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Amazon AWS-Certified-Machine-Learning-Specialty Exam is an excellent certification program for professionals who want to build a career in machine learning or data science. It provides a comprehensive and in-depth understanding of the AWS platform and its machine learning services, and it validates an individual's knowledge and skills in designing, building, and deploying machine learning solutions on AWS.

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The AWS Certified Machine Learning - Specialty certification exam covers a wide range of topics, including exploring data, building and training ML models, deploying models, and managing and optimizing ML solutions. AWS-Certified-Machine-Learning-Specialty Exam also tests the candidate's knowledge of machine learning algorithms, deep learning, neural networks, and other related technologies. Passing this certification exam requires a deep understanding of AWS ML services, including Amazon SageMaker, Amazon Rekognition, and Amazon Comprehend.

Amazon AWS Certified Machine Learning - Specialty Sample Questions (Q86-Q91):

NEW QUESTION # 86
A retail company intends to use machine learning to categorize new products A labeled dataset of current products was provided to the Data Science team The dataset includes 1 200 products The labeled dataset has
15 features for each product such as title dimensions, weight, and price Each product is labeled as belonging to one of six categories such as books, games, electronics, and movies.
Which model should be used for categorizing new products using the provided dataset for training?

- A. An XGBoost model where the objective parameter is set to multi: softmax
- B. A regression forest where the number of trees is set equal to the number of product categories
- C. A deep convolutional neural network (CNN) with a softmax activation function for the last layer
- D. A DeepAR forecasting model based on a recurrent neural network (RNN)

Answer: A

Explanation:
XGBoost is a machine learning framework that can be used for classification, regression, ranking, and other tasks. It is based on the gradient boosting algorithm, which builds an ensemble of weak learners (usually decision trees) to produce a strong learner. XGBoost has several advantages over other algorithms, such as scalability, parallelization, regularization, and sparsity handling. For categorizing new products using the provided dataset, an XGBoost model would be a suitable choice, because it can handle multiple features and multiple classes efficiently and accurately. To train an XGBoost model for multi-class classification, the objective parameter should be set to multi: softmax, which means that the model will output a probability distribution over the classes and predict the class with the highest probability. Alternatively, the objective parameter can be set to multi: softprob, which means that the model will output the raw probability of each class instead of the predicted class label. This can be useful for evaluating the model performance or for post- processing the predictions. References:
* XGBoost: A tutorial on how to use XGBoost with Amazon SageMaker.
* XGBoost Parameters: A reference guide for the parameters of XGBoost.

NEW QUESTION # 87
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. Apply the Synthetic Minority Oversampling Technique (SMOTE) on the majority class in the training dataset. Retrain the model with the updated training data.
- D. Oversample the majority class.

Answer: A

Explanation:
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 # 88
A monitoring service generates 1 TB of scale metrics record data every minute. A Research team performs queries on this data using Amazon Athena. The queries run slowly due to the large volume of data, and the team requires better performance.
How should the records be stored in Amazon S3 to improve query performance?

- A. RecordIO
- B. Parquet files
- C. CSV files
- D. Compressed JSON

Answer: B

NEW QUESTION # 89
An online reseller has a large, multi-column dataset with one column missing 30% of its data A Machine Learning Specialist believes that certain columns in the dataset could be used to reconstruct the missing data Which reconstruction approach should the Specialist use to preserve the integrity of the dataset1?

- A. Listwise deletion
- B. Last observation carried forward
- C. Mean substitution
- D. Multiple imputation

Answer: A

NEW QUESTION # 90
A data scientist is working on a public sector project for an urban traffic system. While studying the traffic patterns, it is clear to the data scientist that the traffic behavior at each light is correlated, subject to a small stochastic error term. The data scientist must model the traffic behavior to analyze the traffic patterns and reduce congestion.
How will the data scientist MOST effectively model the problem?

- A. Rather than finding an equilibrium policy, the data scientist should obtain accurate predictors of traffic flow by using unlabeled simulated data representing the new traffic patterns in the city and applying an unsupervised learning approach.
- B. The data scientist should obtain the optimal equilibrium policy by formulating this problem as a single-agent reinforcement learning problem.
- C. The data scientist should obtain a correlated equilibrium policy by formulating this problem as a multi-agent reinforcement learning problem.

- D. Rather than finding an equilibrium policy, the data scientist should obtain accurate predictors of traffic flow by using historical data through a supervised learning approach.

Answer: C

Explanation:
The data scientist should obtain a correlated equilibrium policy by formulating this problem as a multi-agent reinforcement learning problem. This is because:
Multi-agent reinforcement learning (MARL) is a subfield of reinforcement learning that deals with learning and coordination of multiple agents that interact with each other and the environment 1. MARL can be applied to problems that involve distributed decision making, such as traffic signal control, where each traffic light can be modeled as an agent that observes the traffic state and chooses an action (e.g., changing the signal phase) to optimize a reward function (e.g., minimizing the delay or congestion) 2.
A correlated equilibrium is a solution concept in game theory that generalizes the notion of Nash equilibrium. It is a probability distribution over the joint actions of the agents that satisfies the following condition: no agent can improve its expected payoff by deviating from the distribution, given that it knows the distribution and the actions of the other agents 3. A correlated equilibrium can capture the correlation among the agents' actions, which is useful for modeling the traffic behavior at each light that is subject to a small stochastic error term.
A correlated equilibrium policy is a policy that induces a correlated equilibrium in a MARL setting. It can be obtained by using various methods, such as policy gradient, actor-critic, or Q-learning algorithms, that can learn from the feedback of the environment and the communication among the agents 4. A correlated equilibrium policy can achieve a better performance than a Nash equilibrium policy, which assumes that the agents act independently and ignore the correlation among their actions 5.
Therefore, by obtaining a correlated equilibrium policy by formulating this problem as a MARL problem, the data scientist can most effectively model the traffic behavior and reduce congestion.
References:
Multi-Agent Reinforcement Learning
Multi-Agent Reinforcement Learning for Traffic Signal Control: A Survey Correlated Equilibrium Multi-Agent Actor-Critic for Mixed Cooperative-Competitive Environments Correlated Q-Learning

NEW QUESTION # 91
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