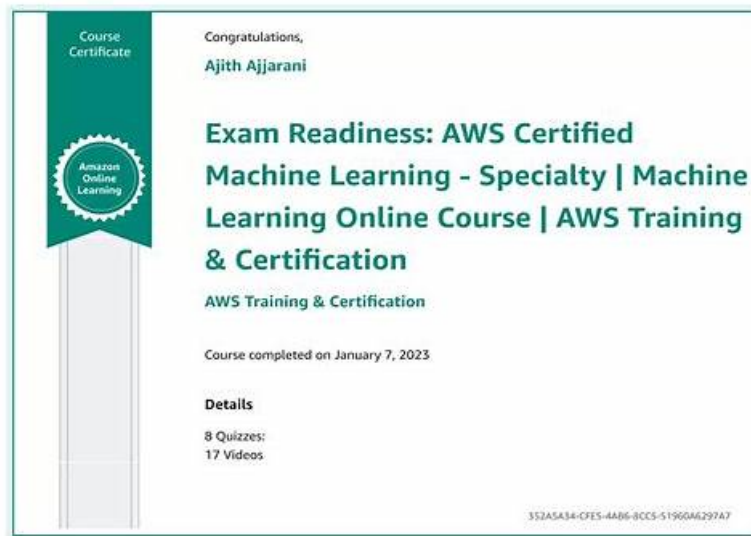


AWS-Certified-Machine-Learning-Specialty PDF考古題



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最新的 AWS Certified Machine Learning AWS-Certified-Machine-Learning-Specialty 免費考試真題 (Q116-Q121):

問題 #116

A Machine Learning Specialist is working for a credit card processing company and receives an unbalanced dataset containing credit card transactions. It contains 99,000 valid transactions and 1,000 fraudulent transactions. The Specialist is asked to score a model that was run against the dataset. The Specialist has been advised that identifying valid transactions is equally as important as identifying fraudulent transactions. What metric is BEST suited to score the model?

- A. Precision
- **B. Area Under the ROC Curve (AUC)**
- C. Root Mean Square Error (RMSE)
- D. Recall

答案：B

解題說明:

Explanation

Area Under the ROC Curve (AUC) is a metric that is best suited to score the model for the given scenario.

AUC is a measure of the performance of a binary classifier, such as a model that predicts whether a credit card transaction is valid or fraudulent. AUC is calculated based on the Receiver Operating Characteristic (ROC) curve, which is a plot that shows the trade-off between the true positive rate (TPR) and the false positive rate (FPR) of the classifier as the decision threshold is varied. The TPR, also known as recall or sensitivity, is the proportion of actual positive cases (fraudulent transactions) that are correctly predicted as positive by the classifier. The FPR, also known as the fall-out, is the proportion of actual negative cases (valid transactions) that are incorrectly predicted as positive by the classifier. The ROC curve illustrates how well the classifier can distinguish between the two classes, regardless of the class distribution or the error costs. A perfect classifier would have a TPR of 1 and an FPR of 0 for all thresholds, resulting in a ROC curve that goes from the bottom left to the top left and then to the top right of the plot. A random classifier would have a TPR and an FPR that are equal for all thresholds, resulting in a ROC curve that goes from the bottom left to the top right of the plot along the diagonal line. AUC is the area under the ROC curve, and it ranges from 0 to 1. A higher AUC indicates a better classifier, as it means that the classifier has a higher TPR and a lower FPR for all thresholds. AUC is a useful metric for imbalanced classification problems, such as the credit card transaction dataset, because it is insensitive to the class imbalance and the error costs. AUC can capture the overall performance of the classifier across all possible scenarios, and it can be used to compare different classifiers based on their ROC curves.

The other options are not as suitable as AUC for the given scenario for the following reasons:

Precision: Precision is the proportion of predicted positive cases (fraudulent transactions) that are actually positive. Precision is a useful metric when the cost of a false positive is high, such as in spam detection or medical diagnosis. However, precision is not a good metric for imbalanced classification problems, because it can be misleadingly high when the positive class is rare. For example, a classifier that predicts all transactions as valid would have a precision of 0, but a very high accuracy of 99%.

Precision is also dependent on the decision threshold and the error costs, which may vary for different scenarios.

Recall: Recall is the same as the TPR, and it is the proportion of actual positive cases (fraudulent transactions) that are correctly predicted as positive by the classifier. Recall is a useful metric when the cost of a false negative is high, such as in fraud detection or cancer diagnosis. However, recall is not a good metric for imbalanced classification problems, because it can be misleadingly low when the positive class is rare. For example, a classifier that predicts all transactions as fraudulent would have a recall of 1, but a very low accuracy of 1%. Recall is also dependent on the decision threshold and the error costs, which may vary for different scenarios.

Root Mean Square Error (RMSE): RMSE is a metric that measures the average difference between the predicted and the actual values. RMSE is a useful metric for regression problems, where the goal is to predict a continuous value, such as the price of a house or the temperature of a city. However, RMSE is not a good metric for classification problems, where the goal is to predict a discrete value, such as the class label of a transaction. RMSE is not meaningful for classification problems, because it does not capture the accuracy or the error costs of the predictions.

References:

ROC Curve and AUC

How and When to Use ROC Curves and Precision-Recall Curves for Classification in Python Precision-Recall Root Mean Squared Error

問題 #117

A Machine Learning Specialist is designing a system for improving sales for a company. The objective is to use the large amount of information the company has on users' behavior and product preferences to predict which products users would like based on the users' similarity to other users.

What should the Specialist do to meet this objective?

- A. Build a content-based filtering recommendation engine with Apache Spark ML on Amazon EMR.
- **B. Build a collaborative filtering recommendation engine with Apache Spark ML on Amazon EMR.**
- C. Build a model-based filtering recommendation engine with Apache Spark ML on Amazon EMR.
- D. Build a combinative filtering recommendation engine with Apache Spark ML on Amazon EMR.

答案: B

解題說明:

Explanation

A collaborative filtering recommendation engine is a type of machine learning system that can improve sales for a company by using the large amount of information the company has on users' behavior and product preferences to predict which products users would like based on the users' similarity to other users. A collaborative filtering recommendation engine works by finding the users who have similar ratings or preferences for the products, and then recommending the products that the similar users have liked but the target user has not seen or rated. A collaborative filtering recommendation engine can leverage the collective wisdom of the users and discover the hidden patterns and associations among the products and the users. A collaborative filtering recommendation

engine can be implemented using Apache Spark ML on Amazon EMR, which are two services that can handle large-scale data processing and machine learning tasks. Apache Spark ML is a library that provides various tools and algorithms for machine learning, such as classification, regression, clustering, recommendation, etc. Apache Spark ML can run on Amazon EMR, which is a service that provides a managed cluster platform that simplifies running big data frameworks, such as Apache Spark, on AWS. Apache Spark ML on Amazon EMR can build a collaborative filtering recommendation engine using the Alternating Least Squares (ALS) algorithm, which is a matrix factorization technique that can learn the latent factors that represent the users and the products, and then use them to predict the ratings or preferences of the users for the products. Apache Spark ML on Amazon EMR can also support both explicit feedback, such as ratings or reviews, and implicit feedback, such as views or clicks, for building a collaborative filtering recommendation engine¹²

問題 #118

A Machine Learning Specialist is assigned to a Fraud Detection team and must tune an XGBoost model, which is working appropriately for test data. However, with unknown data, it is not working as expected. The existing parameters are provided as follows.

```
param = {  
    'eta': 0.05, # the training step for each iteration  
    'silent': 1, # logging mode - quiet  
    'n_estimators': 2000,  
    'max_depth': 30,  
    'min_child_weight': 3,  
    'gamma': 0,  
    'subsample': 0.8,  
    'objective': 'multi:softprob', # error evaluation for multiclass training  
    'num_class': 2014, # the number of classes that exist in this dataset  
    'num_round': 60 # the number of training iterations
```

Which parameter tuning guidelines should the Specialist follow to avoid overfitting?

- A. Lower the min_child_weight parameter value.
- B. Increase the max_depth parameter value.
- C. Update the objective to binary:logistic.
- D. Lower the max_depth parameter value.

答案: D

解題說明:

Overfitting occurs when a model performs well on the training data but poorly on the test data. This is often because the model has learned the training data too well and is not able to generalize to new data. To avoid overfitting, the Machine Learning Specialist should lower the max_depth parameter value. This will reduce the complexity of the model and make it less likely to overfit. According to the XGBoost documentation¹, the max_depth parameter controls the maximum depth of a tree and lower values can help prevent overfitting. The documentation also suggests other ways to control overfitting, such as adding randomness, using regularization, and using early stopping¹. References:

* XGBoost Parameters

問題 #119

A Machine Learning Specialist is building a convolutional neural network (CNN) that will classify 10 types of animals. The Specialist has built a series of layers in a neural network that will take an input image of an animal, pass it through a series of convolutional and pooling layers, and then finally pass it through a dense and fully connected layer with 10 nodes. The Specialist would like to get an output from the neural network that is a probability distribution of how likely it is that the input image belongs to each of the 10 classes. Which function will produce the desired output?

- A. Softmax
- B. Smooth L1 loss
- C. Dropout
- D. Rectified linear units (ReLU)

答案: D

問題 #120

A company is building a predictive maintenance model for its warehouse equipment. The model must predict the probability of failure of all machines in the warehouse. The company has collected 10,000 event samples within 3 months. The event samples include 100 failure cases that are evenly distributed across 50 different machine types.

How should the company prepare the data for the model to improve the model's accuracy?

- A. Adjust the class weight to account for each machine type.
- B. Undersample the non-failure events by using the Synthetic Minority Oversampling Technique (SMOTE).
- C. Undersample the non-failure events. Stratify the non-failure events by machine type.
- **D. Oversample the failure cases by using the Synthetic Minority Oversampling Technique (SMOTE).**

答案：D

解題說明：

In predictive maintenance, when a dataset is imbalanced (with far fewer failure cases than non-failure cases), oversampling the minority class helps the model learn from the minority class effectively. The Synthetic Minority Oversampling Technique (SMOTE) generates synthetic samples for the minority class by creating data points between existing minority class instances. This can enhance the model's ability to recognize failure patterns, particularly in imbalanced datasets.

SMOTE increases the effective presence of failure cases in the dataset, providing a balanced learning environment for the model.

This is more effective than undersampling, which would risk losing important non-failure data.

問題 #121

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