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The Amazon AWS-Certified-Machine-Learning-Specialty Exam is designed to test an individual's knowledge and proficiency in a number of key areas, including data preparation, feature engineering, model selection, and optimization. Candidates are also expected to have a deep understanding of the AWS services and tools that are used for machine learning, including Amazon SageMaker, Amazon Rekognition, and Amazon Comprehend.

Getting the Results

The minimum passing score for this test is 750 marks. The result will be reported on a scale of 100-1000. Note that there might be some unscored items in the exam that are not identified but don't affect your score. Also, always keep in mind that you don't need to succeed in each section to get a pass status and obtain the certification — only a total amount of points matters. The report is only needed to show individuals their performance in each domain and help them identify what are their weak and strong areas of Machine Learning.

Exam Topics

As for the MLS-C01 certification test, there are 4 domains that are presented in the exam content. All in all, the topics you need to focus on when preparing for this test are highlighted below:

- **Modeling**

This is the most prominent part of this exam with a weightage of 36%. This means that it is impossible to get the passing score if you have not mastered this topic. It covers the following sections, including framing business problems as machine learning problems and training machine learning model. In addition, the test takers need to be ready to demonstrate their competence in selecting an appropriate model for specific machine learning problems. They have to possess the ability to perform hyperparameter optimization as well as perform the task of evaluating machine learning models.

- **Data Engineering**

This domain makes up about 20% of the total questions in the entire exam content. It measures the test takers' ability to accomplish the technical tasks such as creating machine and learning data repositories. Another section that is included in this topic is implementing & identifying the data ingestion solution. Besides that, the students are also required to demonstrate their skills in implementing and identifying data transformation solutions.

- **Exploratory Data Analysis**

The second subject area covers about 24% of the total weightage and requires that the learners know about data for machine learning. They should know more about machine modeling concepts as well. The questions in this section demand that the candidates possess the skills in preparing data & sanitizing that particular data for modeling. Other items seek to verify their expertise in performing feature engineering. Last but not least, the applicants should demonstrate their understanding of how to perform visualization and canalization of data for machine learning.

- **Machine Learning Implementation and Operations**

This is the last objective of the certification exam. It mainly includes the concepts of machine learning services as well as implementation. It carries about 20% weightage in the test. One of the most prominent sections covered within this domain is building machine learning solutions for availability, fault tolerance, resiliency, and performance. It also evaluates the candidates' knowledge and skills in implementing and recommending the correct machine learning services particularly for a given problem. In addition, the examinees should be ready to demonstrate that they know about applying basic Amazon Web Services (AWS) security practices to specific machine learning solutions. Also, this part requires that the IT pros attempting this test make evident that they have the skills and knowledge required to deploy and operationalize machine learning solutions.

Amazon AWS Certified Machine Learning - Specialty Sample Questions (Q225-Q230):

NEW QUESTION # 225

A machine learning (ML) specialist needs to extract embedding vectors from a text series. The goal is to provide a ready-to-ingest feature space for a data scientist to develop downstream ML predictive models. The text consists of curated sentences in English. Many sentences use similar words but in different contexts. There are questions and answers among the sentences, and the embedding space must differentiate between them.

Which options can produce the required embedding vectors that capture word context and sequential QA information? (Choose two.)

- A. Amazon SageMaker BlazingText algorithm in continuous bag-of-words (CBOW) mode
- B. Combination of the Amazon SageMaker BlazingText algorithm in Batch Skip-gram mode with a custom recurrent neural network (RNN)
- **C. Amazon SageMaker Object2Vec algorithm**
- D. Amazon SageMaker BlazingText algorithm in Skip-gram mode
- **E. Amazon SageMaker seq2seq algorithm**

Answer: C,E

Explanation:

Reference:

<https://docs.aws.amazon.com/sagemaker/latest/dg/object2vec.html>

NEW QUESTION # 226

A company uses a long short-term memory (LSTM) model to evaluate the risk factors of a particular energy sector. The model reviews multi-page text documents to analyze each sentence of the text and categorize it as either a potential risk or no risk. The model is not performing well, even though the Data Scientist has experimented with many different network structures and tuned the corresponding hyperparameters.

Which approach will provide the MAXIMUM performance boost?

- A. Use gated recurrent units (GRUs) instead of LSTM and run the training process until the validation loss stops decreasing.
- **B. Initialize the words by word2vec embeddings pretrained on a large collection of news articles related to the energy sector.**
- C. Reduce the learning rate and run the training process until the training loss stops decreasing.
- D. Initialize the words by term frequency-inverse document frequency (TF-IDF) vectors pretrained on a large collection of news articles related to the energy sector.

Answer: B

Explanation:

Initializing the words by word2vec embeddings pretrained on a large collection of news articles related to the energy sector will provide the maximum performance boost for the LSTM model. Word2vec is a technique that learns distributed representations of words based on their co-occurrence in a large corpus of text. These representations capture semantic and syntactic similarities between words, which can help the LSTM model better understand the meaning and context of the sentences in the text documents. Using word2vec embeddings that are pretrained on a relevant domain (energy sector) can further improve the performance by reducing the vocabulary mismatch and increasing the coverage of the words in the text documents. References:

* AWS Machine Learning Specialty Exam Guide

* AWS Machine Learning Training - Text Classification with TF-IDF, LSTM, BERT: a comparison of performance

* AWS Machine Learning Training - Machine Learning - Exam Preparation Path

NEW QUESTION # 227

A company is creating an application to identify, count, and classify animal images that are uploaded to the company's website. The company is using the Amazon SageMaker image classification algorithm with an ImageNetV2 convolutional neural network (CNN). The solution works well for most animal images but does not recognize many animal species that are less common.

The company obtains 10,000 labeled images of less common animal species and stores the images in Amazon S3. A machine learning (ML) engineer needs to incorporate the images into the model by using Pipe mode in SageMaker.

Which combination of steps should the ML engineer take to train the model? (Choose two.)

- **A. Create a .lst file that contains a list of image files and corresponding class labels. Upload the .lst file to Amazon S3.**
- B. Use a ResNet model. Initiate full training mode by initializing the network with random weights.
- **C. Initiate transfer learning. Train the model by using the images of less common species.**
- D. Use an augmented manifest file in JSON Lines format.
- E. Use an Inception model that is available with the SageMaker image classification algorithm

Answer: A,C

Explanation:

The combination of steps that the ML engineer should take to train the model are to create a .lst file that contains a list of image files and corresponding class labels, upload the .lst file to Amazon S3, and initiate transfer learning by training the model using the images of less common species. This approach will allow the ML engineer to leverage the existing ImageNetV2 CNN model and fine-tune it with the new data using Pipe mode in SageMaker.

A .lst file is a text file that contains a list of image files and corresponding class labels, separated by tabs. The .

lst file format is required for using the SageMaker image classification algorithm with Pipe mode. Pipe mode is a feature of SageMaker that enables streaming data directly from Amazon S3 to the training instances, without downloading the data first. Pipe mode can reduce the startup time, improve the I/O throughput, and enable training on large datasets that exceed the disk size limit. To use Pipe mode, the ML engineer needs to upload the .lst file to Amazon S3 and specify the S3 path as the input data channel for the training job1.

Transfer learning is a technique that enables reusing a pre-trained model for a new task by fine-tuning the model parameters with new data. Transfer learning can save time and computational resources, as well as improve the performance of the model, especially when the new task is similar to the original task. The SageMaker image classification algorithm supports transfer learning by allowing the ML engineer to specify the number of output classes and the number of layers to be retrained. The ML engineer can use the existing ImageNetV2 CNN model, which is trained on 1,000 classes of common objects, and fine-tune it with the new data of less common animal species, which is a similar task2.

The other options are either less effective or not supported by the SageMaker image classification algorithm.

Using a ResNet model and initiating full training mode would require training the model from scratch, which would take more time and resources than transfer learning. Using an Inception model is not possible, as the SageMaker image classification algorithm only supports ResNet and ImageNetV2 models. Using an augmented manifest file in JSON Lines format is not compatible with Pipe mode, as Pipe mode only supports .

1st files for image classification1.

References:

* 1: Using Pipe input mode for Amazon SageMaker algorithms | AWS Machine Learning Blog

* 2: Image Classification Algorithm - Amazon SageMaker

NEW QUESTION # 228

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

Answer: A

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 class1.

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.

References:

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

NEW QUESTION # 229

Which of the following metrics should a Machine Learning Specialist generally use to compare/evaluate machine learning classification models against each other?

- A. Misclassification rate
- **B. Area Under the ROC Curve (AUC)**
- C. Recall
- D. Mean absolute percentage error (MAPE)

Answer: B

Explanation:

Area Under the ROC Curve (AUC) is a metric that measures the performance of a binary classifier across all possible thresholds. It is also known as the probability that a randomly chosen positive example will be ranked higher than a randomly chosen negative example by the classifier. AUC is a good metric to compare different classification models because it is independent of the class distribution and the decision threshold. It also captures both the sensitivity (true positive rate) and the specificity (true negative rate) of the model. References:

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NEW QUESTION # 230

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