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

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- 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

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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

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        - 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

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- 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

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