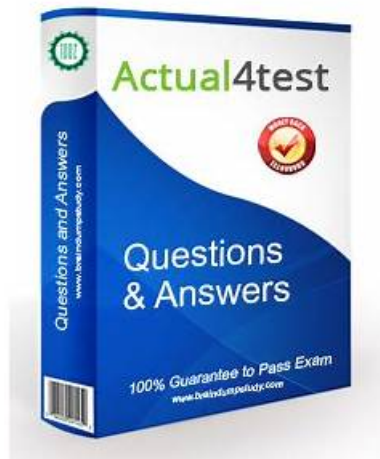


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Snowflake SnowPro Advanced: Data Scientist Certification Exam Sample Questions (Q71-Q76):

NEW QUESTION # 71

You're working with a large dataset containing customer purchase history. You want to identify customers whose purchase frequency deviates significantly from the average purchase frequency of all customers. The dataset is in a table named 'purchase history' with columns 'customer id' and 'purchase date'. What combination of Snowflake functionalities will allow you to achieve this task efficiently?

Choose all that apply.

- A. Calculate the average purchase frequency across all customers using and group by 'customer_id'.
- B. Create a UDF that computes the purchase frequency for a single user and apply it to all customers.
- C. Employ the 'QUALIFY' clause along with window functions to filter customers based on a condition related to their purchase frequency compared to the average.
- D. Calculate the Z-score of each customer's purchase frequency using 'AVG(Y, 'STDDEV()', and window functions, and then filter based on a Z-score threshold.
- E. Use the window function to divide customers into quantiles based on their total purchase count.

Answer: C,D

Explanation:

Options C and D are the correct approaches. Option C, using the 'QUALIFY' clause with window functions, is ideal for filtering rows based on a window function result. You can calculate the purchase frequency using a window function and compare it to the average within the 'QUALIFY' clause, effectively identifying those with significant deviations. Option D offers a robust statistical approach. Calculating the Z-score, which measures how many standard deviations an element is from the mean, allows you to identify customers with purchase frequencies that are statistically significantly different from the average. Filtering based on a Z-score threshold (e.g., $|Z| > 2$) identifies outliers. Although A and B are steps that could be useful, they are not complete solutions on their own. Option E, while technically possible, would be less efficient than using built-in functions and windowing.

NEW QUESTION # 72

You are building a model deployment pipeline using a CI/CD system that connects to your Snowflake data warehouse from your external IDE (VS Code) and orchestrates model training and deployment. The pipeline needs to dynamically create and grant privileges on Snowflake objects (e.g., tables, views, warehouses) required for the model. Which of the following security best practices should you implement when creating and granting privileges within the pipeline?

- A. Create a custom role with minimal required privileges to perform only the necessary operations for the pipeline, and grant this role to a dedicated service account used by the pipeline.
- B. Hardcode the credentials of a highly privileged user (e.g., a user with the SECURITYADMIN role) in the pipeline script for authentication.
- C. Grant the 'OWNERSHIP' privilege on all objects to the service account so it can perform any operation.
- D. Grant the 'SYSADMIN' role to the service account used by the pipeline to ensure it has sufficient privileges.
- E. Use the role within the pipeline script to create and grant all necessary privileges.

Answer: A

Explanation:

The principle of least privilege dictates that the pipeline should only have the minimum necessary privileges to perform its tasks. Creating a custom role with only the required privileges and granting it to a dedicated service account is the most secure approach. Using 'ACCOUNTADMIN' (Option A) or 'SYSADMIN' (Option C) grants excessive privileges. Hardcoding credentials (Option D) is a major security vulnerability. Granting 'OWNERSHIP' (Option E) is generally not necessary and grants excessive control. This follows the principle of least privilege which is essential for secure Snowflake deployments. A dedicated role ensures that the pipeline cannot inadvertently perform actions outside of its intended scope.

NEW QUESTION # 73

A data scientist needs to analyze website session data stored in a Snowflake table named 'WEB SESSIONS'. The table contains columns like 'SESSION ID', 'USER_ID', 'PAGE_VIEWS', 'TIME SPENT_SECONDS', and 'TIMESTAMP'. They want to identify potential bot traffic by analyzing the correlation between 'PAGE_VIEWS' and 'TIME SPENT_SECONDS'. Which of the following Snowflake SQL queries is the MOST efficient and statistically sound way to calculate the Pearson correlation coefficient between

these two columns, handling potential NULL values appropriately?

- ☐ SELECT CORR(PAGE_VIEWS, TIME_SPENT_SECONDS) FROM WEB_SESSIONS;
- ☐ SELECT COVAR_POP(PAGE_VIEWS, TIME_SPENT_SECONDS) / (STDDEV_POP(PAGE_VIEWS) STDDEV_POP(TIME_SPENT_SECONDS)) FROM WEB_SESSIONS;
- ☐ SELECT APPROX_CORR(PAGE_VIEWS, TIME_SPENT_SECONDS) FROM WEB_SESSIONS WHERE PAGE_VIEWS IS NOT NULL AND TIME_SPENT_SECONDS IS NOT NULL;
- ☐ SELECT CORR(PAGE_VIEWS, TIME_SPENT_SECONDS) FROM WEB_SESSIONS WHERE PAGE_VIEWS IS NOT NULL AND TIME_SPENT_SECONDS IS NOT NULL;
- ☐ SELECT APPROX_COVAR_POP(PAGE_VIEWS, TIME_SPENT_SECONDS) / (APPROX_STDDEV_POP(PAGE_VIEWS) APPROX_STDDEV_POP(TIME_SPENT_SECONDS)) FROM WEB_SESSIONS;

- A. Option A
- **B. Option D**
- C. Option E
- D. Option C
- E. Option B

Answer: B

Explanation:

The 'CORR' function in Snowflake directly calculates the Pearson correlation coefficient and implicitly handles NULL values by excluding rows where either input is NULL. Option A is incorrect because it does not explicitly filter NULL values, though the 'CORR' function itself handles it, Option B is mathematically correct but less concise. Option C uses 'APPROX CORR', which is useful for large datasets where approximate results are acceptable, but for a general scenario without size constraints, 'CORR' is preferred for accuracy. While Option E correctly calculates the correlation coefficient using covariance and standard deviation, it uses approximation functions which may impact accuracy without a necessary tradeoff.

NEW QUESTION # 74

You are deploying a pre-trained image classification model stored as a serialized file in an internal stage within Snowflake. You need to create a UDF to load this model and use it for inference on image data stored in a VARIANT column. The model was trained using Python's scikit-learn library and uses OpenCV for image processing. Which of the following code snippets correctly outlines the steps required to create and deploy this UDF? Assume you have already created an internal stage named 'MODEL_STAGE' and uploaded the model file into it. You also need to create a temporary directory that will be removed after the execution.

```
RETURNS VARCHAR
LANGUAGE PYTHON
UNTIL_VERSION = '3.8'
PACKAGES = ('scikit-learn', 'opencv-python')
IMPORTS = ('@MODEL_STAGE/image_model.joblib')
HANDLER = 'main'
S $$

import joblib
import cv2
import numpy as np
import os

def main(image_data):
    model_path = '/tmp/image_model.joblib'
    model = joblib.load(model_path)
    image = cv2.imread(image_data)
    prediction = model.predict([image.flatten()])[0]
    return str(prediction)
```

- A.
- B.

```

CREATE OR REPLACE FUNCTION classify_image(image_data VARIANT)
RETURNS VARCHAR
LANGUAGE PYTHON
RUNTIME_VERSION = '3.8'
PACKAGES = ('scikit-learn', 'opencv-python')
IMPORTS = ('@MODEL_STAGE/image_model.joblib')
HANDLER = 'main'
AS $$
import joblib
import cv2
import numpy as np
import os
from snowflake.snowpark.files import SnowflakeFile

def main(image_data):
    model_file = SnowflakeFile.get('@MODEL_STAGE/image_model.joblib')
    model = joblib.load(model_file)
    image_bytes = image_data['image_bytes'] # Assuming image_data is a VARIANT containing base64 encoded image bytes
    image = cv2.imdecode(np.frombuffer(image_bytes, np.uint8), cv2.IMREAD_COLOR)
    prediction = model.predict([image.flatten()])[0]
    return str(prediction)
$$;

```

- C.

```

CREATE OR REPLACE FUNCTION classify_image(image_data VARIANT)
RETURNS VARCHAR
LANGUAGE PYTHON
RUNTIME_VERSION = '3.8'
PACKAGES = ('scikit-learn', 'opencv-python', 'pillow')
IMPORTS = ('@MODEL_STAGE/image_model.joblib')
HANDLER = 'main'
AS $$
import joblib
import cv2
import numpy as np
import os, tempfile, shutil
import base64

def main(image_data):
    with tempfile.TemporaryDirectory() as tmpdir:
        model_path = os.path.join(tmpdir, 'image_model.joblib')
        sffile = open(os.path.join(tmpdir, 'image_model.joblib'), 'wb')
        sffile.close()
        shutil.copyfile(os.path.join(tmpdir, 'image_model.joblib'), model_path)
        model = joblib.load(model_path)
        image_bytes = base64.b64decode(image_data['image_bytes']) # Assuming image_data is a VARIANT containing base64 encoded image bytes
        image = cv2.imdecode(np.frombuffer(image_bytes, np.uint8), cv2.IMREAD_COLOR)
        prediction = model.predict([image.flatten()])[0]
        return str(prediction)
$$;

```

- D.

```

CREATE OR REPLACE FUNCTION classify_image(image_data VARIANT)
RETURNS VARCHAR
LANGUAGE PYTHON
RUNTIME_VERSION = '3.8'
PACKAGES = ('scikit-learn', 'opencv-python', 'pillow')
IMPORTS = ('@MODEL_STAGE/image_model.joblib')
HANDLER = 'main'
AS $$
import joblib
import cv2
import numpy as np
import os, tempfile, shutil
import base64

def main(image_data):
    with tempfile.TemporaryDirectory() as tmpdir:
        model_path = os.path.join(tmpdir, 'image_model.joblib')
        snowflake_import_directory = os.environ['SNOWFLAKE_IMPORT_DIRECTORY']
        shutil.copyfile(os.path.join(snowflake_import_directory, 'image_model.joblib'), model_path)
        model = joblib.load(model_path)
        image_bytes = base64.b64decode(image_data['image_bytes']) # Assuming image_data is a VARIANT containing base64 encoded image bytes
        image = cv2.imdecode(np.frombuffer(image_bytes, np.uint8), cv2.IMREAD_COLOR)
        prediction = model.predict([image.flatten()])[0]
        return str(prediction)
$$;

```

- E.

```

CREATE OR REPLACE FUNCTION classify_image(image_data VARIANT)
RETURNS VARCHAR
LANGUAGE PYTHON
RUNTIME_VERSION = '3.8'
PACKAGES = ('scikit-learn', 'opencv-python')
IMPORTS = ('@MODEL_STAGE/image_model.joblib')
HANDLER = 'main'
AS $$
import joblib
import cv2
import numpy as np
import os
import tempfile

def main(image_data):
    with tempfile.TemporaryDirectory() as tmpdir:
        model_path = os.path.join(tmpdir, 'image_model.joblib')
        shutil.copyfile(os.path.join(tmpdir, 'image_model.joblib'), model_path)
        model = joblib.load(model_path)
        image_bytes = image_data['image_bytes'] # Assuming image_data is a VARIANT containing base64 encoded image bytes
        image = cv2.imdecode(np.frombuffer(image_bytes, np.uint8), cv2.IMREAD_COLOR)
        prediction = model.predict([image.flatten()])[0]
        return str(prediction)
$$;

```

Answer: D

Explanation:

Option E is correct. This code correctly uses `tempfile` to create a temporary directory. It utilizes `os.environ['SNOWFLAKE_IMPORT_DIRECTORY']` to get the Snowflake import directory to locate the model, which is the recommended way to access imported files in Snowflake Python UDFs. It also decodes the base64 encoded image data and uses OpenCV to decode image and then does the predict. Option A has `shutil copy file` not Snowflake way. Option B is trying to `SnowflakeFile` that would not work. Option C does not create temporary directory. Option D will throw an error since the `os.path.join` is not valid.

NEW QUESTION # 75

You've trained a machine learning model using Scikit-learn and saved it as 'model.joblib'. You need to deploy this model to Snowflake. Which sequence of commands will correctly stage the model and create a Snowflake external function to use it for inference, assuming you already have a Snowflake stage named 'model_stage'?

```

○ PUT file:///path/to/model.joblib @model_stage; CREATE OR REPLACE EXTERNAL FUNCTION predict(input VARCHAR) RETURNS VARCHAR LANGUAGE PYTHON
RUNTIME_VERSION = '3.8' PACKAGES = ('scikit-learn','joblib') HANDLER = 'main.predict' AS $$ import joblib import pandas as pd from
snowflake.snowpark.types import PandasDataFrame class PythonPredictor: def __init__(self): import_dir = os.path.dirname(os.path.abspath(__file__))
self._model = joblib.load(os.path.join(import_dir, 'model.joblib')) def predict(self, input): df = pd.DataFrame([input]) pred =
self._model.predict(df) return str(pred[0]) main = PythonPredictor() $$ ;

○ PUT file:///path/to/model.joblib @model_stage AUTO_COMPRESS=FALSE; CREATE OR REPLACE EXTERNAL FUNCTION predict(input VARCHAR) RETURNS VARCHAR LANGUAGE PYTHON
RUNTIME_VERSION = '3.8' PACKAGES = ('scikit-learn','joblib','pandas','snowflake-snowpark-python') HANDLER = 'main.predict' TARGET_PATH = '@model_stage/model.joblib' AS $$
import joblib import pandas as pd import os class PythonPredictor: def __init__(self): import_dir = os.path.dirname(os.path.abspath(__file__)) self._model =
joblib.load(os.path.join(import_dir, 'model.joblib')) def predict(self, input): df = pd.DataFrame([input]) pred = self._model.predict(df) return str(pred[0]) main =
PythonPredictor() $$ ;

○ PUT file:///path/to/model.joblib @model_stage AUTO_COMPRESS=FALSE; CREATE OR REPLACE EXTERNAL FUNCTION predict(input VARCHAR) RETURNS VARCHAR LANGUAGE PYTHON RUNTIME_VERSION = '3.8' PACKAGES
= ('scikit-learn','joblib','pandas','snowflake-snowpark-python') HANDLER = 'main.predict' IMPORTS = ('@model_stage/model.joblib') AS $$ import joblib import pandas as pd import os class
PythonPredictor: def __init__(self): import_dir = os.path.dirname(os.path.abspath(__file__)) self._model = joblib.load(os.path.join(import_dir, 'model.joblib')) def predict(self, input): df =
pd.DataFrame([input]) pred = self._model.predict(df) return str(pred[0]) main = PythonPredictor() $$ ;

○ PUT file:///path/to/model.joblib @model_stage AUTO_COMPRESS=FALSE; CREATE OR REPLACE EXTERNAL FUNCTION predict(input VARCHAR) RETURNS VARCHAR LANGUAGE PYTHON RUNTIME_VERSION = '3.8' PACKAGES
= ('scikit-learn','joblib','pandas','snowflake-snowpark-python') HANDLER = 'main.predict' IMPORTS = ('@model_stage/model.joblib') AS $$ import joblib import pandas as pd import os import snowflake.snowpark class PythonPredictor: def
__init__(self): import_dir = os.path.dirname(os.path.abspath(__file__)) self._model = joblib.load(os.path.join(import_dir, 'model.joblib')) def predict(self, input): df = pd.DataFrame([input]) pred =
self._model.predict(df) return str(pred[0]) main = PythonPredictor() $$ ;

○ PUT file:///path/to/model.joblib @model_stage OVERWRITE=TRUE; CREATE OR REPLACE EXTERNAL FUNCTION predict(input VARCHAR) RETURNS VARCHAR LANGUAGE PYTHON RUNTIME_VERSION = '3.8' PACKAGES
= ('scikit-learn','joblib','pandas','snowflake-snowpark-python') HANDLER = 'main.predict' IMPORTS = ('@model_stage/model.joblib') AS $$ import joblib import pandas as pd import os import snowflake.snowpark class PythonPredictor: def
__init__(self): import_dir = os.path.dirname(os.path.abspath(__file__)) self._model = joblib.load(os.path.join(import_dir, 'model.joblib')) def predict(self, input): df = pd.DataFrame([input]) pred =
self._model.predict(df) return str(pred[0]) main = PythonPredictor() $$ ;

```

- A. Option D
- B. Option A
- C. Option C
- D. Option B
- E. Option E

Answer: E

Explanation:

Option E is correct. `AUTO\_COMPRESS=FALSE` isn't strictly needed for joblib files, and adding `OVERWRITE=TRUE` ensures the model is updated in case of re-deployment. Importantly, the IMPORTS parameter correctly specifies the location of the model within the stage, and includes necessary packages (pandas and snowflake-snowpark-python) and the code correctly loads the model from the stage within the Python handler. Also snowflake.snowpark need to be imported to avoid errors with snowpark library. Option A lacks pandas, snowflake-snowpark-python, imports section. Option B has wrong syntax TARGET_PATH which is incorrect syntax. Option C doesn't import snowpark, so might give error. Option D doesn't OVERWRITE flag, and can give error if trying to overwrite files.

NEW QUESTION # 76

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