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The Google Professional-Machine-Learning-Engineer exam is designed to test a variety of skills and knowledge areas related to machine learning, including data analysis, model selection and evaluation, and deployment and monitoring of machine learning models. It is also designed to test candidates' ability to apply machine learning techniques to real-world problems and to demonstrate their ability to work effectively with data science teams.

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## Trustworthy Professional-Machine-Learning-Engineer Exam Content - Professional-Machine-Learning-Engineer Test Valid

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Google Professional Machine Learning Engineer Certification Exam is a credential that is designed for professionals who are interested in building and deploying machine learning models using the Google Cloud Platform. Google Professional Machine Learning Engineer certification exam is an ideal choice for individuals who have experience in developing machine learning solutions, are familiar with cloud computing technologies, and are interested in pursuing a career in machine learning engineering.

Achieving the Google Professional Machine Learning Engineer Certification is a significant accomplishment for professionals in the field of machine learning. It demonstrates a high level of expertise in designing, implementing, and deploying machine learning models using Google Cloud Platform. Google Professional Machine Learning Engineer certification also provides opportunities for career advancement and recognition as a leader in the field of machine learning.

### The benefit of obtaining the Professional Machine Learning Engineer - Google Certification

- More than 1 in 4 of Google Cloud certified individuals took on more responsibility or leadership roles at work
- 87% of Google Cloud certified individuals are more confident about their cloud skills
- Professional Cloud Architect was the highest paying certification of 2020 and 2019

### Google Professional Machine Learning Engineer Sample Questions (Q270-Q275):

#### NEW QUESTION # 270

You developed a custom model by using Vertex AI to forecast the sales of your company's products based on historical transactional data. You anticipate changes in the feature distributions and the correlations between the features in the near future. You also expect to receive a large volume of prediction requests. You plan to use Vertex AI Model Monitoring for drift detection and you want to minimize the cost. What should you do?

- A. Use the features and the feature attributions for monitoring. Set a monitoring-frequency value that is lower than the default.
- B. Use the features for monitoring. Set a prediction-sampling-rate value that is closer to 1 than 0.
- **C. Use the features and the feature attributions for monitoring. Set a prediction-sampling-rate value that is closer to 0 than 1.**
- D. Use the features for monitoring. Set a monitoring-frequency value that is higher than the default.

**Answer: C**

Explanation:

The best option for using Vertex AI Model Monitoring for drift detection and minimizing the cost is to use the features and the feature attributions for monitoring, and set a prediction-sampling-rate value that is closer to 0 than 1. This option allows you to leverage the power and flexibility of Google Cloud to detect feature drift in the input prediction requests for custom models, and reduce the storage and computation costs of the model monitoring job. Vertex AI Model Monitoring is a service that can track and compare the results of multiple machine learning runs. Vertex AI Model Monitoring can monitor the model's prediction input data for feature skew and drift. Feature drift occurs when the feature data distribution in production changes over time. If the original training data is not available, you can enable drift detection to monitor your models for feature drift.

Vertex AI Model Monitoring uses TensorFlow Data Validation (TFDV) to calculate the distributions and distance scores for each feature, and compares them with a baseline distribution. The baseline distribution is the statistical distribution of the feature's values in the training data. If the training data is not available, the baseline distribution is calculated from the first 1000 prediction requests that the model receives. If the distance score for a feature exceeds an alerting threshold that you set, Vertex AI Model Monitoring sends you an email alert. However, if you use a custom model, you can also enable feature attribution monitoring, which can provide more insights into the feature drift. Feature attribution monitoring analyzes the feature attributions, which are the contributions of each feature to the prediction output. Feature attribution monitoring can help you identify the features that have the most impact on the model performance, and the features that have the most significant drift over time. Feature attribution monitoring can also help you understand the relationship between the features and the prediction output, and the correlation between the features. The prediction-sampling-rate is a parameter that determines the percentage of prediction requests that are logged and analyzed by the

model monitoring job. Using a lower prediction-sampling-rate can reduce the storage and computation costs of the model monitoring job, but also the quality and validity of the data. Using a lower prediction-sampling-rate can introduce sampling bias and noise into the data, and make the model monitoring job miss some important features or patterns of the data. However, using a higher prediction-sampling-rate can increase the storage and computation costs of the model monitoring job, and also the amount of data that needs to be processed and analyzed. Therefore, there is a trade-off between the prediction-sampling-rate and the cost and accuracy of the model monitoring job, and the optimal prediction-sampling-rate depends on the business objective and the data characteristics<sup>2</sup>. By using the features and the feature attributions for monitoring, and setting a prediction-sampling-rate value that is closer to 0 than 1, you can use Vertex AI Model Monitoring for drift detection and minimize the cost.

The other options are not as good as option D, for the following reasons:

\* Option A: Using the features for monitoring and setting a monitoring-frequency value that is higher than the default would not enable feature attribution monitoring, and could increase the cost of the model monitoring job. The monitoring-frequency is a parameter that determines how often the model monitoring job analyzes the logged prediction requests and calculates the distributions and distance

\* scores for each feature. Using a higher monitoring-frequency can increase the frequency and timeliness of the model monitoring job, but also the computation costs of the model monitoring job. Moreover, using the features for monitoring would not enable feature attribution monitoring, which can provide more insights into the feature drift and the model performance<sup>1</sup>.

\* Option B: Using the features for monitoring and setting a prediction-sampling-rate value that is closer to 1 than 0 would not enable feature attribution monitoring, and could increase the cost of the model monitoring job. The prediction-sampling-rate is a parameter that determines the percentage of prediction requests that are logged and analyzed by the model monitoring job. Using a higher prediction-sampling-rate can increase the quality and validity of the data, but also the storage and computation costs of the model monitoring job. Moreover, using the features for monitoring would not enable feature attribution monitoring, which can provide more insights into the feature drift and the model performance<sup>1,2</sup>.

\* Option C: Using the features and the feature attributions for monitoring and setting a monitoring-frequency value that is lower than the default would enable feature attribution monitoring, but could reduce the frequency and timeliness of the model monitoring job. The monitoring-frequency is a parameter that determines how often the model monitoring job analyzes the logged prediction requests and calculates the distributions and distance scores for each feature. Using a lower monitoring-frequency can reduce the computation costs of the model monitoring job, but also the frequency and timeliness of the model monitoring job. This can make the model monitoring job less responsive and effective in detecting and alerting the feature drift<sup>1</sup>.

References:

\* Preparing for Google Cloud Certification: Machine Learning Engineer, Course 3: Production ML Systems, Week 4: Evaluation

\* Google Cloud Professional Machine Learning Engineer Exam Guide, Section 3: Scaling ML models in production, 3.3 Monitoring ML models in production

\* Official Google Cloud Certified Professional Machine Learning Engineer Study Guide, Chapter 6:

Production ML Systems, Section 6.3: Monitoring ML Models

\* Using Model Monitoring

\* Understanding the score threshold slider

## NEW QUESTION # 271

Your work for a textile manufacturing company. Your company has hundreds of machines and each machine has many sensors. Your team used the sensory data to build hundreds of ML models that detect machine anomalies. Models are retrained daily and you need to deploy these models in a cost-effective way. The models must operate 24/7 without downtime and make sub-millisecond predictions. What should you do?

- A. Deploy a Dataflow batch pipeline with the RunInference API, and use model refresh.
- **B. Deploy a Dataflow streaming pipeline with the RunInference API and use automatic model refresh.**
- C. Deploy a Dataflow streaming pipeline and a Vertex AI Prediction endpoint with autoscaling.
- D. Deploy a Dataflow batch pipeline and a Vertex AI Prediction endpoint.

**Answer: B**

Explanation:

A Dataflow streaming pipeline is a cost-effective way to process large volumes of real-time data from sensors. The RunInference API is a Dataflow transform that allows you to run online predictions on your streaming data using your ML models. By using the RunInference API, you can avoid the latency and cost of using a separate prediction service. The automatic model refresh feature enables you to update your models in the pipeline without redeploying the pipeline. This way, you can ensure that your models are always up-to-date and accurate. By deploying a Dataflow streaming pipeline with the RunInference API and using automatic model refresh, you can achieve sub-millisecond predictions, 24/7 availability, and low operational overhead for your ML models.

References:

\* Dataflow documentation

\* RunInference API documentation

\* Automatic model refresh documentation

\* Preparing for Google Cloud Certification: Machine Learning Engineer Professional Certificate

### NEW QUESTION # 272

A Data Engineer needs to build a model using a dataset containing customer credit card information. How can the Data Engineer ensure the data remains encrypted and the credit card information is secure?

- A. Use an IAM policy to encrypt the data on the Amazon S3 bucket and Amazon Kinesis to automatically discard credit card numbers and insert fake credit card numbers.
- B. Use AWS KMS to encrypt the data on Amazon S3 and Amazon SageMaker, and redact the credit card numbers from the customer data with AWS Glue.
- C. Use a custom encryption algorithm to encrypt the data and store the data on an Amazon SageMaker instance in a VPC. Use the SageMaker DeepAR algorithm to randomize the credit card numbers.
- **D. Use an Amazon SageMaker launch configuration to encrypt the data once it is copied to the SageMaker instance in a VPC. Use the SageMaker principal component analysis (PCA) algorithm to reduce the length of the credit card numbers.**

**Answer: D**

Explanation:

Explanation/Reference: <https://docs.aws.amazon.com/sagemaker/latest/dg/pca.html>

### NEW QUESTION # 273

You are developing a Kubeflow pipeline on Google Kubernetes Engine. The first step in the pipeline is to issue a query against BigQuery. You plan to use the results of that query as the input to the next step in your pipeline. You want to achieve this in the easiest way possible. What should you do?

- A. Use the BigQuery console to execute your query and then save the query results into a new BigQuery table.
- B. Use the Kubeflow Pipelines domain-specific language to create a custom component that uses the Python BigQuery client library to execute queries.
- **C. Locate the Kubeflow Pipelines repository on GitHub. Find the BigQuery Query Component, copy that component's URL, and use it to load the component into your pipeline. Use the component to execute queries against BigQuery.**
- D. Write a Python script that uses the BigQuery API to execute queries against BigQuery. Execute this script as the first step in your Kubeflow pipeline.

**Answer: C**

Explanation:

Kubeflow is an open source platform for developing, orchestrating, deploying, and running scalable and portable machine learning workflows on Kubernetes. Kubeflow Pipelines is a component of Kubeflow that allows you to build and manage end-to-end machine learning pipelines using a graphical user interface or a Python-based domain-specific language (DSL). Kubeflow Pipelines can help you automate and orchestrate your machine learning workflows, and integrate with various Google Cloud services and tools<sup>1</sup>. One of the Google Cloud services that you can use with Kubeflow Pipelines is BigQuery, which is a serverless, scalable, and cost-effective data warehouse that allows you to run fast and complex queries on large-scale data. BigQuery can help you analyze and prepare your data for machine learning, and store and manage your machine learning models<sup>2</sup>. To execute a query against BigQuery as the first step in your Kubeflow pipeline, and use the results of that query as the input to the next step in your pipeline, the easiest way to do that is to use the BigQuery Query Component, which is a pre-built component that you can find in the Kubeflow Pipelines repository on GitHub.

The BigQuery Query Component allows you to run a SQL query on BigQuery, and output the results as a table or a file. You can use the component's URL to load the component into your pipeline, and specify the query and the output parameters. You can then use the output of the component as the input to the next step in your pipeline, such as a data processing or a model training step<sup>3</sup>. The other options are not as easy or feasible. Using the BigQuery console to execute your query and then save the query results into a new BigQuery table is not a good idea, as it does not integrate with your Kubeflow pipeline, and requires manual intervention and duplication of data. Writing a Python script that uses the BigQuery API to execute queries against BigQuery is not ideal, as it requires writing custom code and handling authentication and error handling. Using the Kubeflow Pipelines DSL to create a custom component that uses the Python BigQuery client library to execute queries is not optimal, as it requires creating and packaging a Docker container image for the component, and testing and debugging the component.

References: 1: Kubeflow Pipelines overview 2: BigQuery overview 3: BigQuery Query Component

### NEW QUESTION # 274

You developed a Vertex AI pipeline that trains a classification model on data stored in a large BigQuery table.

The pipeline has four steps, where each step is created by a Python function that uses the KubeFlow v2 API. The components have the following names:

□ You launch your Vertex AI pipeline as the following:

□ You perform many model iterations by adjusting the code and parameters of the training step. You observe high costs associated with the development, particularly the data export and preprocessing steps. You need to reduce model development costs. What should you do?

- A. □
- B. □
- C. □
- D. □

**Answer: C**

Explanation:

According to the official exam guide<sup>1</sup>, one of the skills assessed in the exam is to "automate and orchestrate ML pipelines using Cloud Composer". Vertex AI Pipelines<sup>2</sup> is a service that allows you to orchestrate your ML workflows using Kubeflow Pipelines SDK v2 or TensorFlow Extended. Vertex AI Pipelines supports execution caching, which means that if you run a pipeline and it reaches a component that has already been run with the same inputs and parameters, the component does not run again. Instead, the component uses the output from the previous run. This can save you time and resources when you are iterating on your pipeline. Therefore, option A is the best way to reduce model development costs, as it enables execution caching for the data export and preprocessing steps, which are likely to be the same for each model iteration. The other options are not relevant or optimal for this scenario. References:

\* Professional ML Engineer Exam Guide

\* Vertex AI Pipelines

\* Google Professional Machine Learning Certification Exam 2023

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### NEW QUESTION # 275

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