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# Monte Carlo Training: Data Observability
2 days (14 hours)

## Presentation

Our Monte Carlo training will help you guarantee the reliability and quality of your data across your entire datastack. Monte Carlo is a data observability platform that enables you to understand the health and status of the data in your system by monitoring, detecting and resolving data problems in real time.

This program will familiarize you with the basic principles of the Monte-Carlo method and help you understand the tool's various fields of application. You'll be able to understand common probability distributions such as normal, lognormal, uniform, triangular and Beta-PERT.

Our training course will teach you how to create predictive models and use range estimates. You'll also learn how to understand and apply the bias-variance trade-off through numerous practical exercises that will enable you to validate the skills you've acquired.

Like all our training courses, it will be run on the latest version of the tool: Monte Carlo Data 0.90

## Objectives

- Configuring Monte Carlo for your environment
- Create predictive models to observe your data
- How to use the results

## Target audience

- **Data Analysts**
- Data scientists

## Prerequisites

- Programming skills
- Experience in data analysis

# MONTE CARLO TRAINING PROGRAM: DATA OBSERVABILITY

## INTRODUCTION TO MONTE CARLO SIMULATION

- What is Monte Carlo simulation?
- Advantages and disadvantages of simulation over deterministic analysis
- Fields of application
- Introduction to the basic principles of the Monte Carlo method

## BASIC CONCEPTS IN STATISTICS AND PROBABILITY

- Understand common probability distributions: normal, lognormal, uniform, triangular, Beta-PERT
- Using distributions to model uncertainties
- A reminder of the concepts of variance and expectation
- The importance of probability theory in Monte Carlo simulations

## BUILDING AND USING MONTE CARLO MODELS

- Steps in building a simulation model
- Creating forecasting models and using range estimates
- Understanding and applying the bias-variance tradeoff
- Practical use with exercises on Jupyter Notebooks or specialized Excel plug-ins

## SIMULATION AND OPTIMIZATION TECHNIQUES

- Random number generation and introduction to stochastic simulations
- Stochastic approximation methods and simulation-based optimization
- Using Markov chain Monte Carlo (MCMC) techniques for optimization
- Practical simulation and optimization exercises

## RISK ANALYSIS AND DECISION MAKING BY MONTE CARLO

- Application of Monte Carlo simulation in risk analysis
- Estimation of completion probabilities and extreme risks
- Decision-making based on simulation results
- Case studies and interactive simulations to reinforce understanding

## DATA OBSERVABILITY TOOLS AND TECHNIQUES

- Performance monitoring of SQL queries and databases using tools such as Snowflake
- Notification configuration and integration with tools such as Slack, e-mail, and GitHub
- Advanced monitoring practices: field health, data freshness, and dimension tracking
- Practical exercises including the creation of custom SQL monitors and the use of JSON Schema Monitor

# Companies concerned

This course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced computer technology, or to acquire specific business knowledge or modern methods.

# Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives for the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

# Teaching methods

Practical course: 60% Practical, 40% Theory. Training material distributed in digital format to all participants.

# Organization

The course alternates theoretical input from the trainer, supported by examples, with brainstorming sessions and group work.

# Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

# Sanction

A certificate will be issued to each trainee who completes the course.