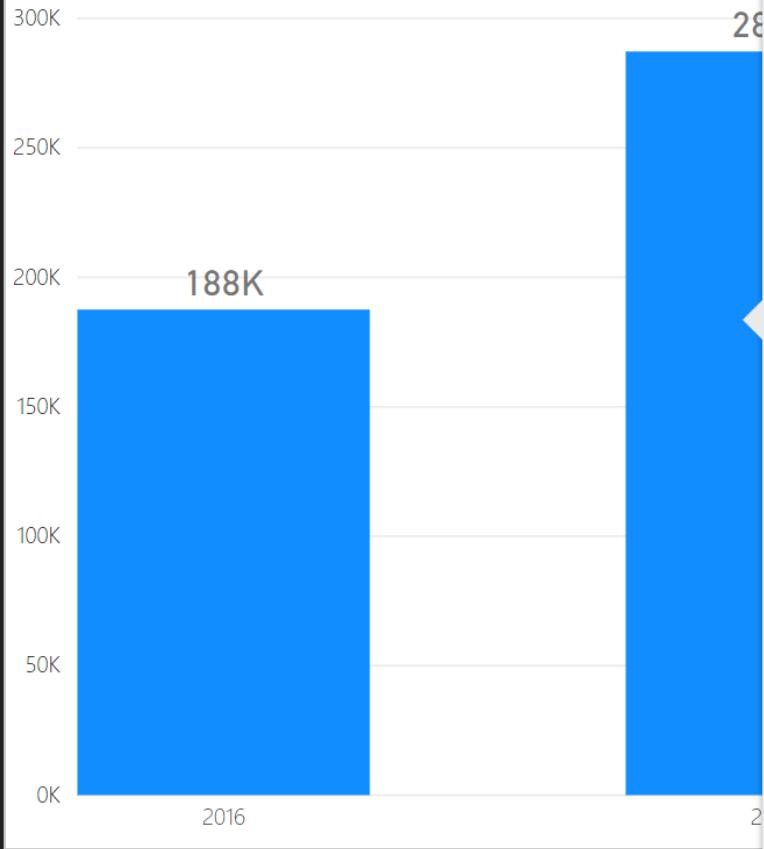
Cross-report

Off

Keep all filters

[Back to report](#)

VISITS BY REGION (YTD)



Here are the filters that cause the distribution of Visits by Year to change the most [?](#)

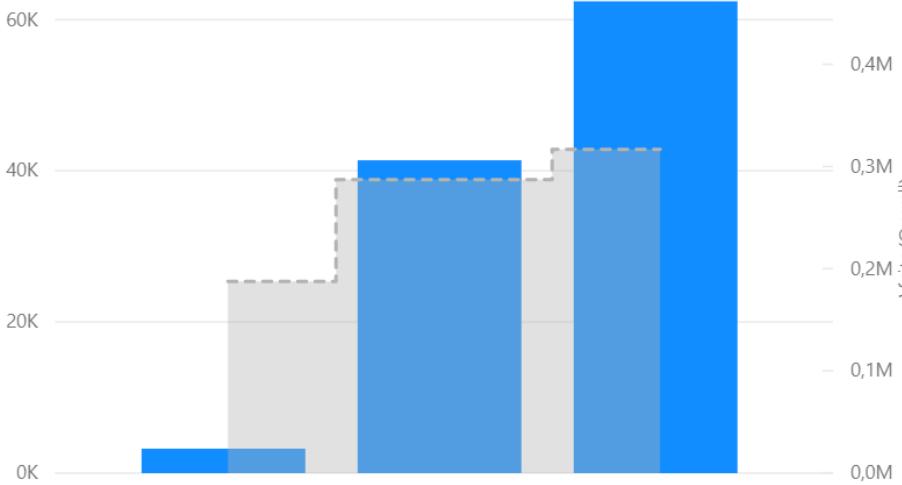
REGION



'Japan', with 20,4% of records; 'US East', with 20,4% of records; and 'Canada', with 20,4% of records, among others, most affect the distribution.

[Japan](#) [US East](#) [Canada](#)

[Visits for Japan](#) [Visits \(Overall\)](#)



Comparing proportions [\(i\)](#)

Other Tips & Cool Features

File Home Insert Modeling View Help External Tools **Table tools** **Column tools**

Name Sales Amount  Fixed decimal n...  Currency  \$  %  . 0  Σ Sum    ...

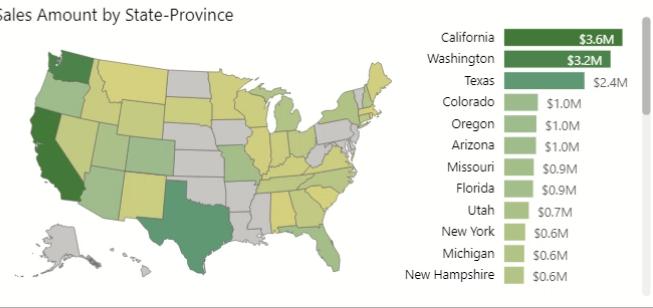
United States Sales Summary

Sales Amount by Year, Quarter and Month



Month	Sales Amount
2019 Jul	\$1.7M
2019 Aug	\$2.3M
2019 Sep	\$2.3M
2019 Oct	\$1.5M
2019 Nov	\$1.9M
2019 Dec	\$1.8M
2020 Jan	\$1.1M
2020 Feb	\$1.5M
2020 Mar	\$1.5M
2020 Apr	\$1.4M
2020 May	\$1.8M
2020 Jun	\$1.9M

Sales Amount by State-Province



State-Province	Sales Amount
California	\$3.6M
Washington	\$3.2M
Texas	\$2.4M
Colorado	\$1.0M
Oregon	\$1.0M
Arizona	\$1.0M
Missouri	\$0.9M
Florida	\$0.9M
Utah	\$0.7M
New York	\$0.6M
Michigan	\$0.6M
New Hampshire	\$0.6M

Last updated: 9/30/20 10:17 AM

Reseller Search

Select row below to enable drill-through →

Reseller	City	State-Province	Sales Amount
Westside Plaza	Sand City	California	\$534,956
Field Trip Store	Loveland	Colorado	\$427,306
Brakes and Gears	Tooele	Utah	\$397,237
Thorough Parts and Repair Services	Lacey	Washington	\$386,958
Rally Master Company Inc	Chandler	Arizona	\$355,142
Outdoor Equipment Store	Nashua	New Hampshire	\$314,663
Eastside Department Store	Union City	California	\$296,329
Totes & Baskets Company	San Antonio	Texas	\$289,777
Permanent Finish Products	Reno	Nevada	\$288,088
Extraordinary Bike Works	Mesquite	Texas	\$281,845
Safe Cycles Shop	Bellevue	Washington	\$277,795
Great Bikes	Casper	Wyoming	\$277,495
Excellent Riding Supplies	Memphis	Tennessee	\$276,729
Area Bike Accessories	Modesto	California	\$275,644
Total			\$20,927,177



Introduction

Sales Summary

Reseller Drill through

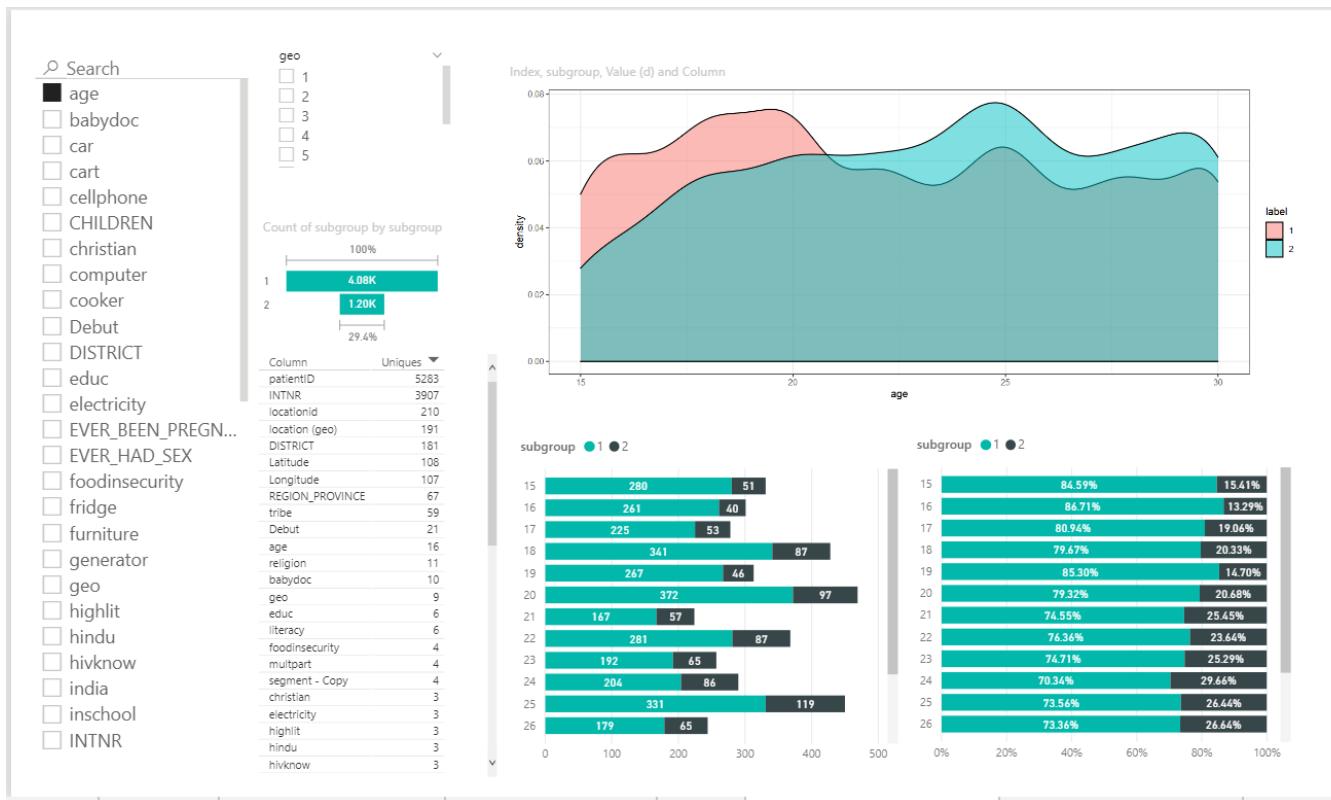
Visual Zoom Slider

Anomaly Detection

Page 1



Easy Refactoring, renames, measure formats,...



Reproducibility (just open it!)

Forecast

Metric

All Trips (With Test)

Forecast Version

4k_run

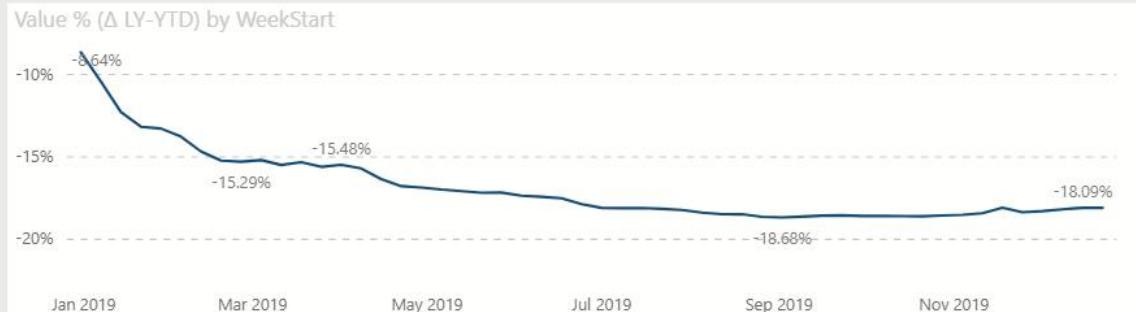
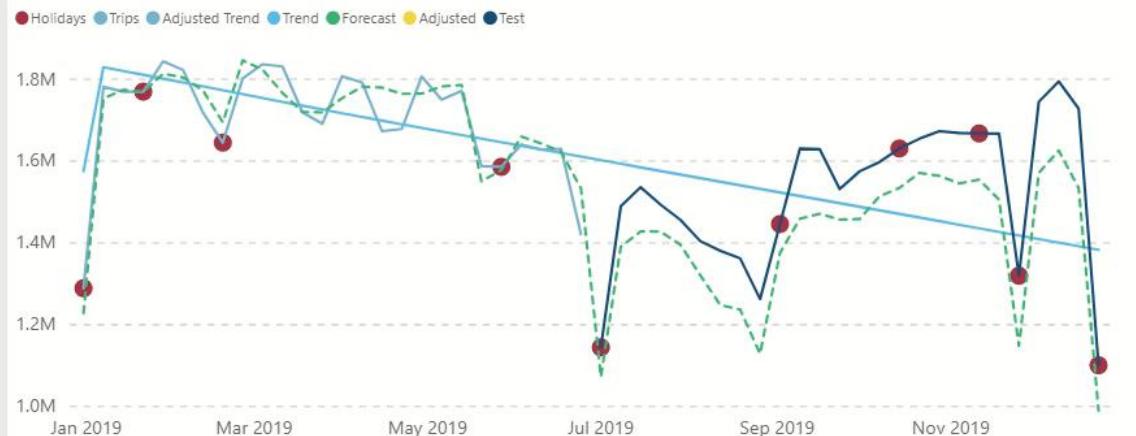
Service, Borough, Zone

All

1/1/2019

12/29/2019

devscope



83,879,351
Year
-17.86%
% Diff (YTD)
84,437,750
Forecast (Simple)
0.67%
Abs. Perc. Error (Simple)
102,399,456
LY
-18.09%
Value % (Δ LY-YTD)
81,021,841
Forecast (Full Year)
3.41%
Abs. Perc. Error (Full Year)
-20.88%
Forecast % (Δ LY)
7.22%
Abs. Perc. Error
8.10%
MAPE (week)

39,587,847
Trips (Test)
36,730,337
Forecast (Test)
7.22%
Abs. Perc. Error
8.10%
MAPE (week)

Trend Adjustment
0.00

2020-09-21 10:38:38

What-ifs/Interactive Parameters

ies

Analysis

Forecast

Simple

Sample by year

Coverage

Trend

Seasonal

Parameters

Page 1



Visual Zoom Slider



New Zoom Slider



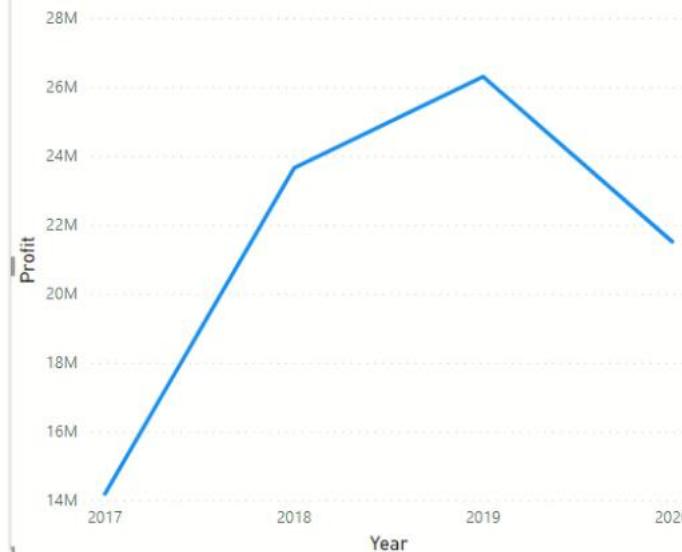
Daniil Maslyuk • 2nd
Microsoft Power BI specialist
7h •



+ Follow

Native small multiples in #PowerBI!!!

Profit by Year | Twitter: @DMaslyuk



A screenshot of the Microsoft Power BI ribbon interface. The "Axis" tab is selected. In the "Values" section, there is a dropdown menu open with "Profit" selected. Below the dropdown, under "Small multiples", there is a button labeled "Add data field". A yellow circle highlights this button, indicating it is the focus of the post. Other sections visible include "Legend", "Secondary values", and "Toolips".



1

***New* Native Small Multiples**

Power BI & Auto ML

+ Add ML model

Entities



Select data



Choose model



Customize inputs



Name + train

NAME



Low

Select the historical outcome data that you would like to predict

Your model needs to learn from past situations where the event outcome is known

Entity name

Customer

Historical outcome field

LowRating

Semantic Models based Auto ML (cloud/premium feature)

Entities

Select data

Choose model

Customize inputs

Name + train

+ Add ML model

X Close

NAME



Low

Choose a model type

Classification

Regression

Forecasting



Binary Prediction

Determine the likelihood of a specific outcome being achieved.



General Classification

Identify the category or class an entity belongs to.



Regression

Estimate a numeric value



Forecasting

Estimate values and trends based on historical data.

Back

Next

Cancel



Entities Machine learning models

Add ML model | Save Close

NAME

Low Ratings Model

LAST TRAINED

STATUS

Ready

Your model is ready for training



You can refresh your dataflow now to start training or refresh later.

We'll notify you when your model is ready and show you how it performed.

We estimate it may take up to 30 minutes for your model to train, based on the size of your dataset.

1. Create and train your model



2. Improve it

Evaluate, customize and retrain
your model until it's optimized.

3. Apply it

Apply your model to future data
for predictive insights.

What's next:

Refresh now

Refresh later

← Titanic Survival model accuracy preview

This report summarizes the accuracy of the binary prediction model and enables you to find an optimal threshold for defining your business outcome.

Apply model

Edit model

Model Performance

78%

Area under ROC curve

Training summary data

304	404
Total Data Provided	Total Data Sampled
304	100
Training Data	Validation Data

How the model was tested

The model predicted Survived probabilities for a test set of 100 records and compared the predicted outcomes (based on the selected threshold) to the historical outcomes.

Inspect your model

Learn about the performance of your model by inspecting the accuracy diagrams below.

Cumulative Gains Chart

A Cumulative Gains chart shows what percentage of the positive rows can be detected by targeting a percentage of the total rows.

This chart compares the performance of 3 approaches:

- "Model" -- your model is used to sort the rows in descending order of the predicted score indicating the target category.
- "Ideal" -- a theoretically "perfect" model, which would always rank any rows in the target category above rows that do not belong to the target category
- "Random guess" -- no model being used. The rows are assumed to be evenly distributed so, for example, 10% of the total rows are expected to contain 10% of the target category.

ROC Curve

An ROC (Received Operating Characteristics) curve tells you how capable your model is to distinguish between the target category (positive) and the other rows in your data (negative).

A model will produce probability, between 0 and 1, for each row it scores. Typically, you will select a threshold (e.g. 0.5) and decide that everything above that threshold will be treated as a positive prediction and everything below will be treated as a negative prediction.

Each point on the ROC curve represents a possible value of the probability threshold. The vertical coordinate represents the rate of correct positive predictions, while the horizontal coordinate represents the rate of negatives incorrectly labeled by your model as positives.

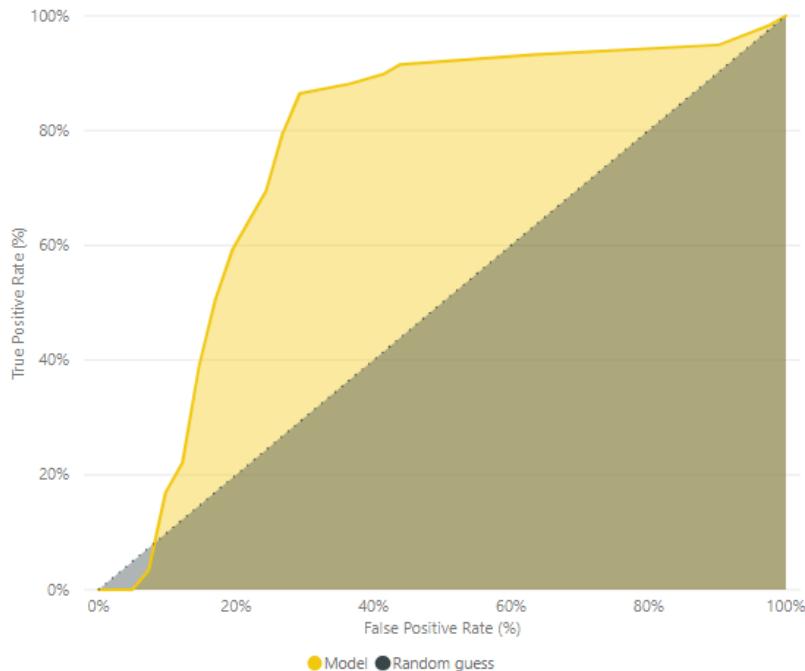
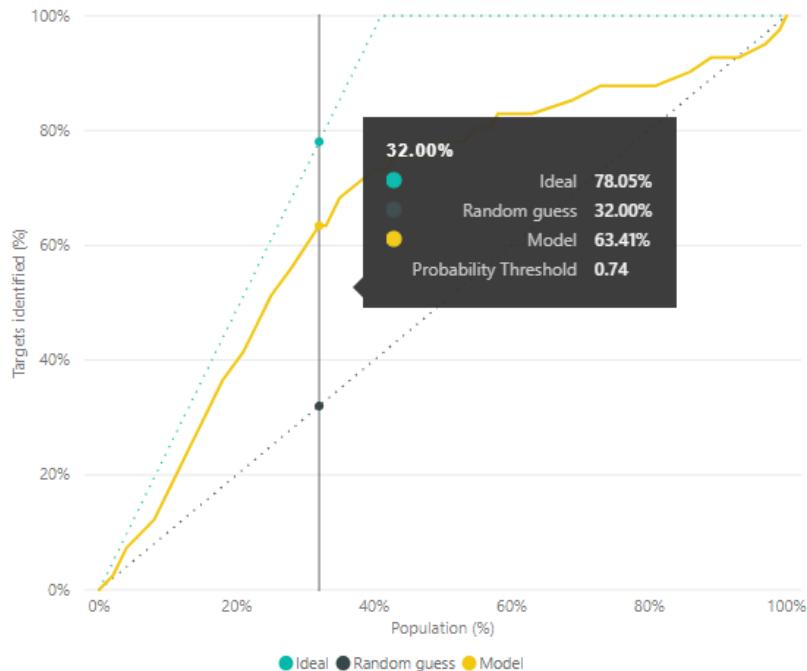
Titanic Survival model accuracy preview

This report summarizes the accuracy of the binary prediction model and enables you to find an optimal threshold for defining your business outcome.

[Apply model](#)[Edit model](#)

The performance of your model gets better as it gets close to the ideal model line.

Ideal model that is achieved by your model. The higher the curve, the better your model is at predicting positives as positives and negatives as negatives.



How to Start?

Microsoft Power BI Desktop

Important! Selecting a language below will dynamically change the complete page content to that language.

Select Language:

English

Download

Microsoft Power BI Desktop is built for the analyst. It combines state-of-the-art interactive visualizations, with industry-leading data query and modeling built-in. Create and publish your reports to Power BI. Power BI Desktop helps you empower others with timely critical insights, anytime, anywhere.



Details

Note: There are multiple files available for this download. Once you click on the "Download" button, you will be prompted to select the files you need.

Version:

2.88.621.0

Date Published:

12/16/2020

File Name:

PBIDesktopSetup_x64.exe

PBIDesktopSetup.exe

File Size:

318.8 MB

292.5 MB

Press **F11** to exit full screen

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From creating your first graph to trying the latest advanced technique, our collected resources make it easy to learn about Power BI.



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Power BI
Portugal

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Lisbon, Portugal

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Organized by Manuel D. and 7 others

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...

What we're about

We are a group of Power BI users and data enthusiasts, interested on leveraging data analytics in real business scenarios. Our group will cover several areas, from Data Engineering, Data Modelling, Data Visualization, to more advanced analytics such as Machine Learning, Storytelling or Open Data, always learning from peers and industry experts.

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[Message](#)

Members (2,184)

[See all](#)



Some Limitations (Power BI Desktop)

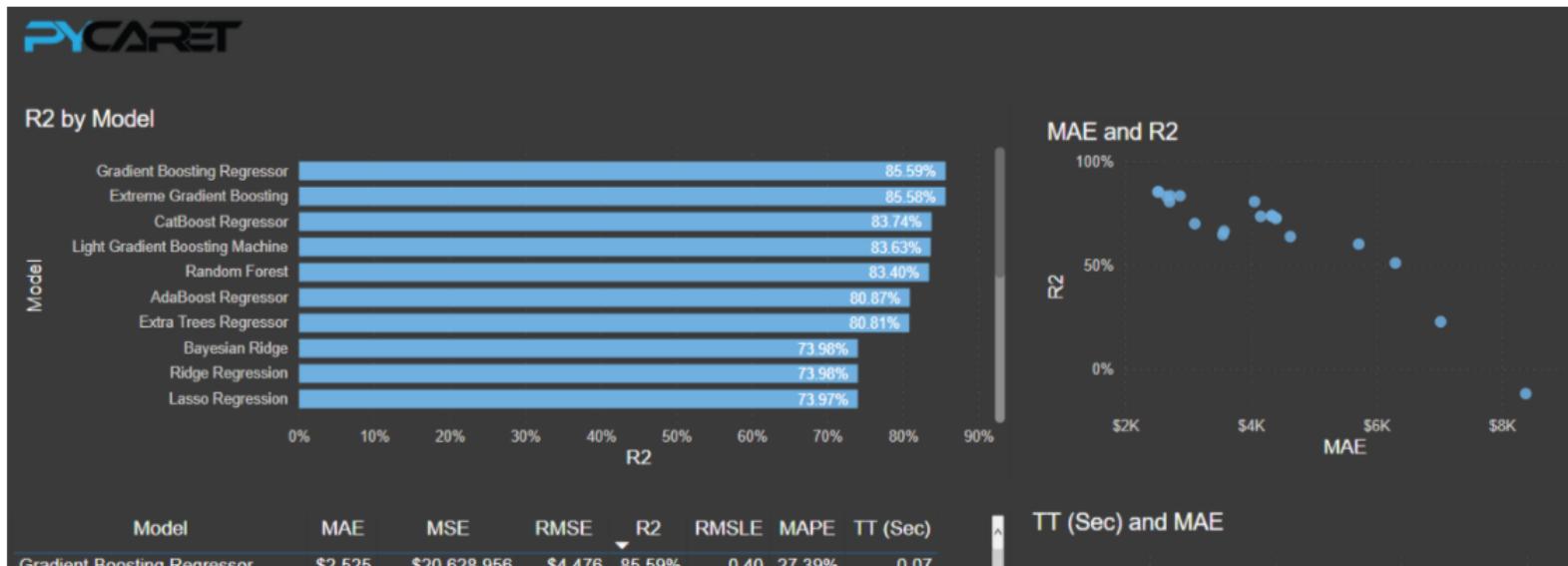
- not a true Data Science/Machine Learning workbench (sadly... 😞)
 - Ex: no native distribution plots, histograms (custom visuals available)
- Yeap, not Open Source...
- Not the best format for CI/CD (binary)
- Not scriptable/automation friendly
- Windows only
 - No Linux, No MacOs
(but note: lots of Power BI feature available on web/cloud version)
- Not the fastest reading formats like Excel, CSV
 - Like, *damn slow*...
 - But after load... "damn fast" ☺

References & Further reading

Build your own AutoML in Power BI using PyCaret 2.0



Moez Ali Aug 5 · 8 min read



Time series Forecasting in Power BI

Time series forecasting in PowerBI. (An Almost) Comprehensive Guide

Apr 24, 2020 • 37 min read

→ forecasting Python powerbi forecasting_in_powerbi



View On GitHub



launch binder



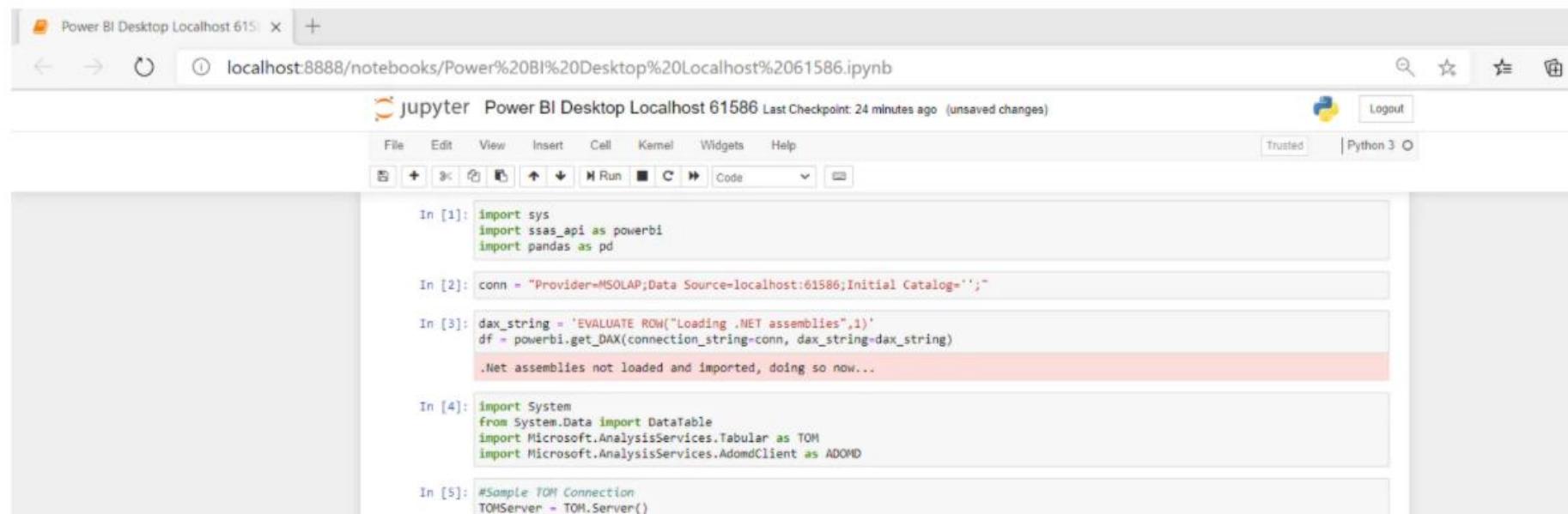
Open in Colab

- Overview
 - How to create a forecast in PowerBI?

[Power BI](#)[Python](#)

Jupyter as an External Tool for Power BI Desktop (Python Part 4)

By [David Eldersveld](#) | August 17, 2020



The screenshot shows a Jupyter Notebook interface running in a browser window titled "Power BI Desktop Localhost 6158". The URL is "localhost:8888/notebooks/Power%20BI%20Desktop%20localhost%2061586.ipynb". The notebook contains the following Python code:

```
In [1]: import sys
import ssas_api as powerbi
import pandas as pd

In [2]: conn = "Provider=MSOLAP;Data Source=localhost:61586;Initial Catalog='';"

In [3]: dax_string = 'EVALUATE ROW("Loading .NET assemblies",1)'
df = powerbi.get_DAX(connection_string=conn, dax_string=dax_string)
.NET assemblies not loaded and imported, doing so now...

In [4]: import System
from System.Data import DataTable
import Microsoft.AnalysisServices.Tabular as TOM
import Microsoft.AnalysisServices.AdomdClient as ADOMD

In [5]: #Sample TOM Connection
TOMServer = TOM.Server()
```

Thank you!

 rui.quintino@devscope.net

 [Linkedin.com/in/rquintino](https://www.linkedin.com/in/rquintino)

 Twitter [@rquintino](https://twitter.com/@rquintino)

 Medium [/devscope-ai](https://medium.com/@devscope-ai)

 Github [/DevScope/ai-lab](https://github.com/DevScope/ai-lab)

\$20.93M

Sales Amount

\$7.00M

COGS

62K

Order Quantity

Reseller Search

Select row below to enable drill-through →

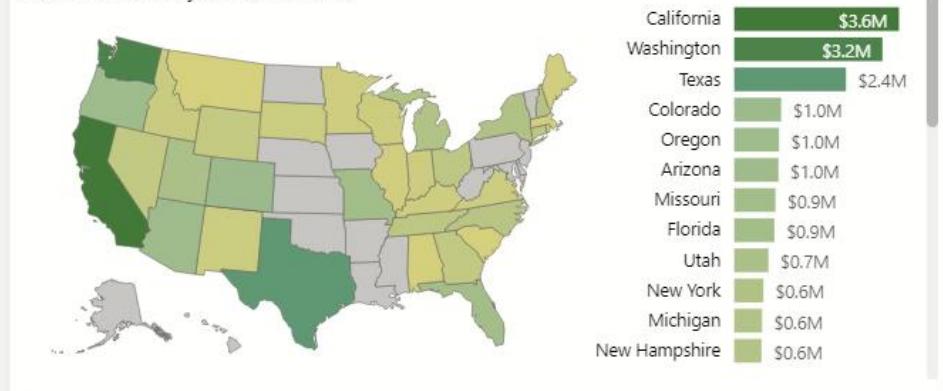
All

Reseller	City	State-Province	Sales Amount
Westside Plaza	Sand City	California	\$534,956.28
Field Trip Store	Loveland	Colorado	\$427,305.59
Brakes and Gears	Tooele	Utah	\$397,237.24
Thorough Parts and Repair Services	Lacey	Washington	\$386,958.19
Rally Master Company Inc	Chandler	Arizona	\$355,141.98
Outdoor Equipment Store	Nashua	New Hampshire	\$314,662.56
Eastside Department Store	Union City	California	\$296,328.92
Totes & Baskets Company	San Antonio	Texas	\$289,777.50
Permanent Finish Products	Reno	Nevada	\$288,088.47
Extraordinary Bike Works	Mesquite	Texas	\$281,844.75
Safe Cycles Shop	Bellevue	Washington	\$277,795.47
Great Bikes	Casper	Wyoming	\$277,495.37
Excellent Riding Supplies	Memphis	Tennessee	\$276,729.43
Area Bike Accessories	Modesto	California	\$275,643.81
Total			\$20,927,177.22

Sales Amount by Year, Quarter and Month



Sales Amount by State-Province



Questions/Feedback ?

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 Twitter [@rquintino](https://twitter.com/@rquintino)

 Medium [/devscope-ai](https://medium.com/@devscope-ai)

 Github [/DevScope/ai-lab](https://github.com/DevScope/ai-lab)

Power BI & AI Built-in models

Edit queries

Power Query

Get data Refresh Options Manage columns Transform column Transform table Reduce rows Add column AI insights ...

Customers Customer Comments Image Classification Key Phrases

	A ^B C categories	Date	A ^B C Guest Comment	A ^B C Hotel Name	1 ² 3 Index	1.2 long
1	Hotels	7/2/2014, 5:00:00 PM	First impression not great ...	Grand Kailua		93
2	Hotels	10/30/2013, 5:00:00 PM	Beautiful, clean, and conve...	Grand Kailua		58
3	Hotels	9/20/2014, 5:00:00 PM	It is hard to find the resort....	Grand Kailua		98
4	Hotels	2/9/2015, 4:00:00 PM	Close to the shopping cent...	Grand Kailua		59
5	Hotels	7/22/2016, 5:00:00 PM	Condos were okay but limi...	Grand Kailua		97
6	Hotels	3/1/2016, 4:00:00 PM	Dirt everywhere, dust on fu...	Grand Kailua		107
7	Hotels	9/29/2014, 5:00:00 PM	experience was average...a...	Grand Kailua		75
8	Hotels	5/27/2016, 5:00:00 PM	Had a room right on the w...	Grand Kailua		61
9	Hotels	12/12/2014, 4:00:00 PM	Great location and well ma...	Grand Kailua		69
10	Hotels	6/1/2016, 5:00:00 PM	Great location, within walki...	Grand Kailua		106
11	Hotels	3/1/2015, 4:00:00 PM	great stay. Very convenient...	Grand Kailua		64
12	Hotels	7/3/2016, 5:00:00 PM	Awesome stay. Was here f...	Grand Kailua		104

Name
Customer Comm
Entity type ⓘ
Custom
Applied steps
Source
Navigation 1

Example: Natural Language Processing steps

Invoke function

- ◀ CognitiveServices [4]
 - fx CognitiveServices.TagImages
 - fx CognitiveServices.ExtractKeyPhr...
 - fx CognitiveServices.DetectLangu...
 - fx CognitiveServices.ScoreSentim...

CognitiveServices.ScoreSentiment

This function returns a numeric score between 0 and 1. Scores close to 1 indicate positive sentiment, while scores close to 0 indicate negative sentiment. A score of 0.5 indicates the lack of sentiment (e.g. a factoid statement). You can provide a language ISO code as optional parameter.

text *



Guest Comment



Show ▾

languageISOCode



en

Invoke

Cancel

Access to AI APIs (Azure Cognitive Services)

Power Query

Edit queries

Get data Refresh Options Manage columns Transform column Transform table Reduce rows Add column AI insights ...

Customers

Customer Comments

Image Classification

Key Phrases

	1.2 longitude	1.2 latitude	A ^B _C province	A ^B _C Guest Comment	1.2 Sentiment Score
1	93	-155.989	19.63 HI	First impression not great ...	0.754
2	58	-155.989	19.63 HI	Beautiful, clean, and conve...	0.997
3	98	-155.989	19.63 HI	It is hard to find the resort....	0.793
4	59	-155.989	19.63 HI	Close to the shopping cent...	0.944
5	97	-155.989	19.63 HI	Condos were okay but limi...	0.031
6	107	-155.989	19.63 HI	Dirt everywhere, dust on fu...	0.06
7	75	-155.989	19.63 HI	experience was average...a...	0.945
8	61	-155.989	19.63 HI	Had a room right on the w...	0.71
9	69	-155.989	19.63 HI	Great location and well ma...	0.988
10	106	-155.989	19.63 HI	Great location, within walki...	0.877
11	64	-155.989	19.63 HI	great stay. Very convenient...	0.968
12	104	-155.989	19.63 HI	Awesome stay. Was here f...	0.781
13					

Name Customer Comments

Entity type Custom

Applied steps

- Source
- Navigation 1
- Removed columns
- Reordered columns

Cancel Done

Sentiment Analysis of Guest Comments

Edit queries

Power Query

Get data Refresh Options Manage columns Transform column Transform table Reduce rows Add column AI insights ...

Customers
Customer Comments
Image Classification
Key Phrases

Name
Image Classification

Entity type ①
Custom

Applied steps

Source
Navigation 1

Index	Image	Probability	Image Tag
1	0 https://hotelpictures.blob.c...	0.995	A/C
2	1 https://hotelpictures.blob.c...	0.998	A/C
3	5 https://hotelpictures.blob.c...	0.97	Pool
4	6 https://hotelpictures.blob.c...	0.981	A/C
5	7 https://hotelpictures.blob.c...	0.994	A/C
6	8 https://hotelpictures.blob.c...	0.992	A/C
7	9 https://hotelpictures.blob.c...	0.984	Pool
8	10 https://hotelpictures.blob.c...	0.977	Beach
9	10 https://hotelpictures.blob.c...	0.916	View
10	10 https://hotelpictures.blob.c...	0.898	Water View
11	11 https://hotelpictures.blob.c...	1	Hotel Room
12	11 https://hotelpictures.blob.c...	0.996	Clean
13	11 https://hotelpictures.blob.c...	0.002	Dated/Old Hotel Room

Cancel Done

Image Tagging and Key Phrases

Edit queries

Get data Refresh Options Manage columns Transform column Transform table Reduce rows Add column AI insights

Customers Customer Comments Image Classification Key Phrases

X ✓ fx = Source{[Schema = "hotel", Item = "Key Phrases"]}[Data]

Index	Keyphrases
1	AC unit
2	AC unit
3	accommodating
4	accommodating
5	adults
6	adults
7	adults
8	air conditioning
9	air conditioning
10	air conditioning
11	air conditioning
12	air conditioning
13	air conditioning

GUEST REVIEWS



Our room was on the ground floor, facing the ocean. Great view. The lobby was beautiful - no walls. Breakfast



The accommodation is basic but you will have money left over for shopping and sightseeing.



Great beach park next to the hotel. Worth it if travelling with kids due to the large playground. Very quiet.



I would expect that the Jacuzzi would be hot (or at least warm) - it was not. Very disappointed with my stay...



Incredible hotel. Loved the view. Very friendly staff.



Amazing Japanese restaurant downstairs. The hotel is walking distance to all the necessary amenities.



Reserved a king room with ocean view. Was given a queen bed with a view. Notified desk was given a king.



Clean, good location, fast WiFi, a very comfortable king bed. Ended up with a great view which was a nice

SENTIMENT SCORE BY HOTEL



REFERENCES AND SENTIMENT BY TOPIC



	<input type="checkbox"/> Members.Joined Group on	<input checked="" type="checkbox"/> Members.Last visited group on	<input type="checkbox"/> Members.Last Attended	Custom
1	01/02/2019	13/02/2019	06/02/2019	20190201
2	27/01/2019	27/01/2019	06/02/2019	20190127
3	06/01/2019	27/02/2019	06/02/2019	20190106
4	06/01/2019	27/02/2019	06/02/2019	20190106
5	06/01/2019	27/02/2019	06/02/2019	20190106
6	22/01/2019	04/02/2019	06/02/2019	20190122
7	26/02/2019	02/03/2019	no	20190226
8	<input type="checkbox"/> A ^B _C Members.Name	<input checked="" type="checkbox"/> A ^B _C Members.U	Custom	no
	Rodrigo Fazendeiro	Fastwheels	Fazendeiro, R.	
	Nuno Gomes	user 5182529	Gomes, N.	
	Daniel Monteiro	user 6053978	Monteiro, D.	
	<input type="checkbox"/> A ^B _C Members.Name	<input checked="" type="checkbox"/> A ^B _C Members.U	Custom	
	Rodrigo Fazendeiro	Fastwheels	rfa zendeiro	
	Nuno Gomes	user 5182529	ngomes	
	Daniel Monteiro	user 6053978	dmonteiro	
	Daniel Monteiro	user 6053978	dmonteiro	

Prep by example

powerbi-kaggle-days-p

File Home Transform

New Recent Enter Data

Close & Apply Close New Query

Date

731 distinct, 731 unique

1 12/31
2 1/1
3 1/2
4 1/3
5 1/4
6 1/5
7 1/6
8 1/7
9 1/8
10 1/9
11 1/10
12 1/11
13 1/12
14 1/13
15 1/14
16 1/15
17 1/16
18 1/17
19 1/18
20 1/19
21 1/20
22 1/21
23 1/22
24 1/23
25 1/24
26 1/25
27 1/26
28 1/27
29 1/28
30 1/29
31 1/30
32 1/31

Vision

Tag images

Analyze images to generate tags based on what they contain.

[Learn more](#)

Image (optional)

Date

Language ISO code (optional)

Example: abc

Premium capacity used for AI Insights

Default (based on availability)

Text Analytics Vision Azure Machine Learning AI Insights

Properties

STEPS

CalendarQuarter
CurrentCalendarQuarter
CurrentQuarterYear
CurrentQuarterYear
CurrentSemesterYear
CurrentSemesterYear
Capitalized Each Word
Native (Year)
Native (Month)
Native (Day)
Holidays
BannedHolidays
IsWorkDay
Ordered Columns
Changed Type
ColumnPT

PREVIEW DOWNLOADED AT 12:59 AM

Vision/Text AI APIs from Power BI (tagging, sentiment,...)

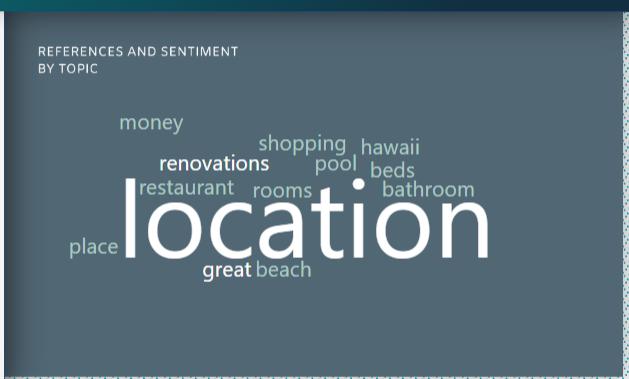


GUEST REVIEWS



Rooms were acceptable, basic but a decent size, older style. No major issues. The beds were very

Clean room, older style, 1950ish, needs some remodelling, but the most important thing is of course,



- New
- Home
- Author
- Notebooks
- Automated ML
- Assets
- Datasets
- Experiments
- Pipelines
- Models
- Endpoints
- Manage
- Compute
- Datastores
- Data Labeling

Automated ML

Let Automated ML train and find the best model based on your data without writing a single line of code. [Learn more about Automated ML](#)

[New Automated ML run](#)

Recent Automated ML runs

[View all experiments](#)

Run	Run ID	Experiment	Status	Submitted time	Duration	Submitted by	Compu
Run 1	AutoML_f3281d5b-fa56-4fc6-ac...	expenses-class...	Completed	Jun 22, 2020 12:48 AM	2h 45m 46s	Rui Quintino	tiny-ssh
Run 1	AutoML_f1fa01a7-6fe3-416f-8d...	ticket-classifica...	Canceled	Jun 21, 2020 10:58 PM	1h 46m 12s	Rui Quintino	tiny-ssh
Run 12	AutoML_e6e1d435-8a6d-4bb5-...	corefx-issues-t...	Canceled	Jun 21, 2020 10:54 PM	1h 48m 2s	Rui Quintino	tiny-ssh
Run 22	AutoML_e78199dd-4249-479b-...	automl-expens...	Completed	Jun 8, 2020 5:48 PM	1h 9m 13s	Rui Quintino	tiny-ssh
Run 1	AutoML_3a1d21b2-e869-4e37-...	corefx-issues-t...	Completed	Jun 8, 2020 12:50 PM	1h 6m 17s	Rui Quintino	tiny-ssh
Run 16	AutoML_c7e061fe-277e-434a-b...	automl-expens...	Canceled	Jun 8, 2020 12:33 PM	5m 5s	Rui Quintino	tiny-ssh
Run 11	AutoML_f6829b43-6d25-4578-...	automl-expens...	Canceled	Jun 8, 2020 12:16 PM	11m 36s	Rui Quintino	tiny-clu
Run 7	AutoML_f2ed06e1-c044-4617-9...	automl-expens...	Canceled	Jun 8, 2020 11:55 AM	16m 17s	Rui Quintino	tiny-clu

Run & Deploy Auto ML models in Azure Auto ML...

Azure Machine Learning Models

AzureML.lifetime-value

Region : westeurope
Created On : 6/21/2020 9:42 PM
Last modified On : 6/21/2020 9:42 PM

[Learn more](#)

age
1.2 Example: 123

workclass
A>B>C Example: abc

fnlwgt
1.2 Example: 123

education
A>B>C Example: abc

educational_num
1.2 Example: 123

marital_status
A>B>C Example: abc

occupation

... And using directly in Power BI/Power Query

File Home Transform

New Source Recent Sources Enter Data

Close & Apply Close New Query

Date

731 distinct, 731 unique

1	12/31
2	1/1
3	1/2
4	1/3
5	1/4
6	1/5
7	1/6
8	1/7
9	1/8
10	1/9
11	1/10
12	1/11
13	1/12
14	1/13
15	1/14
16	1/15
17	1/16
18	1/17
19	1/18
20	

Text Analytics
Vision
Azure Machine Learning
AI Insights

Properties

STEPS

- CalendarQuarter
- CalendarSemester
- DayWeek
- DayName
- WeekYear
- MonthYear
- QuarterYear
- SemesterYear
- Tokenized Each Word
- Native (Year)
- Native (Month)
- Native (Day)
- ElapsedHolidays
- ElapsedHolidays
- ElapsedWorkDay
- Ordered Columns
- Changed Type
- ColumnPT

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BI, Analytics
&
Data Science/Machine Learning

What on earth is data science?

The quest for a useful definition



Cassie Kozyrkov [Follow](#)

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CHOOSE YOUR OWN DATA SCIENCE ADVENTURE



HUH?

LOTS AND LOTS!

ARE YOU MAKING DECISIONS?

YES!

HOW MANY?

ONLY A FEW

IS THERE UNCERTAINTY?

NOPE, JUST
CURIOS

YOU WANT
DATA
ANALYTICS

YOU WANT
MACHINE LEARNING

YOU WANT
STATISTICS

ARE THEY IMPORTANT?

- N

Author: @quaesita

The Data Science Landscape

An attempt to provide structure and reference points in a complex field



Dr. Stefan Karenfort Nov 27 · 9 min read ★

