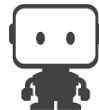# Automated Time Series modelling with DataRobot

Jarlath Quinn

www.sv-europe.com
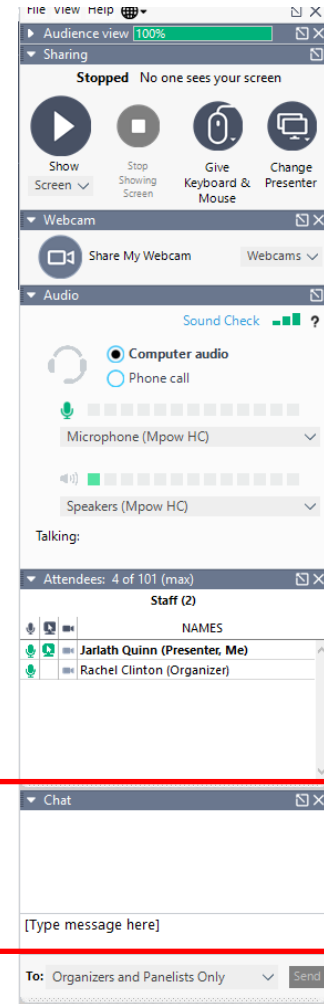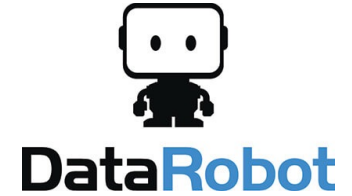
DataRobot

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FAQ's

- Is this session being recorded? Yes

- Can I get a copy of the slides? Yes, we'll email a PDF copy to you after the session has ended.

- Can we arrange a re-run for colleagues? Yes, just ask us.

- How can I ask questions? All lines are muted so please use the chat facility – if we run out of time we will follow up with you.

- Premier accredited partner to IBM, Predictive Solutions and DataRobot specialising in advanced analytics & big data technologies

- Work with open source technologies (R, Python, Spark etc.)

- Team each has 15 to 30 years of experience working in the advanced and predictive analytics industry

- Deep experience of applied advanced analytics applications across sectors
  – Retail
  – Gaming
  – Utilities
  – Insurance
  – Telecommunications
  – Media
  – FMCG

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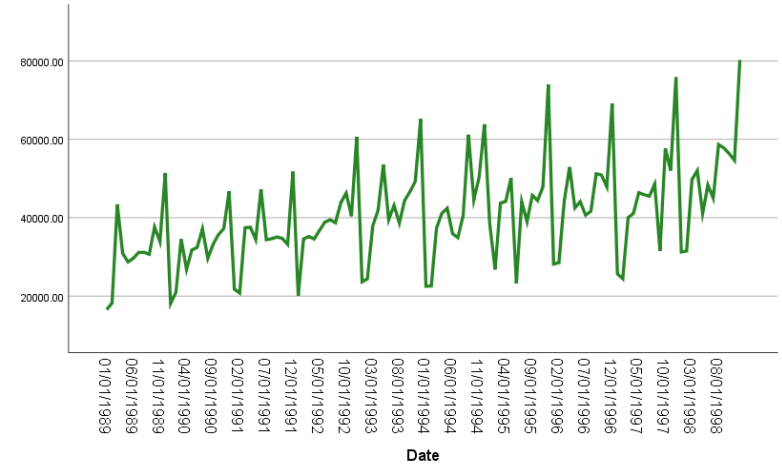
The Principles of Time Series Forecasting

What is Time Series?

- A 'Time Series' is simply a series of values of a quantity collected over a specific time period, often with equal intervals between them

- Examples of time series include:
  - Airline passenger numbers for a particular country over the last 40 years
  - Daily website hits during a three-month period
  - Hourly traffic volumes over the course of a week

Time Series Forecasting

" 'Things' that are observed repeatedly over time, with past values and other factors being used to predict future values"

Past   Now   Future
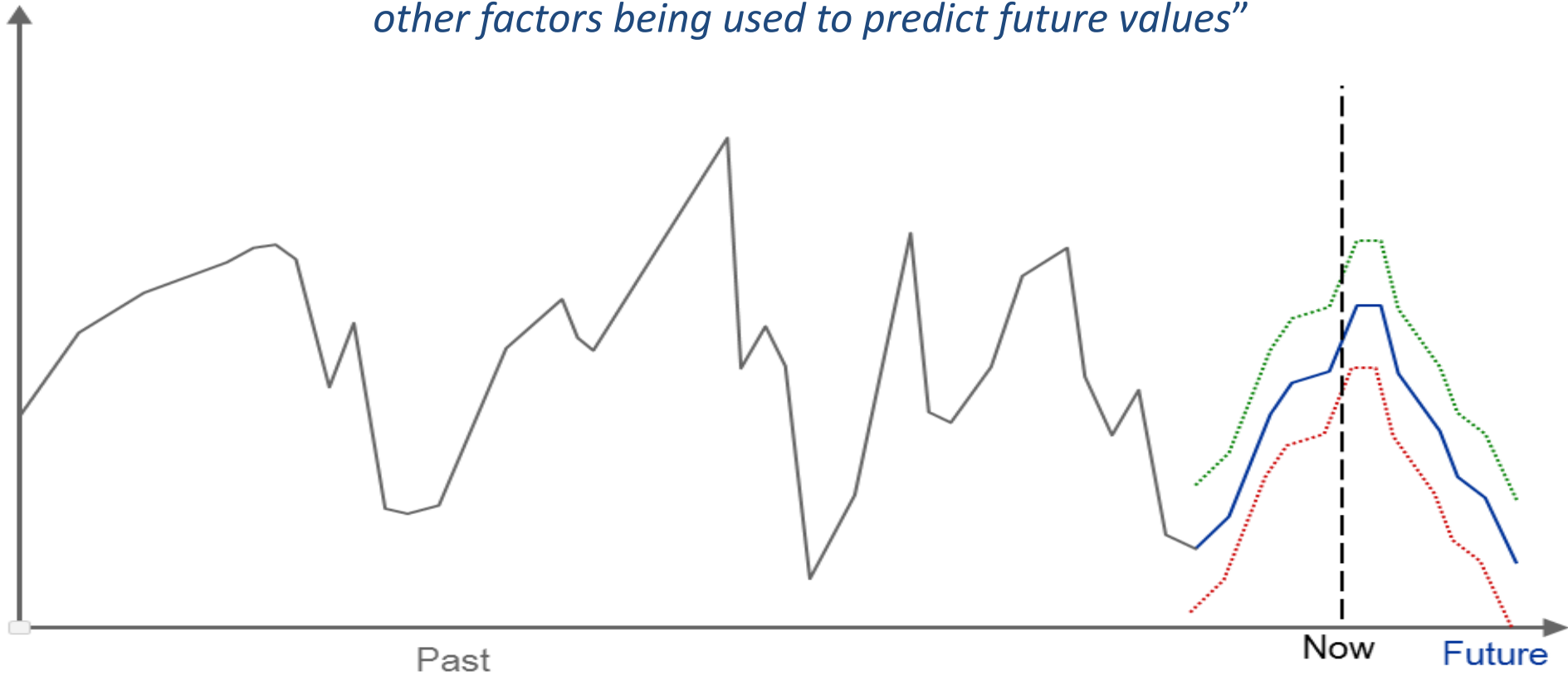
What is Time Series?

- Time series analysis is based on the principle that the past provides a model for the future

- Time series forecasting models often don't require predictor/independent variables

- The goal of time series analysis is to separate the random variability ('noise') from the variability that can be explained

- A single time series may have several elements that enable effective forecasting
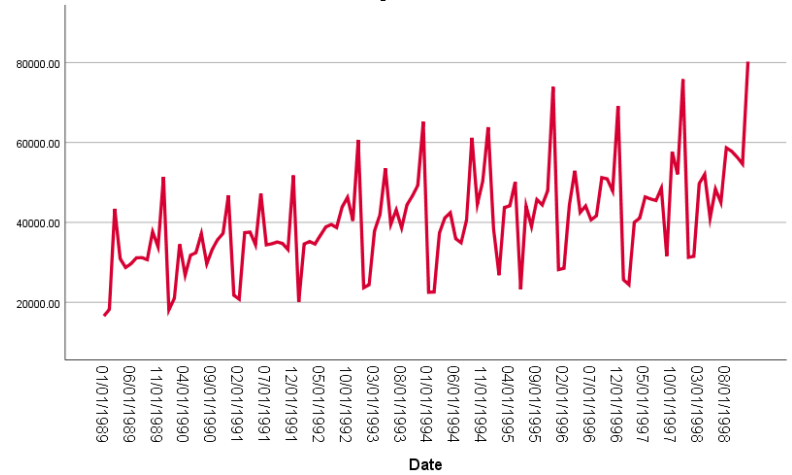
What's *in* a 'Time Series'?

Time Series
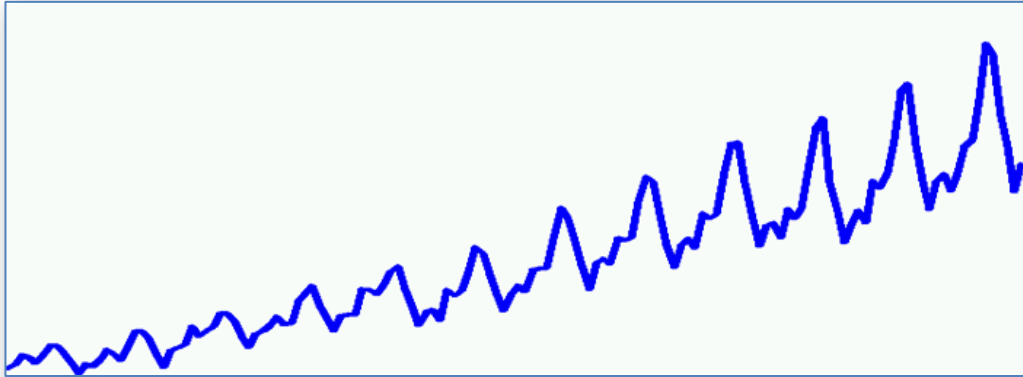
Trend
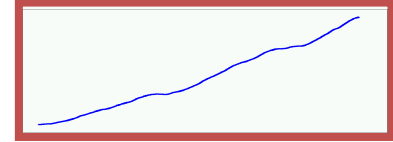
Seasonality

Events

Noise

SMARTVISION
Europe

Types of Time Series

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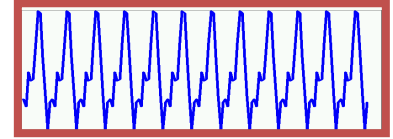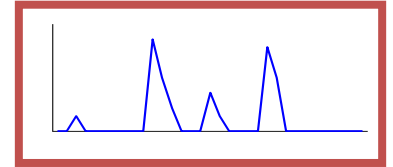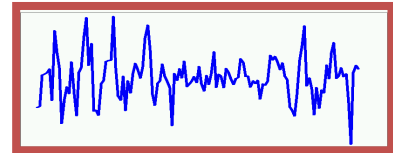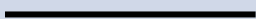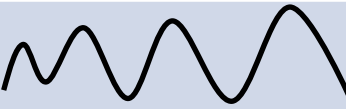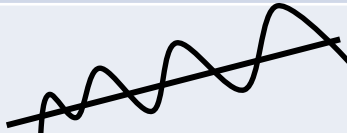
Two **classic** approaches to **Time Series** forecasting

- **ETS** (Error, Trend and Seasonality) / Exponential Smoothing models
  - Often used when there are strong seasonal trends (e.g. you see the same patterns from one year to the next)
- **ARIMA** (Autoregression, Integrated, Moving Average)
  - Often used when the only most recent values are needed to forecast what happens next
  - Can incorporate independent 'predictor' variables

Example: Basic Exponential Smoothing Methods

	Non Seasonal	Additive Seasonal	Multiplicative Seasonal
Constant Level			
Linear Trend			
Damped Trend			
Exponential Trend			

DataRobot also includes a number of advanced machine learning methods

DataRobot
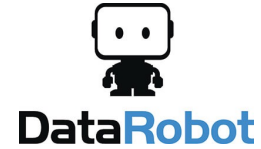
Machine learning and linear models

- RNN, XGBoost, elastic-net, etc.
- Linear trends, Ridge regression, Fourier models

Open Source models

- Facebook Prophet
- Spark
- Eureqa

SMART VISION Europe

DataRobot automates most steps that are traditionally manually configured

- Uploads, reads and explores the data

- Identifies extremes, missing values and data issues

- Detects the time series periodicity (minutes, days, weeks, months, years etc)

- Detects multiple series and hierarchies

- Creates a portfolio of potential predictor fields in the data

- Identifies how best to test the model using back-steps

- Carries out a range of data preparation steps such as missing value imputations

- Creates a series of Blueprints showing the data preparation steps and configuration of each model

- Generates a leader board of the best performing models

- Creates a series of evaluation plots to test and understand model performance

DataRobot uses back tests to test and rank the models

Each overlapping back test has a validation time zone to test a given model's accuracy
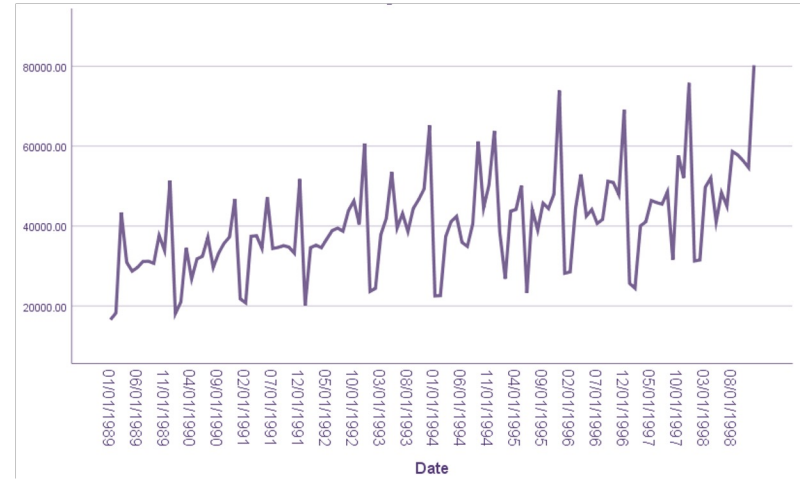
Simple Time Series

Create your own time series

- https://trends.google.com
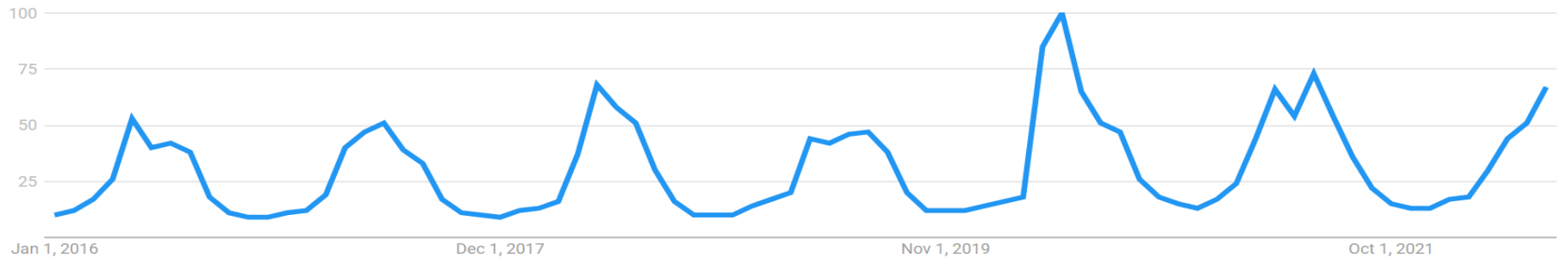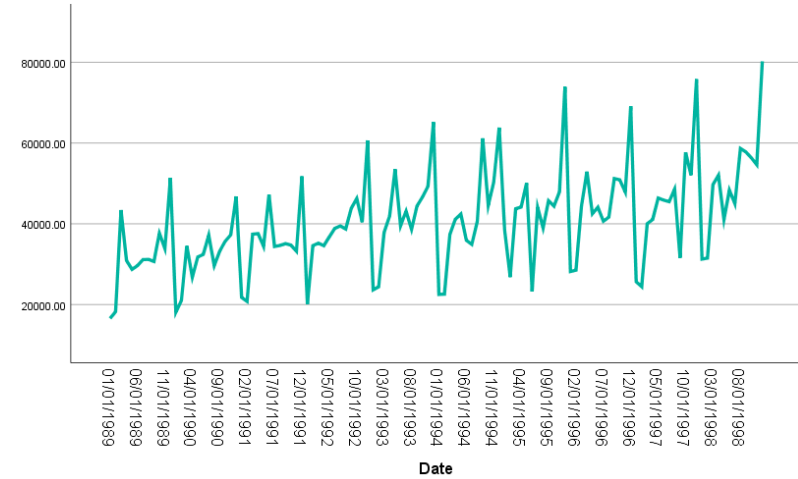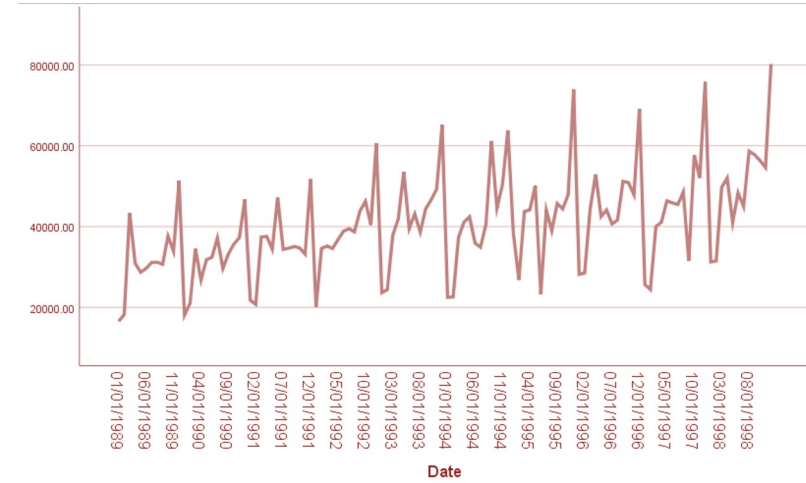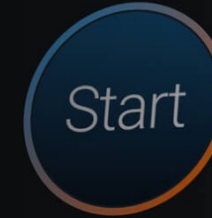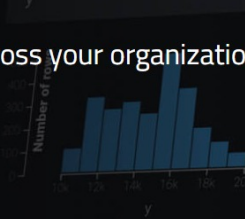
Time Series with Predictors

Multiple Time Series

Automated Time Series

Effortlessly create, deploy, and maintain high-impact forecasts across your organization.

- Fully Automated
- AI-Driven innovative models
- Granular forecasting at scale
- Real-time Anomaly detection
- Easy Integration
- On-Cloud and On-Prem
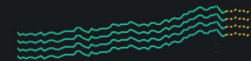
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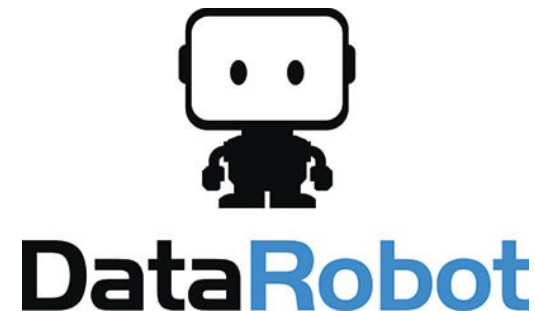
Please contact Rachel Clinton

rclinton@sv-europe.com

To find out more about how Smart Vision and

DataRobot can help accelerate your

organisation's efforts in Cloud AI

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Thank you