Training: Google Cloud
# Vertex Forecasting and Time Series in Practice

Google Cloud

## TRAINING GOALS:

This course is an introduction to building forecasting solutions with Google Cloud. You start with sequence models and time series foundations. You then walk through an end-to-end workflow: from data preparation to model development and deployment with Vertex AI. Finally, you learn the lessons and tips from a retail use case and apply the knowledge by building your own forecasting models.

### What you'll learn

- Understand the main concepts and the applications of a sequence model, time series, and forecasting.
- Identify the options to develop a forecasting model on Google Cloud.
- Describe the workflow to develop a forecasting model by using Vertex AI.
- Prepare data (including ingestion and feature engineering) by using BigQuery and Vertex managed datasets.
- Train a forecasting model and evaluate the performance by using AutoML.
- Deploy and monitor a forecasting model by using Vertex AI Pipelines.
- Build a forecasting solution from end-to-end using a retail dataset.

### Audience

This course is intended for professional data analysts, data scientists, and ML engineers who want to build end-to-end high performance forecasting solutions on Google Cloud and add automation to the workflow.

### Products

- Vertex AI
- AutoML
- BigQuery ML
- Vertex AI Pipelines



Compendium Centrum Edukacyjne Spółka z o.o.
ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
BNP Paribas Bank Polska S.A.
EUR: PL 79 1600 1462 1853 6451 3000 0006
USD: PL 52 1600 1462 1853 6451 3000 0007

- TensorFlow

## CONSPECT:

- Course Introduction
  - Topics
    - This module addresses the reasons to build a forecasting solution on Google Cloud and introduces the learning objectives.
  - Objectives
    - Identify the reasons to learn Vertex AI Forecasting from Google.
    - Learn the course objectives.
- Time Series and Forecasting Fundamentals
  - Topics
    - This module provides a theoretical foundation of types of sequence models, time series patterns and analysis, and forecasting notations.
  - Objectives
    - Identify the different types of sequence models.
    - Identify the different patterns and analysis methods of time series.
    - Describe the primary notations of forecasting.
  - Activities
    - Quiz
- Forecasting Options on Google Cloud
  - Topics
    - This module introduces two major options to build a forecasting solution on Google Cloud: BigQuery ML and Vertex AI Forecast (AutoML). It also investigates the unique features of Vertex AI Forecast and explores an end-to-end workflow with AutoML.
  - Objectives
    - Identify the options to develop forecasting models on Google Cloud.
    - Describe Vertex AI and its benefits.
    - Explore the workflow to build a forecasting model by using Vertex AI.
  - Activities
    - Lab: Building Demand Forecasting with BigQuery ML
    - Quiz
- Data Preparation
  - Topics
    - This module explores the transformation of original data to the data types and format supported by Vertex AI. It also introduces the different types of features in



Compendium Centrum Edukacyjne Spółka z o.o.
ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
BNP Paribas Bank Polska S.A.
EUR: PL 79 1600 1462 1853 6451 3000 0006
USD: PL 52 1600 1462 1853 6451 3000 0007

time series and the best practices for data ingestion.

- Objectives
  - Prepare the input data to fit the requirements of Vertex AI Forecasting.
  - Demonstrate different types of features.
  - Describe the best practices for the data ingestion stage.
- Activities
  - Quiz

- Model Training
  - Topics
    - This module walks learners through the model training and demonstrates the configuration details such as the setup of context window, forecast horizon, and optimization objective.
  - Objectives
    - Configure model training.
    - Select the appropriate training optimization objective.
  - Activities
    - Lab: Training a Model with Vertex AI Forecast
    - Quiz

- Model Evaluation
  - Topics
    - This module describes the training data split, demonstrates the evaluation metrics, and recommends the approaches to improve the model performance.
  - Objectives
    - Demonstrate training data split in time series forecasting.
    - Describe evaluation metrics.
    - Design the approach to improve the performance.
  - Activities
    - Quiz

- Model Deployment
  - Topics
    - This module demonstrates model prediction, specifically the batch prediction with Vertex AI Forecast. It also explores machine learning operations (MLOps) and the transition from development to production.
  - Objectives
    - Deploy the forecasting model.
    - Describe Vertex AI Pipelines and MLOps
    - Use batch predictions to generate model forecasts.
  - Activities



Compendium Centrum Edukacyjne Spółka z o.o.
ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
BNP Paribas Bank Polska S.A.
EUR: PL 79 1600 1462 1853 6451 3000 0006
USD: PL 52 1600 1462 1853 6451 3000 0007

        - Quiz
- Model Monitoring
    - Topics
        - This module describes model drift and the approach of model retraining. It also demonstrates the automation of the forecasting workflow by using Vertex AI Pipelines.
    - Objectives
        - Describe model drift.
        - Demonstrate model retraining.
        - Use Vertex AI Pipelines and prebuilt (SDKs) to automate the forecasting workflow.
    - Activities
        - Lab (optional): Building a Forecasting Pipeline with Vertex AI Python SDKs
        - Quiz
- Vertex Forecasting in Retail
    - Topics
        - This module describes a use case to build a forecasting solution with Vertex AI Forecast in a retail store. It demonstrates the steps and considerations, walks through a pilot study with two different datasets, and discusses the challenges and lessons.
    - Objectives
        - Describe the steps and considerations of building a forecasting solution in retail.
        - Demonstrate the model development with different datasets.
        - Identify the challenges and the lessons of developing a forecasting model in retail.
    - Activities
        - Lab: Developing an End-to-end Forecasting Solution in Retail
- Course Summary
    - Topics
        - This module addresses the main features of Vertex AI Forecast and summarizes the main topics of each module.
    - Objectives
        - Summarize the steps to build a forecasting model with Vertex AI.

## REQUIREMENTS:

Having one or more of the following:

- Basic knowledge of Python syntax
- Basic understanding of machine learning models



Compendium Centrum Edukacyjne Spółka z o.o.
ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
BNP Paribas Bank Polska S.A.
EUR: PL 79 1600 1462 1853 6451 3000 0006
USD: PL 52 1600 1462 1853 6451 3000 0007

- Prior experience building machine learning solutions on Google Cloud

## Difficulty level



## CERTIFICATE:

The participants will obtain certificates signed by Google Cloud (course completion).

## TRAINER:

Authorized Google Cloud Trainer



Compendium Centrum Edukacyjne Spółka z o.o.
ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
BNP Paribas Bank Polska S.A.
EUR: PL 79 1600 1462 1853 6451 3000 0006
USD: PL 52 1600 1462 1853 6451 3000 0007