Forecasting

STATISTICAL TECHNIQUES IN TABLEAU

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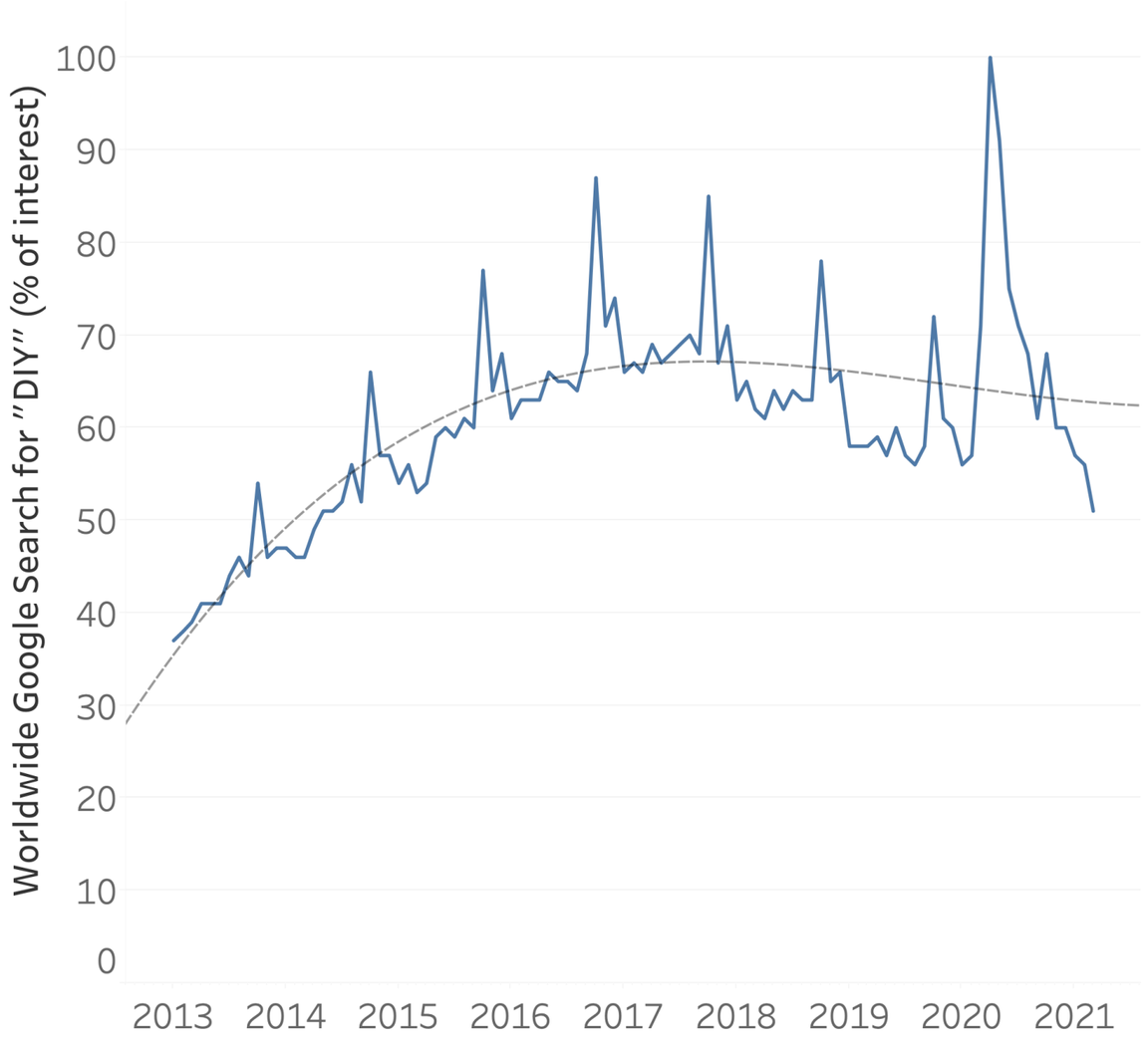
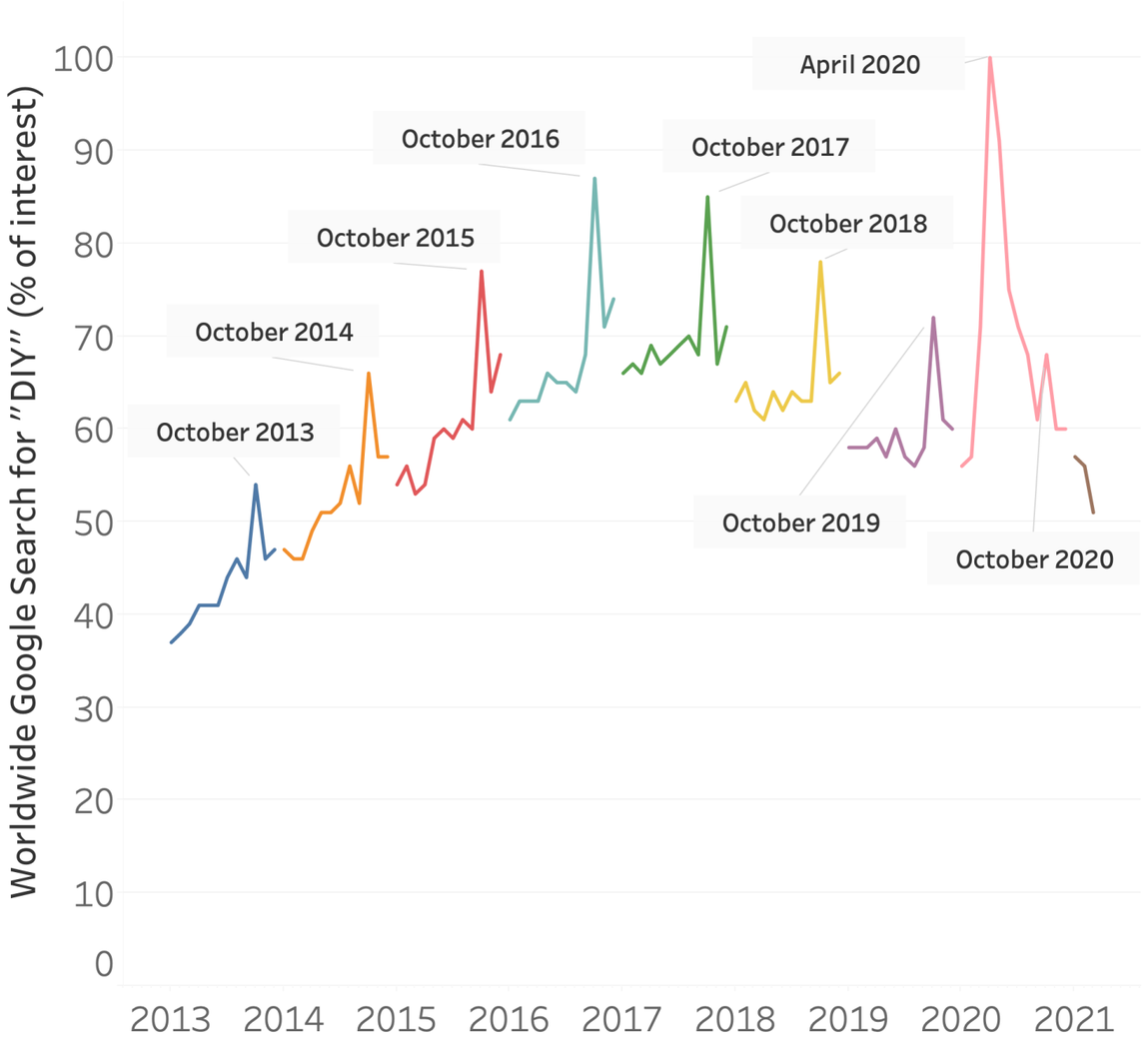
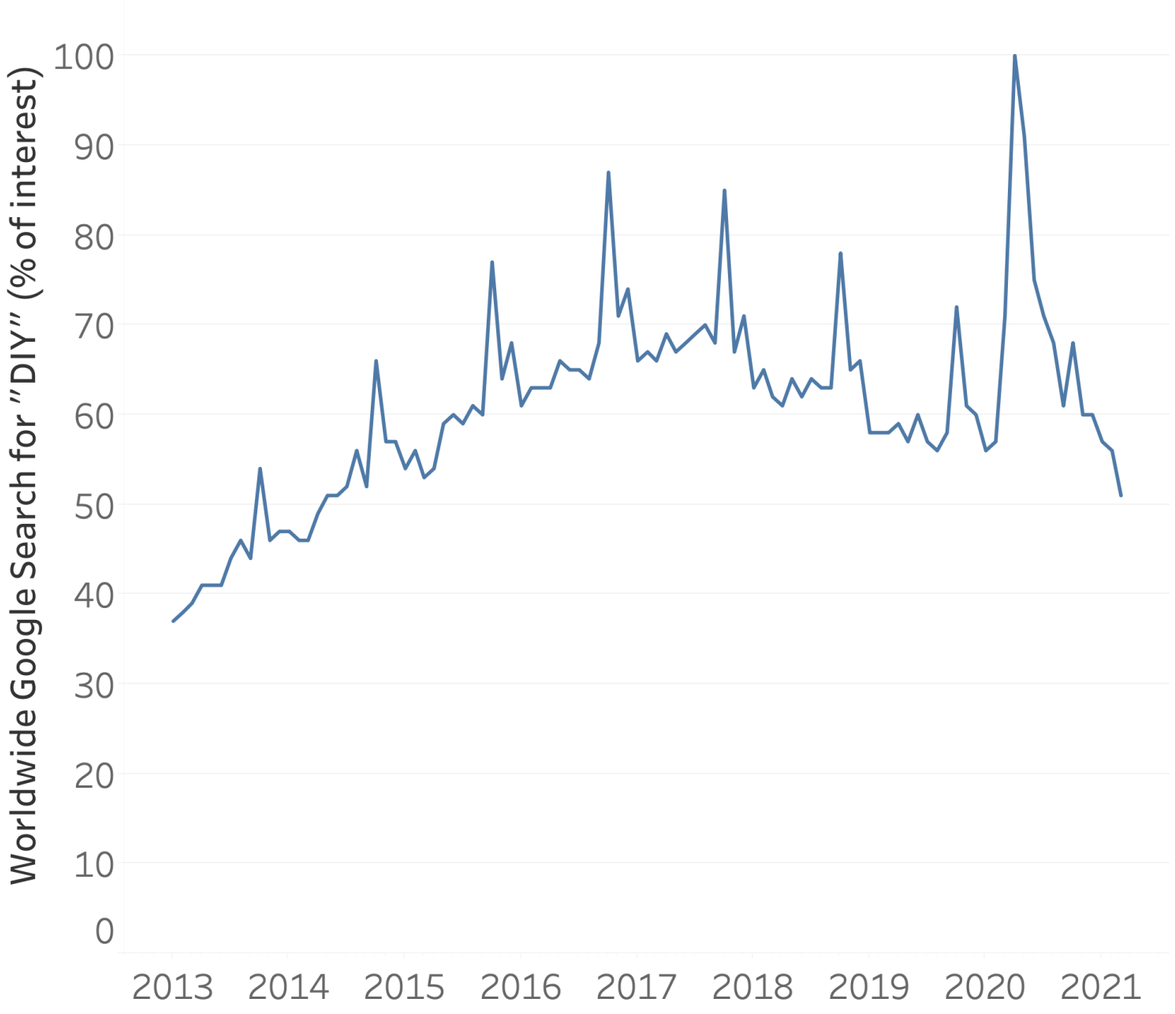
datacamp

Correlation vs. autocorrelation



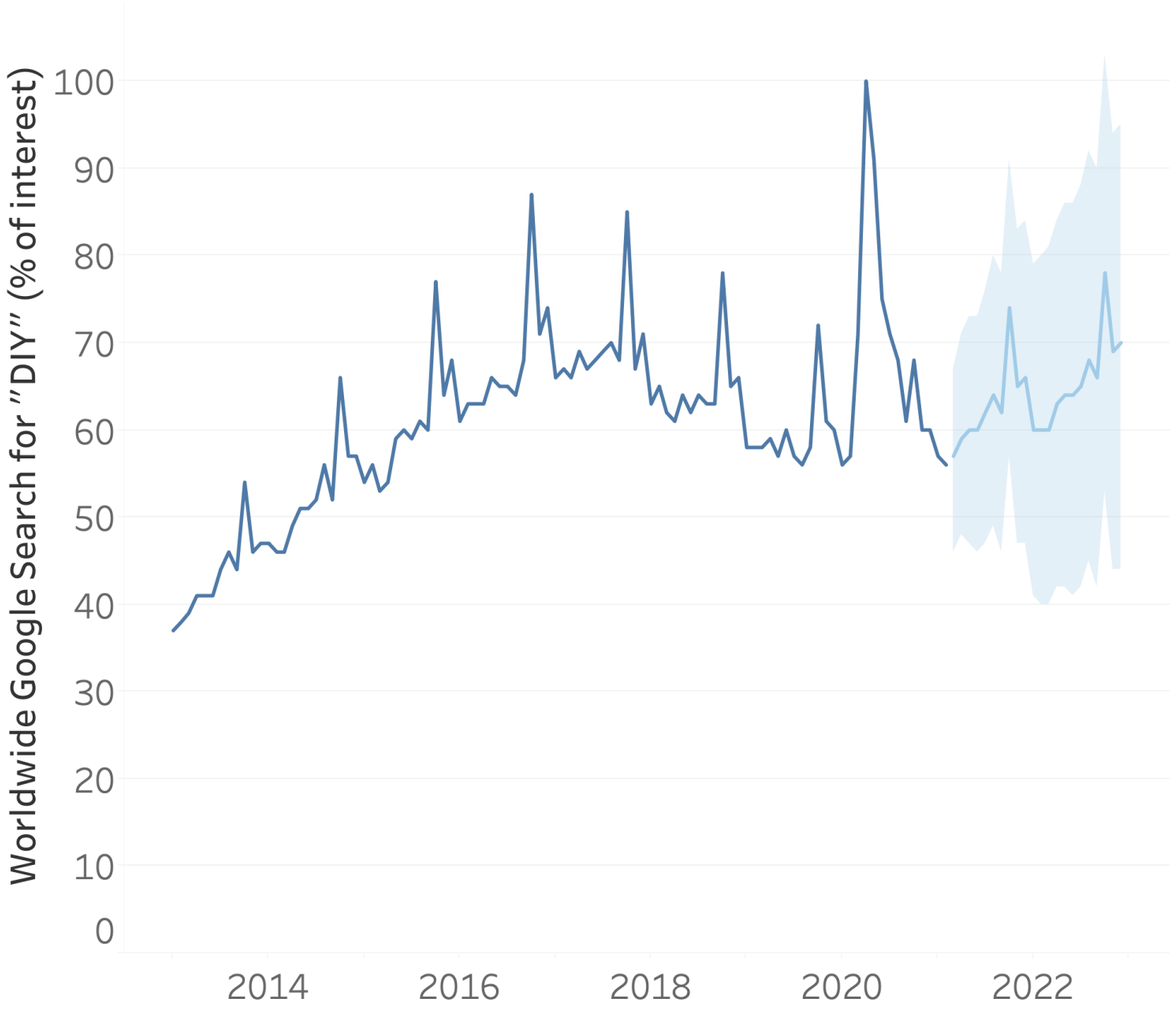


Correlation vs. autocorrelation



- Autocorrelation: repeating pattern correlates with itself
- Time series: a value measured repeatedly over time, in discrete time-intervals
- Time series analysis: general term for analysis on time series

Forecasting

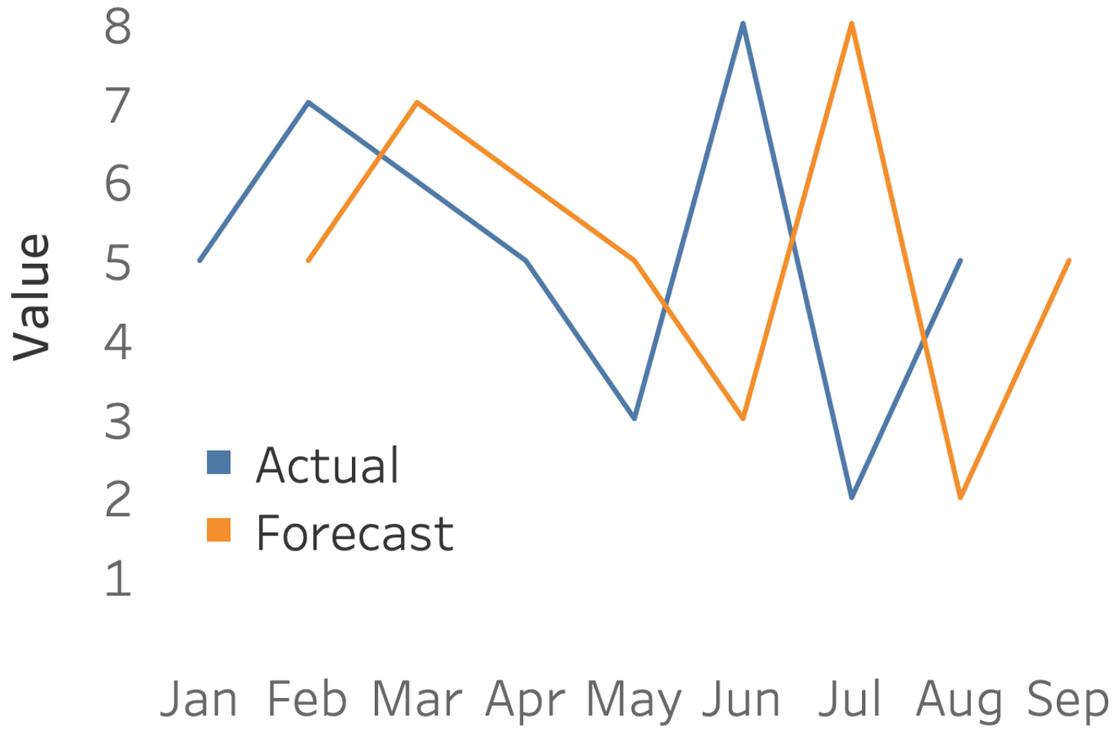


- Predictions about the future based on historical data
- Estimation: probability where future data points will fall, using confidence intervals
- Used in
  - supply chain management
  - earthquakes
  - hormone levels
  - market stocks
  - sports performance
  - weather

Naive forecast

$$F_{t+1} = A_t$$

Month t	Actual A	Forecast F
January	5	
February	7	5
March	6	7
April	5	6
May	3	5
June	8	3
July	2	8
August		2



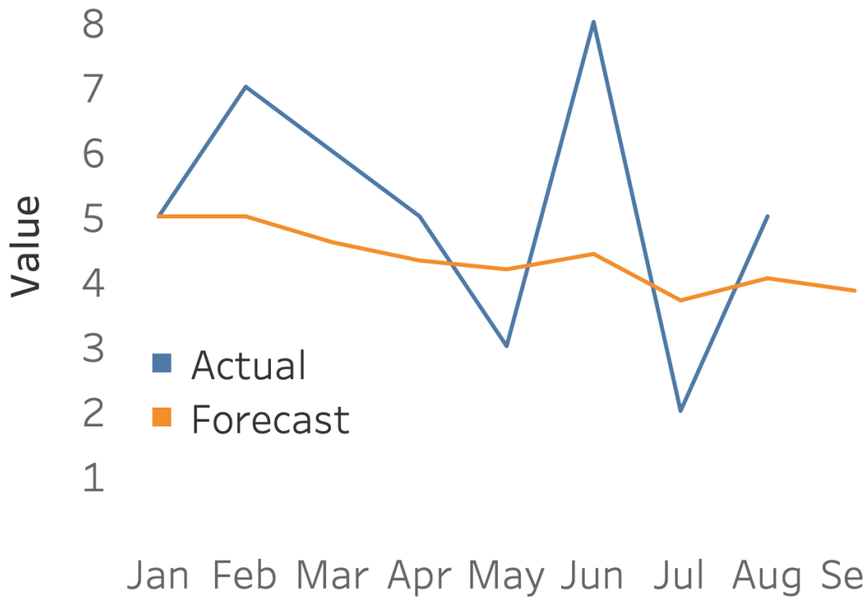
- Useful for benchmarking

Exponential smoothing

$$F_{t+1} = F_t + \alpha(A_t - F_t)$$

Month t	Actual A	Forecast F
January	5	5
February	7	5
March	6	4,6
April	5	4,32
May	3	4,184
June	8	4,4208
July	2	3,70496
August	5	4,045952

- Predictions will be influenced more by recent value changes than the past



- Tableau will run many models and select the best one

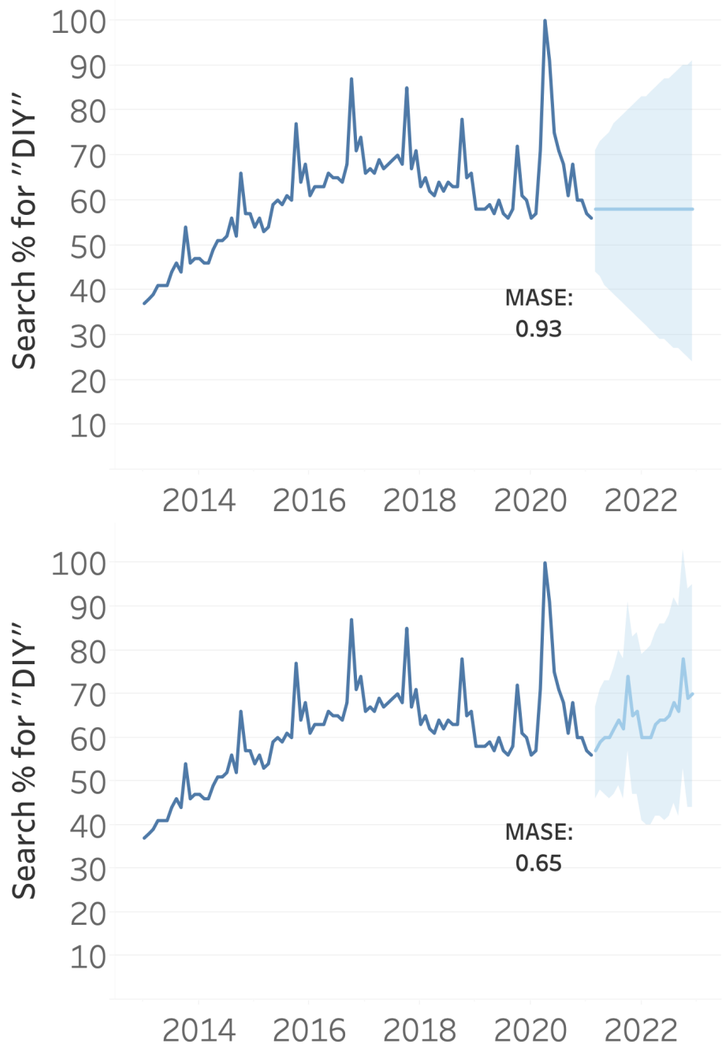
Mean absolute error (MAE)

Month	Actual	Forecast	Error	Absolute Error
January	5			
February	7	5	2	2
March	6	7	-1	1
April	5	6	-1	1
May	3	5	-2	2
June	8	3	5	5
July	2	8	-6	6
August	5	2	3	3
September		5	**MAE**	**2.86**

Mean absolute scaled error (MASE)

$$MASE = \frac{MAE_{model}}{MAE_{naive}}$$

- MASE compares MAE of your model with MAE of naive forecast
- Typically between `0` (good) and `1` (bad), or higher (even worse)
- You can customize options in Tableau, but out-of-the-box forecast is acceptable by default



Let's practice!

STATISTICAL TECHNIQUES IN TABLEAU

Tableau: forecasting

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Let's practice!

STATISTICAL TECHNIQUES IN TABLEAU

Clustering

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Supervised vs. unsupervised machine learning

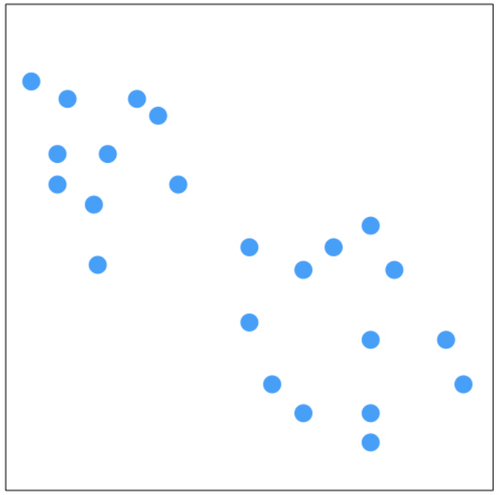
Supervised learning

- Apply known relationship between variables on new, unseen data
- E.g. regression, exponential smoothing

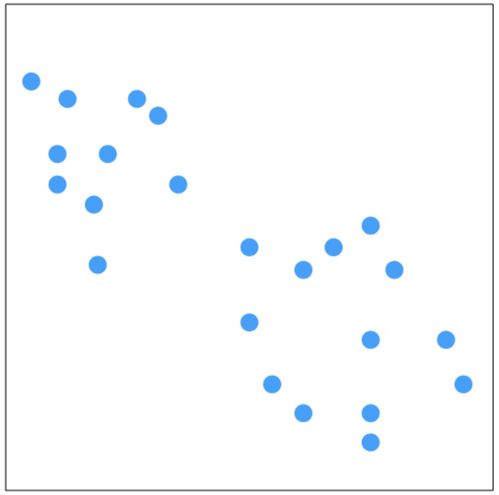
Unsupervised learning

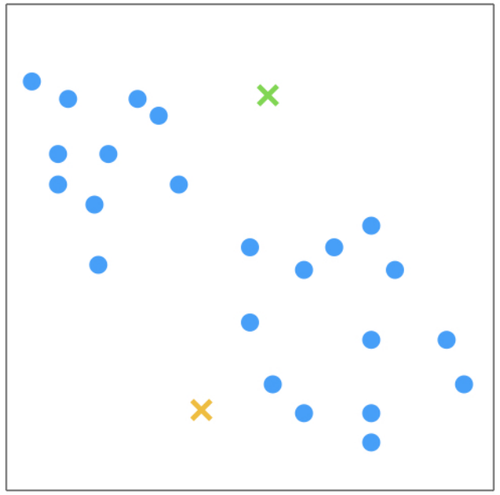
- Looks for similar data points and detects patterns
- E.g. clustering

k-means clustering



k-means clustering





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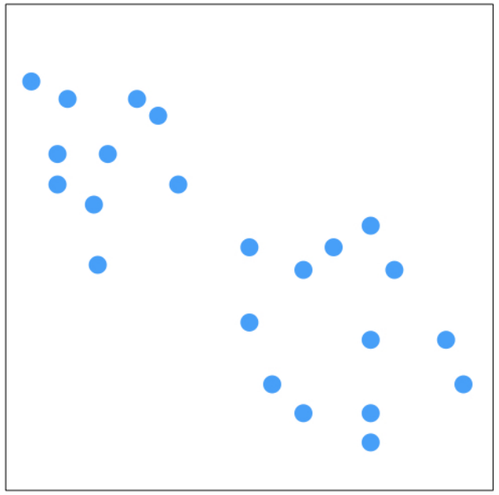
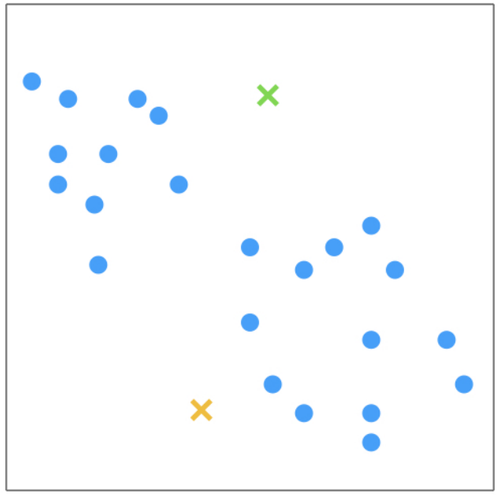
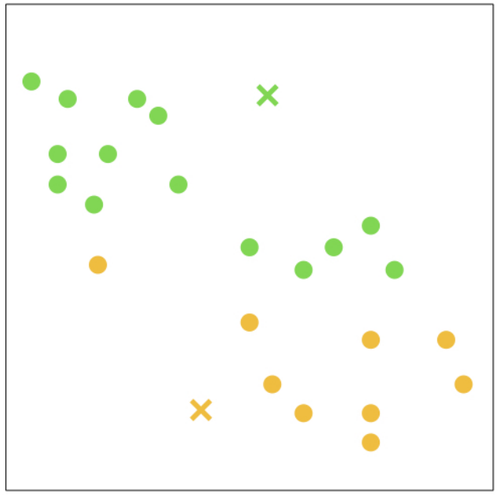
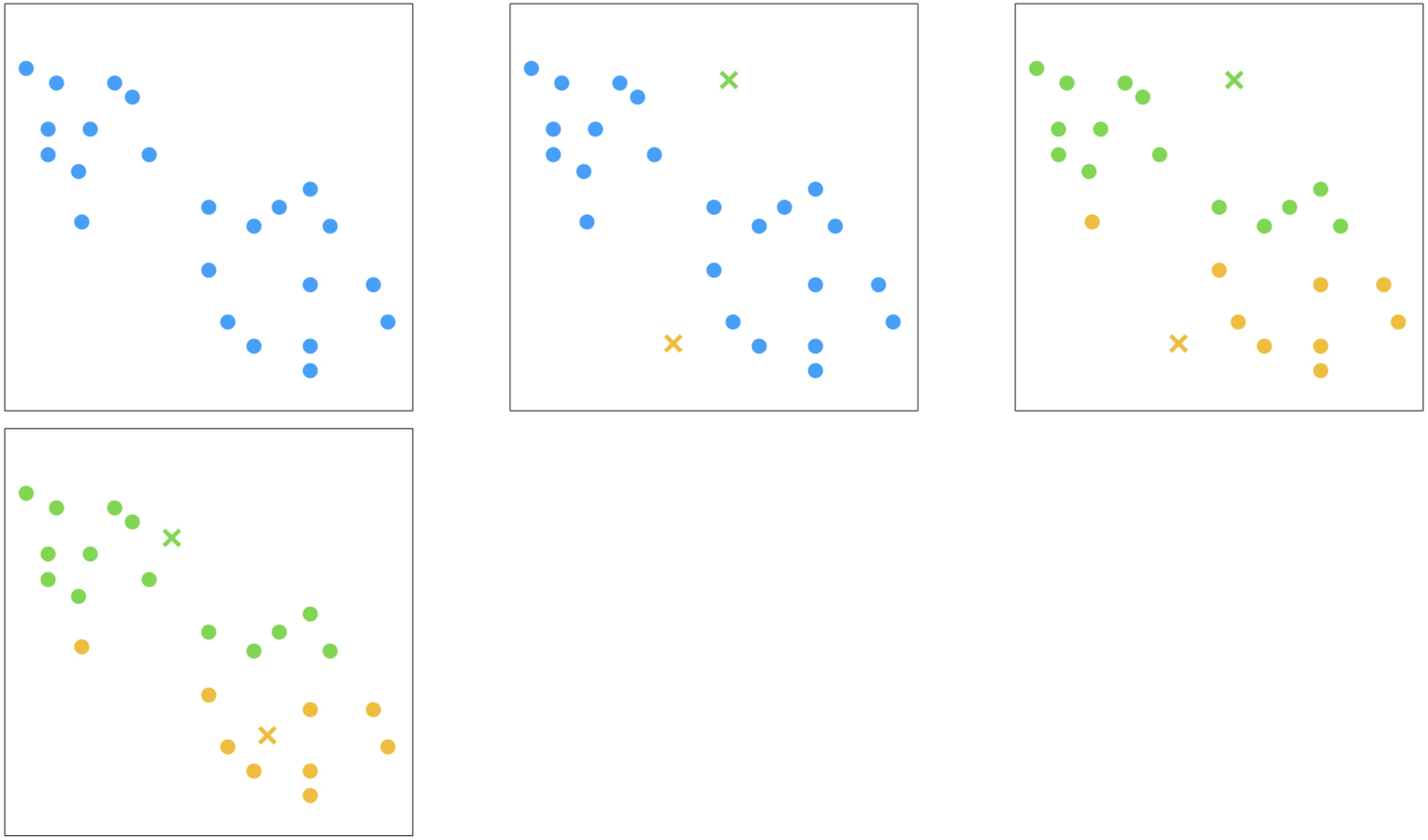


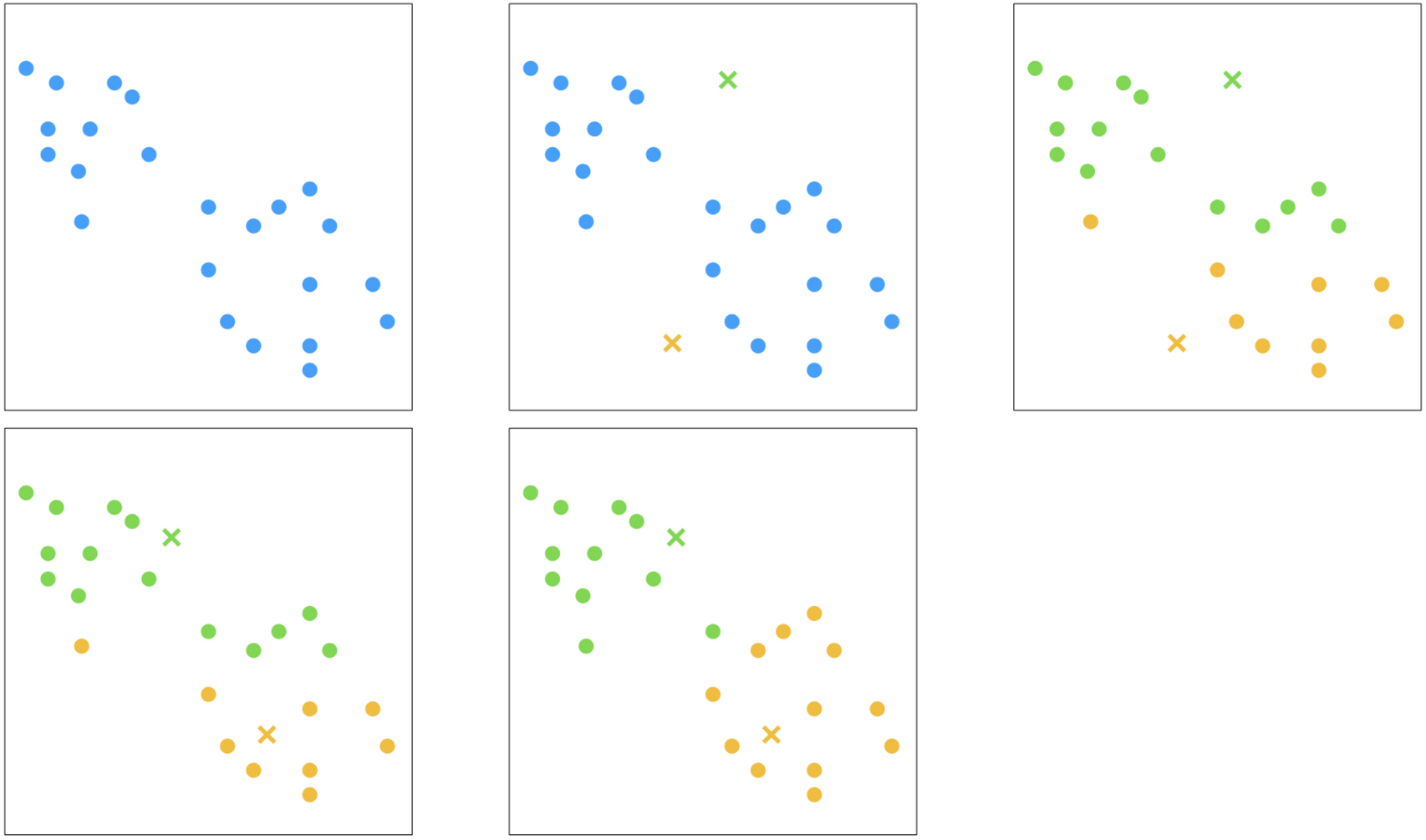




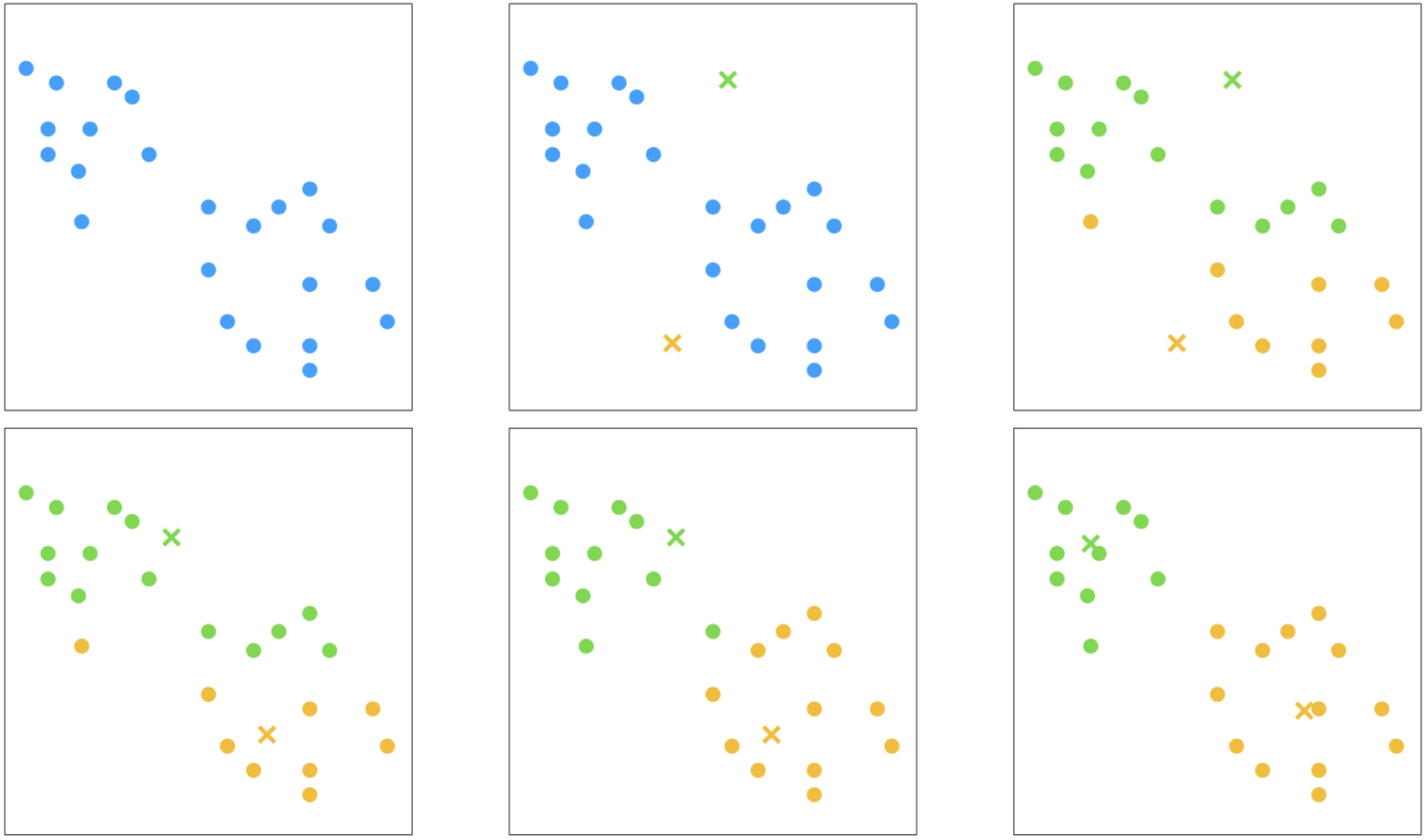
k-means clustering



k-means clustering

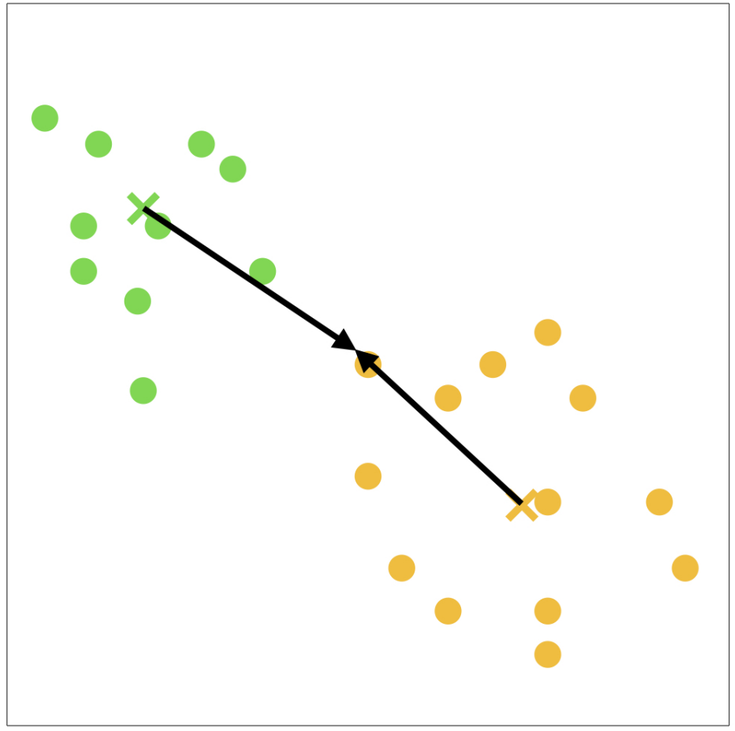


k-means clustering



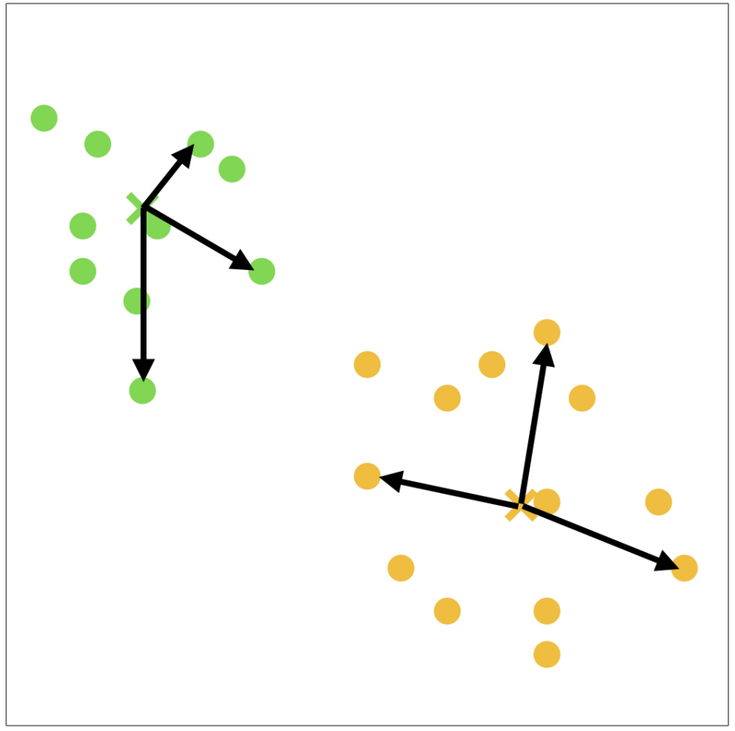
Assess clustering quality

Between-group sum of squares



- The higher, the better

Within-group sum of squares



- The lower, the better

Let's practice!

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Tableau: clustering

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Congratulations!

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Statistical techniques in Tableau

Univariate EDA

- Tables
- Bar plots
- Histograms
- Box plots

Bivariate EDA

- Trend lines
- Regression models

Measures of spread

- Summary card
- Reference lines/bands
- Distribution bands
- Standard error & confidence intervals

Machine learning

- Forecasting
- Clustering

See you in the next course!

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