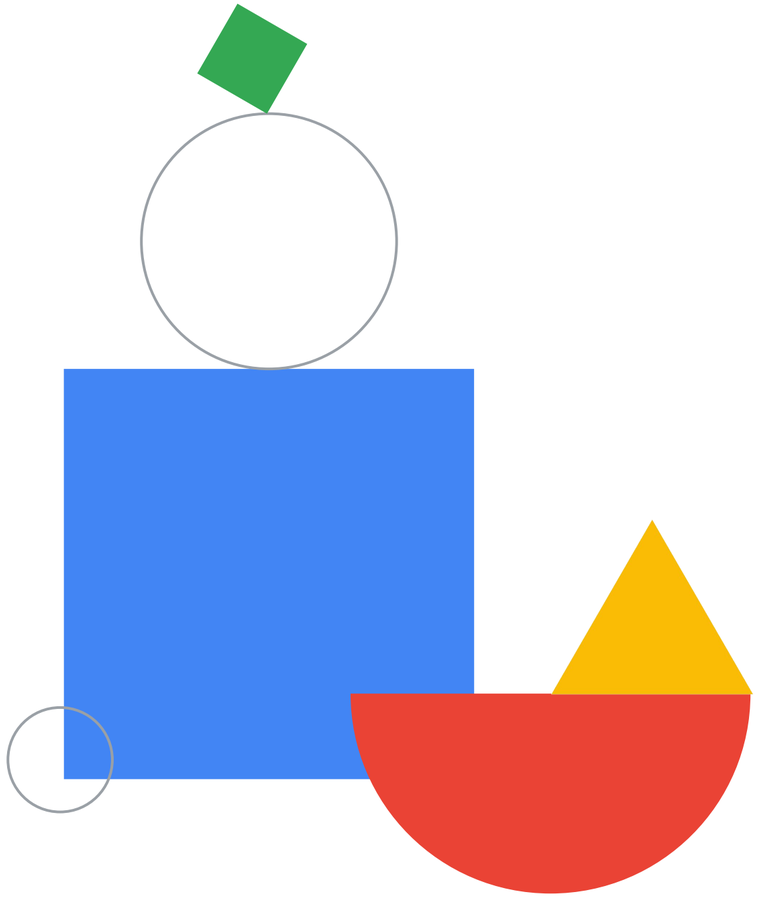
Google Cloud

Machine Learning on Google Cloud



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Introductions

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Audience and prerequisites

Target audience

- Data analysts, data scientists, and data engineers, ML engineers, ML software engineers
- Individuals that want to be exposed to machine learning in the cloud

Prerequisites

To get the most out of this specialization, participants should have:

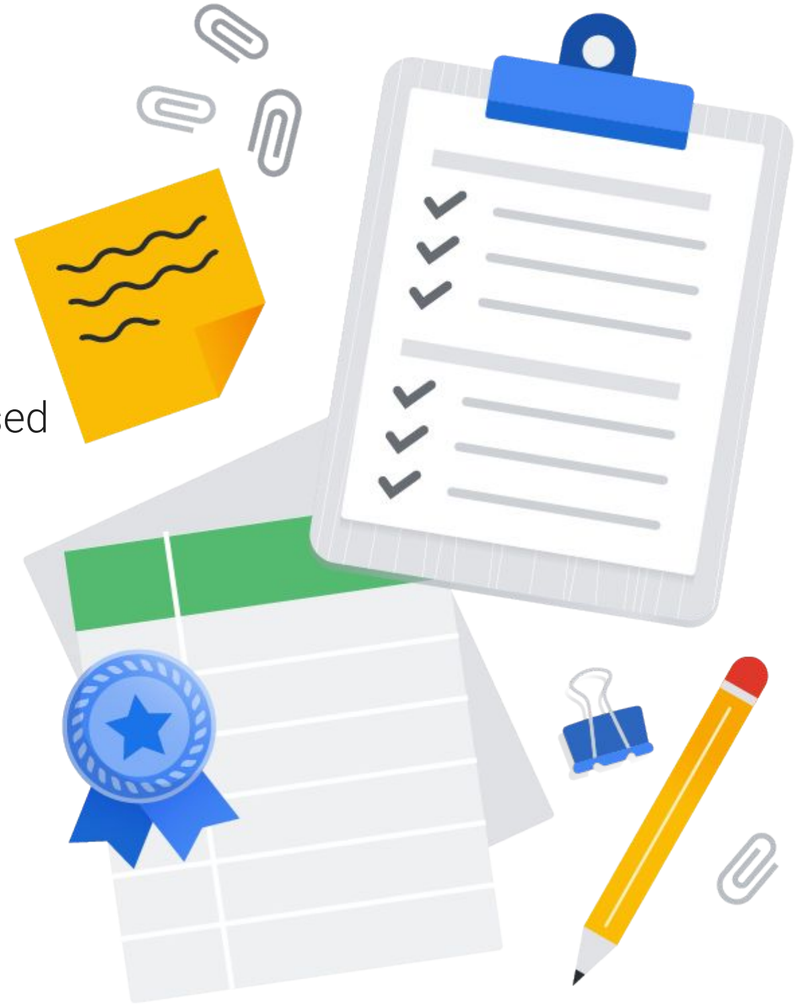
- Some familiarity with basic machine learning concepts
- Basic proficiency with a scripting language — Python preferred
- Google Crash Course on Python

Machine Learning on Google Cloud learning path

1. How Google Does Machine Learning
2. Launching into Machine Learning
3. TensorFlow on Google Cloud
4. Feature Engineering
5. Machine Learning in the Enterprise

Course objectives

- Build, train and deploy a machine learning model without writing a single line of code using Vertex AI AutoML.
- Understand when to use AutoML, Big Query ML and custom training.
- Create Vertex AI managed datasets.
- Learn Feature Store.
- Describe Analytics Hub, Dataplex, Data Catalog.
- Describe hyperparameter tuning using Vertex Vizier and how it can be used to improve model performance.
- Create a Vertex AI Workbench User-Managed Notebook, build a custom training job, then deploy it using a Docker container.
- Describe batch and online predictions and model monitoring.
- Describe how to improve data quality.
- Perform exploratory data analysis.
- Build and train supervised learning models.
- Implement machine learning models using TensorFlow/Keras.
- Describe how to represent and transform features.
- Understand the benefits of using feature engineering to improve model quality.
- Explain Vertex AI Monitoring and Vertex AI Pipelines.



Course objectives

- Build, train and deploy a machine learning model without writing a single line of code using **Vertex AI AutoML**.
- Understand when to use **AutoML**, **BigQuery ML** and custom training.
- Create **Vertex AI managed datasets**.
- Learn **Feature Store**.
- Describe **Analytics Hub**, **Dataplex**, **Data Catalog**.
- Describe hyperparameter tuning using **Vertex Vizier** and how it can be used to improve model performance.
- Create a **Vertex AI Workbench User-Managed Notebook**, build a custom training job, then deploy it using a Docker container.
- Describe batch and online predictions and model monitoring.
- Describe how to improve data quality.
- Perform exploratory data analysis.
- Build and train supervised learning models.
- Implement machine learning models using **TensorFlow/Keras**.
- Describe how to represent and transform features.
- Understand the benefits of using feature engineering to improve model quality.
- Explain **Vertex AI Monitoring** and **Vertex AI Pipelines**.

Course agenda

Module	Topics
1. How Google Does Machine Learning	• 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 • Develop a data strategy around machine learning • Examine use cases that are then reimagined 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
2. Launching into Machine Learning	• Describe Vertex AI AutoML and how to build, train, and deploy an ML model without writing a single line of code. • Describe Bigquery 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.

Course agenda

Module	Topics
3. TensorFlow on Google Cloud	• 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. • 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.
4. Feature Engineering	• 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 BQML, Keras, and TensorFlow.

Course agenda

Module	Topics
5. Machine Learning in the Enterprise	• Understand the tools required for data management and governance • Describe the best approach for data preprocessing - from providing an overview of DataFlow and DataPrep to using SQL for preprocessing tasks. • Explain how AutoML, BQML, and custom training differ and when to use a particular framework. • Describe hyperparameter tuning using Vertex Vizier and how it can be used to improve model performance. • Explain prediction and model monitoring and how Vertex AI can be used to manage ML models. • Describe the benefits of Vertex AI Pipelines