



# Data Camp Live Training: Time Series Analysis in Python





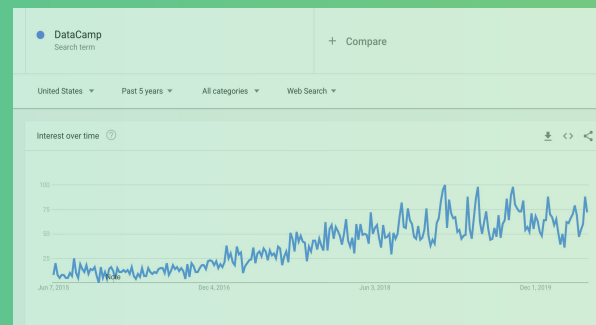
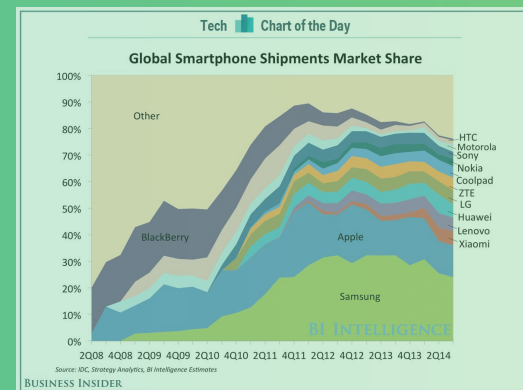
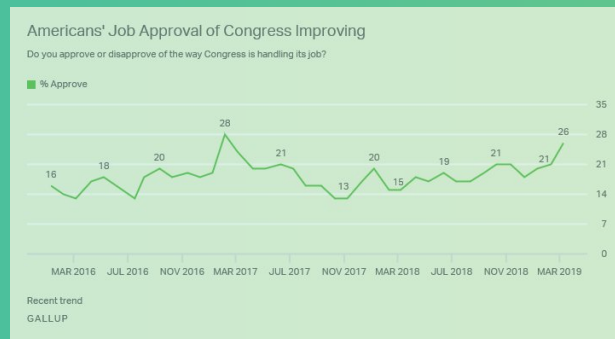
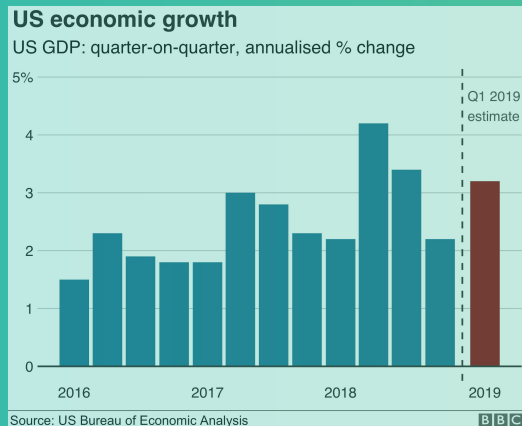
**Alex Yarosh**

**Content Quality Analyst @ DataCamp**



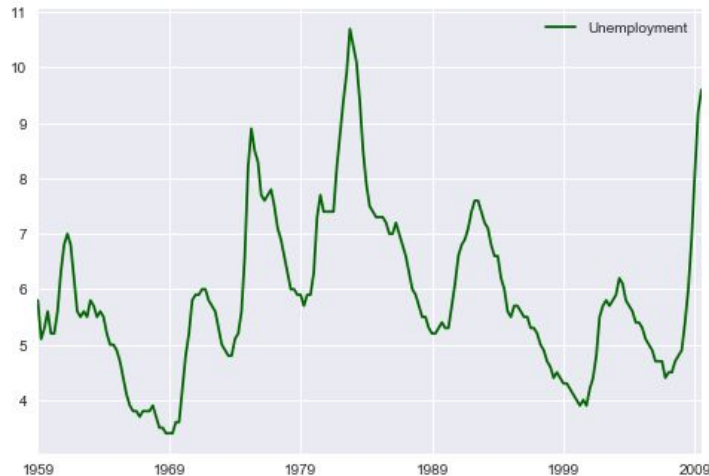
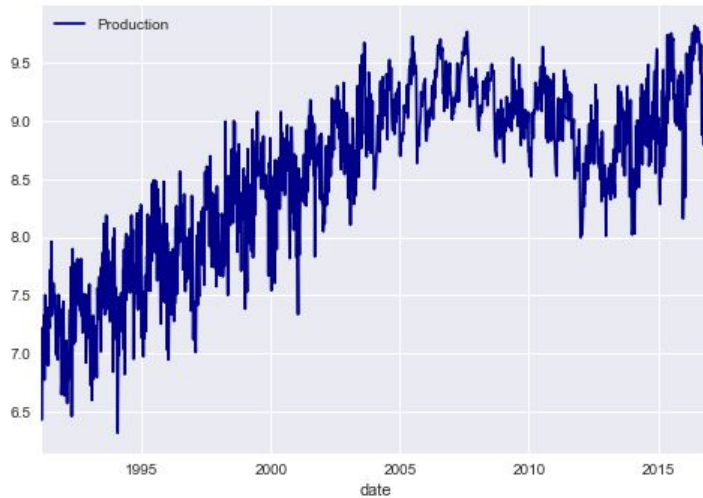
# Introduction

Most data is  
time series data



# Time series analysis

- Simple models often do well
- Complicated models are composed of simple pieces
- Domain expertise is necessary
- Many subtleties involved

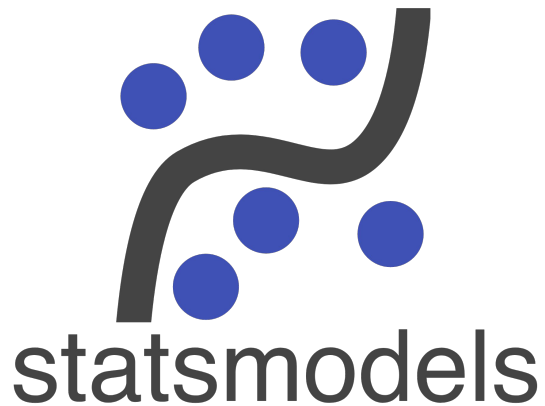


# Datasets overview

- Weekly US gasoline production
- Monthly US unemployment rate



**matplot****lib**



## Tools

pandas : data manipulation

[Learn more](#)

matplotlib: data visualization

[Learn more](#)

statsmodels: statistical modeling

[Learn more:](#)

- [Exploratory analysis](#)
- [Linear modeling](#)
- [GLM](#)

jupyter

applayout\_example

Last Checkpoint: 20 hours ago (autosaved)

Logout

File

Edit

View

Insert

Cell

Kernel

Widgets

Help


Trusted

Python 3

```
11         icon='backward',
12         layout=Layout(width='80%',
13                        height='30%'))
14 next_button = Button(description="Next",
15                       icon='forward',
16                       layout=Layout(width='80%',
17                                    height='30%'))
18 footer = HTML("Filename: {}".format(image_file))
19
20 AppLayout(header=header,
21           left_sidebar=prev_button,
22           center=image,
23           right_sidebar=next_button,
24           footer=footer,
25           grid_gap='20px',
26           justify_items='center',
27           align_items='center')
```

### Simple Image Viewer

◀ Prev



▶ Next

Filename: images/cat.jpg



!! Requires a gmail account to edit !!

# Session agenda

- *Introduction*
- Exploratory Analysis
- Q & A
- Autocorrelation
- Q & A
- Moving average model
- Q & A
- Autoregressive model
- Q & A
- Closing notes
- Next steps



The background features four large, teal-colored geometric shapes: a rounded triangle in the top-left, a sharp triangle in the top-right, a sharp triangle in the bottom-left, and a rounded triangle in the bottom-right. These shapes are arranged around the central text.

# Session Notebook

# Recap and Closing Notes

# What did we learn today?

## **Exploratory analysis**

Manipulate and visualize time series to inform modeling

## **Autocorrelation analysis**

Use autocorrelation analysis to uncover dependencies in the data

## **Simple models**

Predict the future using simple models like autoregression and moving average

# Coming soon!



Don't miss these upcoming webinars and live training sessions!

- [String Manipulation in SQL](#) (6/4)
- [Data Analysis in SQL](#) (6/11)

Functions	Description
<code>import pandas as pd</code>	Imports the <code>pandas</code> package with the alias <code>pd</code>
<code>.head()</code>	Prints the header of a DataFrame
<code>.info()</code>	Returns a # observations, data types and missing values per column
<code>pd.to_datetime()</code>	Converts to <code>datetime</code> type
<code>.set_index()</code>	Sets index of the DataFrame
<code>.resample()</code>	Resample the values to a different frequency
<code>.rolling()</code>	Use a rolling window to aggregate
<code>seasonal_decompose()</code>	Decompose time series into trend, seasonal, and residual component
<code>.diff()</code>	Take first-order difference of the DataFrame values
<code>.dropna()</code>	Drop missing values from the DataFrame

Functions	Description
<code>.plot()</code>	Plot the series contained in the DataFrame
<code>plot_acf()</code>	Plot the autocorrelation function
<code>plot_pacf()</code>	Plot the partial autocorrelation function
<code>.ARMA(..., order=..)</code>	Create an AR/MA/ARMA model
<code>.fit()</code>	Fit an AR/MA/ARMA model
<code>.plot_predict()</code>	Plot predictions of an AR/MA/ARMA model
<code>sns.distplot()</code>	Plots distribution of one variable
<code>msno.matrix()</code>	Visualizes missingness matrix
<code>msno.barplot()</code>	Visualizes missingness barplot
<code>.duplicated(subset = , keep = )</code>	Lets you find duplicates in a DataFrame based on all or subset of columns

# Thank you

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NEW COURSE

# Introduction to Power BI

Unlock more value from your Microsoft plan. This interactive course empowers everyone with a 360-degree overview of how to analyze data and build impactful reports

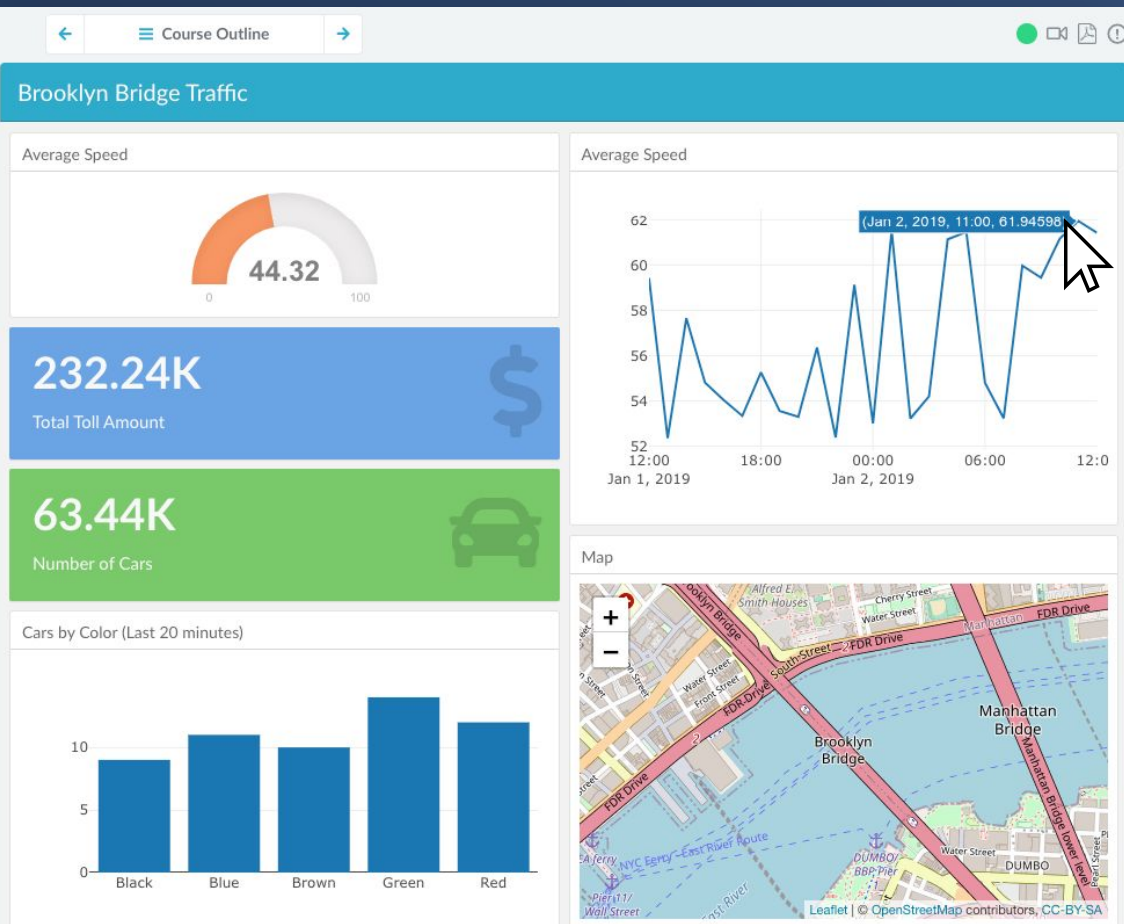
The screenshot displays the Power BI Desktop application window. The title bar indicates the file is '2\_2\_Editing\_Properties [Read-Only] - Power BI Desktop'. The ribbon menu includes File, Home, Insert, Modeling, View, and Help. The 'Home' tab is active, showing options for data sources (Excel, Power BI datasets, SQL Server), queries (Transform data, Refresh), and visualizations (New visual, Text box, More visuals). The main workspace contains a report with a table and a treemap.

**Table Data:**

ScenarioName	ProductCategoryName	AccountName	Amount	Datekey
Actual	Audio	Taxation	312,499.77	1/1/2017 12:00:00 AM
Actual	Audio	Taxation	352,579.76	2/1/2017 12:00:00 AM
Actual	Audio	Taxation	347,883.48	3/1/2017 12:00:00 AM
Actual	Audio	Taxation	466,923.03	4/1/2017 12:00:00 AM
Actual	Audio	Taxation	486,038.53	5/1/2017 12:00:00 AM
Actual	Audio	Taxation	470,165.46	6/1/2017 12:00:00 AM
Actual	Audio	Taxation	441,023.33	7/1/2017 12:00:00 AM
Actual	Audio	Taxation	444,406.78	8/1/2017 12:00:00 AM
Total			53,642,226,537.68	

**Treemap Data:**

The treemap visual, titled 'Product Category Amount', shows a hierarchical breakdown of data. The top level includes 'Home Appliances' (blue), 'Computers' (dark blue), 'Cameras and camco...' (orange), 'TV and Video' (purple), and 'Cell ...' (pink). The 'Home Appliances' category is further subdivided into 'Computers' and 'TV and Video'.

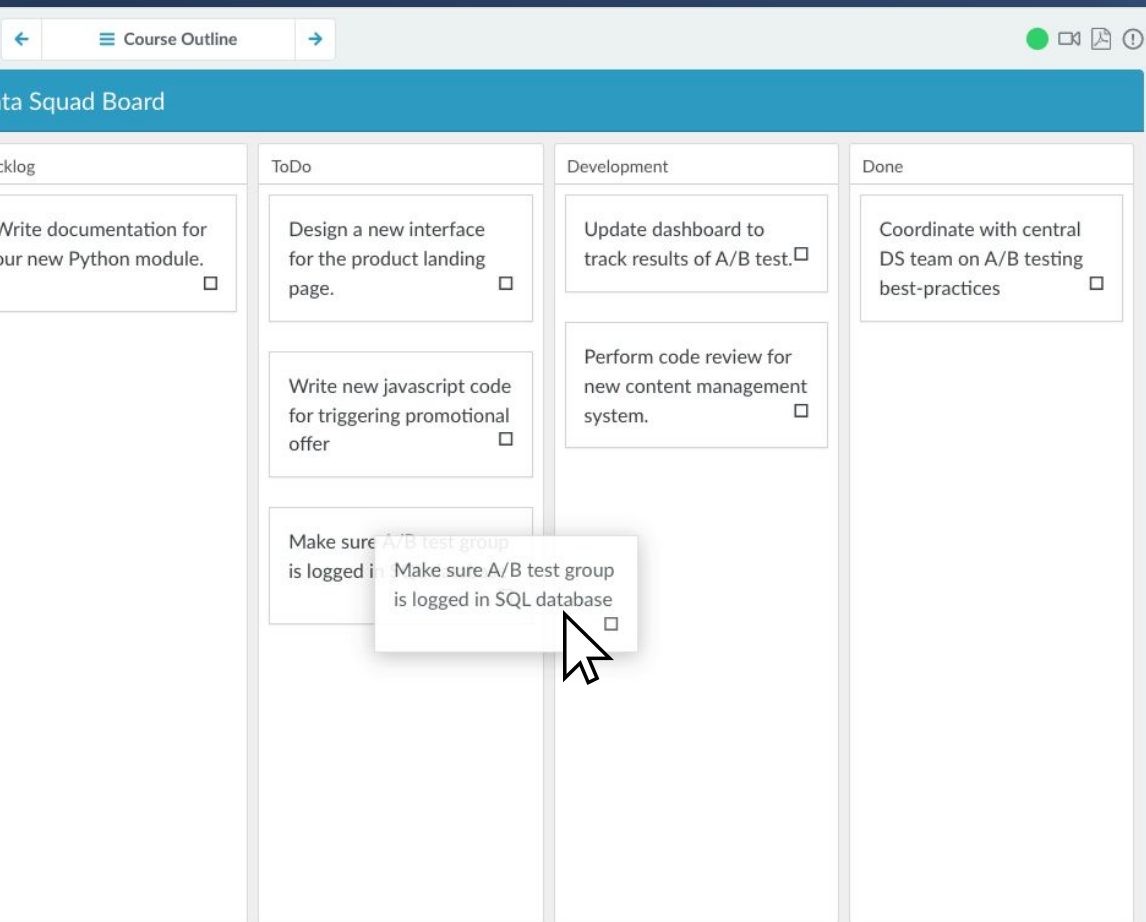


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Learn core data concepts, understand how to answer real-world questions using data, and become a more confident data-driven decision-maker within your organization

## NEW COURSE

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 DataCamp

Exercise

### Changing to text

By now, you know that there are four data types. As soon as you type something in a cell and hit enter, Excel will try to figure out which of these types you intend. It is not always right though, so you might need to convert the default data type to the appropriate one.

Let's take a look at our data. We want to make sure the project ID is not accidentally used for calculations. Let's make sure it is readable as non-numeric characters. Note that IDs are 8-10 characters long.

Instructions:

- Go to cell `B2`.
- Use `TEXT()` to convert the id column to text.

How is the id data aligned after the conversion?

Instructions

50XP

Possible Answers

←

Course Outline

→

	A	B
1	id	id_text
2	12846160	Hex Tile content Ado
3	13547406	Epic Stuff Library vol
4	20761861	Our House: The Lore
5	30059044	Zombicide: 2nd Editi
6	49752892	Longest Number Eve
7	52444976	=text
8	61166675	the oracle of heaven
9	63381877	Dwarf board game
10	92129914	Tzolk'in: Fifth Edition
11	96526024	Converts a value
12	148612159	TEXTJOIN
13	154179006	BAHTTEXT
14	165906545	FORMULATEXT
15	182072441	ISNONTTEXT
16	189035699	ISTEXT
17	191795368	g Cards: The Je
18	194146399	Azote playing cards
19	229060132	Monster Menagerie:
20	255478760	Hit the Streets: Defe
21	257726009	Dice Palace: Display
22	265338582	peculiarity oracle, sa
23	272156229	DoubleSix Dice: Gen
24	279753888	The World of the Los
25	283822315	Super Dude Jump
26	302537271	Sloosh Cards
27	310730322	Dice Friend - Innovat
28	310781283	Dungeon Craft: Build
29	328751672	THE MANA BOOK: CO

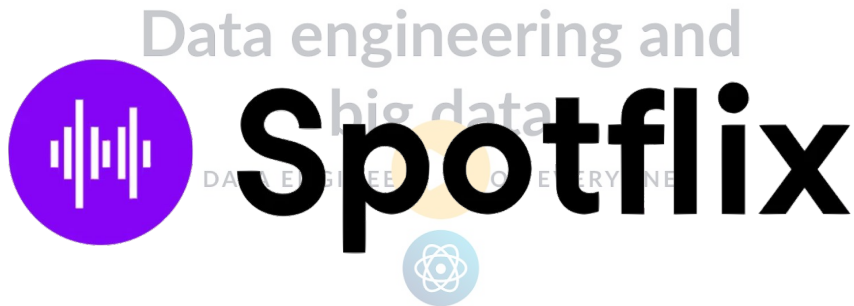
Sheet1

Course Outline



Data engineering and big data

50 X



DataCamp

Got It

NEW COURSE

# Data Engineering for Everyone

Learn about data engineering and why demand for them is at an all time high. Grow your knowledge in this area or take your first step towards becoming a data engineer



NEW COURSE

# Introduction to Tableau

Learn how to navigate, analyze, and build awesome dashboards that bring your data to life—all within your browser