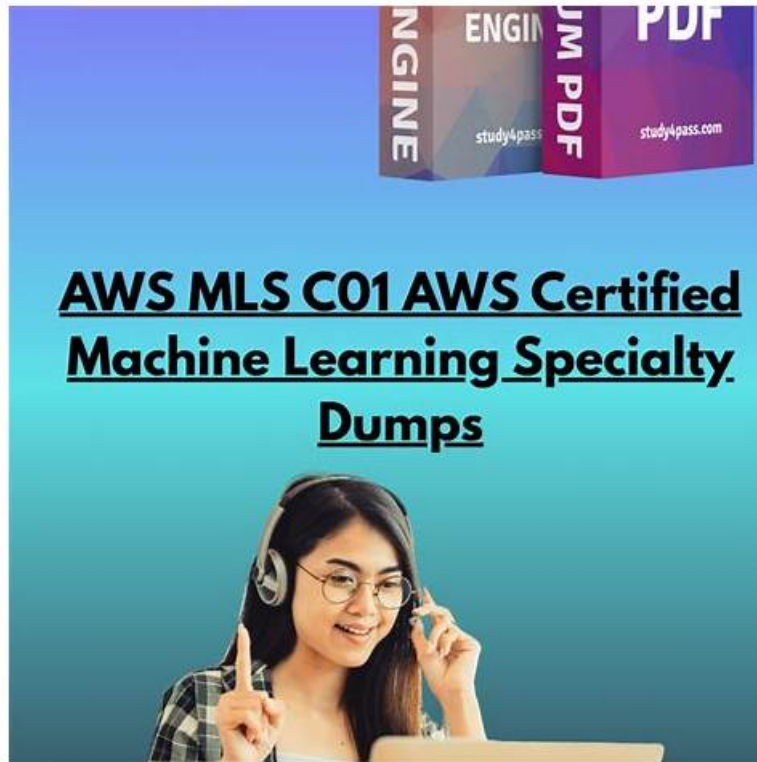


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Amazon AWS Certified Machine Learning - Specialty Sample Questions (Q77-Q82):

NEW QUESTION # 77

A company that runs an online library is implementing a chatbot using Amazon Lex to provide book recommendations based on category. This intent is fulfilled by an AWS Lambda function that queries an Amazon DynamoDB table for a list of book titles, given

a particular category. For testing, there are only three categories implemented as the custom slot types: "comedy," "adventure," and "documentary." A machine learning (ML) specialist notices that sometimes the request cannot be fulfilled because Amazon Lex cannot understand the category spoken by users with utterances such as "funny," "fun," and "humor." The ML specialist needs to fix the problem without changing the Lambda code or data in DynamoDB. How should the ML specialist fix the problem?

- **A. Add the unrecognized words as synonyms in the custom slot type.**
- B. Create a new custom slot type, add the unrecognized words to this slot type as enumeration values, and use this slot type for the slot.
- C. Use the AMAZON.SearchQuery built-in slot types for custom searches in the database.
- D. Add the unrecognized words in the enumeration values list as new values in the slot type.

Answer: A

Explanation:

The best way to fix the problem without changing the Lambda code or data in DynamoDB is to add the unrecognized words as synonyms in the custom slot type. This way, Amazon Lex can resolve the synonyms to the corresponding slot values and pass them to the Lambda function. For example, if the slot type has a value "comedy" with synonyms "funny", "fun", and "humor", then any of these words entered by the user will be resolved to "comedy" and the Lambda function can query the DynamoDB table for the book titles in that category. Adding synonyms to the custom slot type can be done easily using the Amazon Lex console or API, and does not require any code changes.

The other options are not correct because:

* Option A: Adding the unrecognized words in the enumeration values list as new values in the slot type would not fix the problem, because the Lambda function and the DynamoDB table are not aware of these new values. The Lambda function would not be able to query the DynamoDB table for the book titles in the new categories, and the request would still fail. Moreover, adding new values to the slot type would increase the complexity and maintenance of the chatbot, as the Lambda function and the DynamoDB table would have to be updated accordingly.

* Option B: Creating a new custom slot type, adding the unrecognized words to this slot type as enumeration values, and using this slot type for the slot would also not fix the problem, for the same reasons as option A. The Lambda function and the DynamoDB table would not be able to handle the new slot type and its values, and the request would still fail. Furthermore, creating a new slot type would require more effort and time than adding synonyms to the existing slot type.

* Option C: Using the AMAZON.SearchQuery built-in slot types for custom searches in the database is not a suitable approach for this use case. The AMAZON.SearchQuery slot type is used to capture free-form user input that corresponds to a search query. However, this slot type does not perform any validation or resolution of the user input, and passes the raw input to the Lambda function. This means that the Lambda function would have to handle the logic of parsing and matching the user input to the DynamoDB table, which would require changing the Lambda code and adding more complexity to the solution.

Custom slot type - Amazon Lex

Using Synonyms - Amazon Lex

Built-in Slot Types - Amazon Lex

NEW QUESTION # 78

A credit card company wants to identify fraudulent transactions in real time. A data scientist builds a machine learning model for this purpose. The transactional data is captured and stored in Amazon S3. The historic data is already labeled with two classes: fraud (positive) and fair transactions (negative). The data scientist removes all the missing data and builds a classifier by using the XGBoost algorithm in Amazon SageMaker.

The model produces the following results:

- * True positive rate (TPR): 0.700
- * False negative rate (FNR): 0.300
- * True negative rate (TNR): 0.977
- * False positive rate (FPR): 0.023
- * Overall accuracy: 0.949

Which solution should the data scientist use to improve the performance of the model?

- A. Undersample the minority class.
- B. Apply the Synthetic Minority Oversampling Technique (SMOTE) on the majority class in the training dataset. Retrain the model with the updated training data.
- **C. Apply the Synthetic Minority Oversampling Technique (SMOTE) on the minority class in the training dataset. Retrain the model with the updated training data.**
- D. Oversample the majority class.

Answer: C

Explanation:

The solution that the data scientist should use to improve the performance of the model is to apply the Synthetic Minority Oversampling Technique (SMOTE) on the minority class in the training dataset, and retrain the model with the updated training data. This solution can address the problem of class imbalance in the dataset, which can affect the model's ability to learn from the rare but important positive class (fraud).

Class imbalance is a common issue in machine learning, especially for classification tasks. It occurs when one class (usually the positive or target class) is significantly underrepresented in the dataset compared to the other class (usually the negative or non-target class). For example, in the credit card fraud detection problem, the positive class (fraud) is much less frequent than the negative class (fair transactions). This can cause the model to be biased towards the majority class, and fail to capture the characteristics and patterns of the minority class. As a result, the model may have a high overall accuracy, but a low recall or true positive rate for the minority class, which means it misses many fraudulent transactions.

SMOTE is a technique that can help mitigate the class imbalance problem by generating synthetic samples for the minority class. SMOTE works by finding the k-nearest neighbors of each minority class instance, and randomly creating new instances along the line segments connecting them. This way, SMOTE can increase the number and diversity of the minority class instances, without duplicating or losing any information. By applying SMOTE on the minority class in the training dataset, the data scientist can balance the classes and improve the model's performance on the positive class.

The other options are either ineffective or counterproductive. Applying SMOTE on the majority class would not balance the classes, but increase the imbalance and the size of the dataset. Undersampling the minority class would reduce the number of instances available for the model to learn from, and potentially lose some important information. Oversampling the majority class would also increase the imbalance and the size of the dataset, and introduce redundancy and overfitting.

1: SMOTE for Imbalanced Classification with Python - Machine Learning Mastery

NEW QUESTION # 79

A company is using Amazon Textract to extract textual data from thousands of scanned text-heavy legal documents daily. The company uses this information to process loan applications automatically. Some of the documents fail business validation and are returned to human reviewers, who investigate the errors. This activity increases the time to process the loan applications. What should the company do to reduce the processing time of loan applications?

- **A. Configure Amazon Textract to route low-confidence predictions to Amazon Augmented AI (Amazon A2I). Perform a manual review on those words before performing a business validation.**
- B. Configure Amazon Textract to route low-confidence predictions to Amazon SageMaker Ground Truth. Perform a manual review on those words before performing a business validation.
- C. Use an Amazon Textract synchronous operation instead of an asynchronous operation.
- D. Use Amazon Rekognition's feature to detect text in an image to extract the data from scanned images. Use this information to process the loan applications.

Answer: A

Explanation:

The company should configure Amazon Textract to route low-confidence predictions to Amazon Augmented AI (Amazon A2I). Amazon A2I is a service that allows you to implement human review of machine learning (ML) predictions. It also comes integrated with some of the Artificial Intelligence (AI) services such as Amazon Textract. By using Amazon A2I, the company can perform a manual review on those words that have low confidence scores before performing a business validation. This will help reduce the processing time of loan applications by avoiding errors and rework.

Option A is incorrect because Amazon SageMaker Ground Truth is not a suitable service for human review of Amazon Textract predictions. Amazon SageMaker Ground Truth is a service that helps you build highly accurate training datasets for machine learning. It allows you to label your own data or use a workforce of human labelers. However, it does not provide an easy way to integrate with Amazon Textract and route low-confidence predictions for human review.

Option B is incorrect because using an Amazon Textract synchronous operation instead of an asynchronous operation will not reduce the processing time of loan applications. A synchronous operation is a request-response operation that returns the results immediately. An asynchronous operation is a start-and-check operation that returns a job identifier that you can use to check the status and results later. The choice of operation depends on the size and complexity of the document, not on the confidence of the predictions.

Option D is incorrect because using Amazon Rekognition's feature to detect text in an image to extract the data from scanned images is not a better alternative than using Amazon Textract. Amazon Rekognition is a service that provides computer vision capabilities, such as face recognition, object detection, and scene analysis. It can also detect text in an image, but it does not provide the same level of accuracy and functionality as Amazon Textract. Amazon Textract can not only detect text, but also extract data from tables and forms, and understand the layout and structure of the document.

References:

- * Amazon Augmented AI
- * Amazon SageMaker Ground Truth
- * Amazon Textract Operations
- * Amazon Rekognition

NEW QUESTION # 80

A retail company uses a machine learning (ML) model for daily sales forecasting. The company's brand manager reports that the model has provided inaccurate results for the past 3 weeks.

At the end of each day, an AWS Glue job consolidates the input data that is used for the forecasting with the actual daily sales data and the predictions of the model. The AWS Glue job stores the data in Amazon S3. The company's ML team is using an Amazon SageMaker Studio notebook to gain an understanding about the source of the model's inaccuracies.

What should the ML team do on the SageMaker Studio notebook to visualize the model's degradation MOST accurately?

- **A. Create a histogram of the model errors over the last 3 weeks. In addition, create a histogram of the model errors from before that period.**
- B. Create a scatter plot of daily sales versus model error for the last 3 weeks. In addition, create a scatter plot of daily sales versus model error from before that period.
- C. Create a histogram of the daily sales over the last 3 weeks. In addition, create a histogram of the daily sales from before that period.
- D. Create a line chart with the weekly mean absolute error (MAE) of the model.

Answer: A

Explanation:

The best way to visualize the model's degradation is to create a histogram of the model errors over the last 3 weeks and compare it with a histogram of the model errors from before that period. A histogram is a graphical representation of the distribution of numerical data. It shows how often each value or range of values occurs in the data. A model error is the difference between the actual value and the predicted value. A high model error indicates a poor fit of the model to the data. By comparing the histograms of the model errors, the ML team can see if there is a significant change in the shape, spread, or center of the distribution. This can indicate if the model is underfitting, overfitting, or drifting from the data. A line chart or a scatter plot would not be as effective as a histogram for this purpose, because they do not show the distribution of the errors. A line chart would only show the trend of the errors over time, which may not capture the variability or outliers.

A scatter plot would only show the relationship between the errors and another variable, such as daily sales, which may not be relevant or informative for the model's performance. References:

- * Histogram - Wikipedia
- * Model error - Wikipedia
- * SageMaker Model Monitor - visualizing monitoring results

NEW QUESTION # 81

A manufacturing company wants to use machine learning (ML) to automate quality control in its facilities.

The facilities are in remote locations and have limited internet connectivity. The company has 20 ## of training data that consists of labeled images of defective product parts. The training data is in the corporate on- premises data center.

The company will use this data to train a model for real-time defect detection in new parts as the parts move on a conveyor belt in the facilities. The company needs a solution that minimizes costs for compute infrastructure and that maximizes the scalability of resources for training. The solution also must facilitate the company's use of an ML model in the low-connectivity environments.

Which solution will meet these requirements?

- A. Train the model on premises. Upload the model to an Amazon S3 bucket. Set up an edge device in the manufacturing facilities with AWS IoT Greengrass. Deploy the model on the edge device.
- B. Move the training data to an Amazon S3 bucket. Train and evaluate the model by using Amazon SageMaker. Optimize the model by using SageMaker Neo. Deploy the model on a SageMaker hosting services endpoint.
- C. Train and evaluate the model on premises. Upload the model to an Amazon S3 bucket. Deploy the model on an Amazon SageMaker hosting services endpoint.
- **D. Move the training data to an Amazon S3 bucket. Train and evaluate the model by using Amazon SageMaker. Optimize the model by using SageMaker Neo. Set up an edge device in the manufacturing facilities with AWS IoT Greengrass. Deploy the model on the edge device.**

Answer: D

Explanation:

The solution C meets the requirements because it minimizes costs for compute infrastructure, maximizes the scalability of resources for training, and facilitates the use of an ML model in low-connectivity environments.

The solution C involves the following steps:

- * Move the training data to an Amazon S3 bucket. This will enable the company to store the large amount of data in a durable, scalable, and cost-effective way. It will also allow the company to access the data from the cloud for training and evaluation purposes¹.
- * Train and evaluate the model by using Amazon SageMaker. This will enable the company to use a fully managed service that provides various features and tools for building, training, tuning, and deploying ML models. Amazon SageMaker can handle large-scale data processing and distributed training, and it can leverage the power of AWS compute resources such as Amazon EC2, Amazon EKS, and AWS Fargate².
- * Optimize the model by using SageMaker Neo. This will enable the company to reduce the size of the model and improve its performance and efficiency. SageMaker Neo can compile the model into an executable that can run on various hardware platforms, such as CPUs, GPUs, and edge devices³.
- * Set up an edge device in the manufacturing facilities with AWS IoT Greengrass. This will enable the company to deploy the model on a local device that can run inference in real time, even in low- connectivity environments. AWS IoT Greengrass can extend AWS cloud capabilities to the edge, and it can securely communicate with the cloud for updates and synchronization⁴.
- * Deploy the model on the edge device. This will enable the company to automate quality control in its facilities by using the model to detect defects in new parts as they move on a conveyor belt. The model can run inference locally on the edge device without requiring internet connectivity, and it can send the results to the cloud when the connection is available⁴.

The other options are not suitable because:

- * Option A: Deploying the model on a SageMaker hosting services endpoint will not facilitate the use of the model in low-connectivity environments, as it will require internet access to perform inference. Moreover, it may incur higher costs for hosting and data transfer than deploying the model on an edge device.
- * Option B: Training and evaluating the model on premises will not minimize costs for compute infrastructure, as it will require the company to maintain and upgrade its own hardware and software. Moreover, it will not maximize the scalability of resources for training, as it will limit the company's ability to leverage the cloud's elasticity and flexibility.
- * Option D: Training the model on premises will not minimize costs for compute infrastructure, nor maximize the scalability of resources for training, for the same reasons as option B.

References:

- * 1: Amazon S3
- * 2: Amazon SageMaker
- * 3: SageMaker Neo
- * 4: AWS IoT Greengrass

NEW QUESTION # 82

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