

# Sela.

MLGC

## Machine Learning on Google Cloud

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# Machine Learning on Google Cloud

MLGC - Version: 1

 0 days Course

## Description:

This course teaches you how to build Vertex AI AutoML models without writing a single line of code; build BigQuery ML models knowing basic SQL; create Vertex AI custom training jobs you deploy using containers (with little knowledge of Docker); use Feature Store for data management and governance; use feature engineering for model improvement; determine the appropriate data preprocessing options for your use case; write distributed ML models that scale in TensorFlow; and leverage best practices to implement machine learning on Google Cloud. Learn all this and more!

## Intended audience:

## Prerequisites:

## Objectives:

## Topics:

How Google Does Machine Learning

- Objectives

- What are best practices for implementing machine learning on Google Cloud? What is



- Vertex AI and how can you use the platform to quickly build, train, and deploy AutoML
- machine learning models without writing a single line of code? What is machine
- learning, and what kinds of problems can it solve?
- Google thinks about machine learning slightly differently: it's about providing a unified
- platform for managed datasets, a feature store, a way to build, train, and deploy
- machine learning models without writing a single line of code, providing the ability
- to label data, create Workbench notebooks using frameworks such as TensorFlow,
- SciKit Learn, Pytorch, R, and others. Our Vertex AI Platform also includes the ability
- to train custom models, build component pipelines, and perform both online and batch
- predictions. We also discuss the five phases of converting a candidate use case to be
- driven by machine learning, and consider why it is important to not skip the phases. We
- end with a recognition of the biases that machine learning can amplify and how
- to recognize them.
- Describe the Vertex AI Platform and how it is used to quickly build, train, and deploy
- AutoML machine learning models without writing a single line of code.
- Describe best practices for implementing machine learning on Google Cloud.
- Develop a data strategy around machine learning.
- Examine use cases that are then reimaged through an ML lens.
- Leverage Google Cloud Platform tools and environment to do ML.
- Learn from Google's experience to avoid common pitfalls.
- Carry out data science tasks in online collaborative notebooks.
- Activities:
  - • Hands-On Labs
  - • Module Quizzes
  - • Module Readings

## Launching into Machine Learning

- Objectives
  - The course begins with a discussion about data: how to improve data quality and
  - perform exploratory data analysis. We describe Vertex AI AutoML and how to build,



- train, and deploy an ML model without writing a single line of code. You will understand
- the benefits of Big Query ML. We then discuss how to optimize a machine learning
- (ML) model and how generalization and sampling can help assess the quality of ML
- models for custom training.
- • Describe Vertex AI AutoML and how to build, train, and deploy an ML model without
- writing a single line of code.
- • Describe Big Query ML and its benefits.
- • Describe how to improve data quality.
- • Perform exploratory data analysis.
- • Build and train supervised learning models.
- • Optimize and evaluate models using loss functions and performance metrics.
- • Mitigate common problems that arise in machine learning.
- • Create repeatable and scalable training, evaluation, and test datasets.
- • Hands
- Activities
  - • Hands-On Labs
  - • Module Quizzes
  - • Module Readings

## TensorFlow on Google Cloud

- Objectives:
  - The modules cover designing and building a TensorFlow input data pipeline, building
  - ML models with TensorFlow and Keras, improving the accuracy of ML models, writing
  - ML models for scaled use, and writing specialized ML models.
  - • Create TensorFlow and Keras machine learning models.
  - • Describe TensorFlow key components.
  - • Use the tf.data library to manipulate data and large datasets.
  - • Build a ML model using tf.keras preprocessing layers.
  - • Use the Keras Sequential and Functional APIs for simple and advanced model



- creation. Understand how model subclassing can be used for more
- customized models.
- • Use `tf.keras.preprocessing` utilities for working with image data, text data, and
- sequence data.
- • Train, deploy, and productionalize ML models at scale with Cloud AI Platform.
- Activities:
  - • Hands-On Labs
  - • Module Quizzes
  - • Module Readings

## Feature Engineering

- Objectives
  - Want to know about Vertex AI Feature Store? Want to know how you can improve
  - the accuracy of your ML models? What about how to find which data columns make
  - the most useful features? Welcome to Feature Engineering, where we discuss good
  - versus bad features and how you can preprocess and transform them for optimal use
  - in your models. This course includes content and labs on feature engineering using
  - BigQuery ML, Keras, and TensorFlow.
  - • Describe Vertex AI Feature Store.
  - • Compare the key required aspects of a good feature.
  - • Combine and create new feature combinations through feature crosses.
  - • Perform feature engineering using BigQuery ML, Keras, and TensorFlow.
  - • Understand how to preprocess and explore features with Dataflow and Dataprep
  - by Trifacta.
  - • Understand and apply how TensorFlow transforms features.
- Activities:
  - • Hands-On Labs
  - • Module Quizzes
  - • Module Readings



## Machine Learning in the Enterprise

- Objectives

- This course encompasses a real-world practical approach to the ML Workflow: a case study approach that presents an ML team faced with several ML business requirements and use cases. This team must understand the tools required for data management and governance and consider the best approach for data preprocessing: from providing an overview of Dataflow and Dataprep to using BigQuery for preprocessing tasks.
- The team is presented with three options to build machine learning models for two specific use cases. This course explains why the team would use AutoML, BigQuery ML, or custom training to achieve their objectives.
- A deeper dive into custom training is presented in this course. We describe custom training requirements from training code structure, storage, and loading large datasets to exporting a trained model.
- You will build a custom training machine learning model, which allows you to build a container image with little knowledge of Docker.
- The case study team examines hyperparameter tuning using Vertex Vizier and how it can be used to improve model performance. To understand more about model improvement, we dive into a bit of theory: we discuss regularization, dealing with sparsity, and many other essential concepts and principles. We end with an overview of prediction and model monitoring and how Vertex AI can be used to manage ML models.

- Activities:

- • Hands-On Labs
- • Module Quizzes
- • Module Readings