

# Exam Questions AWS-Certified-Machine-Learning-Specialty

AWS Certified Machine Learning - Specialty

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#### NEW QUESTION 1

A Data Scientist needs to create a serverless ingestion and analytics solution for high-velocity, real-time streaming data.

The ingestion process must buffer and convert incoming records from JSON to a query-optimized, columnar format without data loss. The output datastore must be highly available, and Analysts must be able to run SQL queries against the data and connect to existing business intelligence dashboards.

Which solution should the Data Scientist build to satisfy the requirements?

- A. Create a schema in the AWS Glue Data Catalog of the incoming data format.
- B. Use an Amazon Kinesis Data Firehose delivery stream to stream the data and transform the data to Apache Parquet or ORC format using the AWS Glue Data Catalog before delivering to Amazon S3. Have the Analysts query the data directly from Amazon S3 using Amazon Athena, and connect to BI tools using the Athena Java Database Connectivity (JDBC) connector.
- C. Write each JSON record to a staging location in Amazon S3. Use the S3 Put event to trigger an AWS Lambda function that transforms the data into Apache Parquet or ORC format and writes the data to a processed data location in Amazon S3. Have the Analysts query the data directly from Amazon S3 using Amazon Athena, and connect to BI tools using the Athena Java Database Connectivity (JDBC) connector.
- D. Write each JSON record to a staging location in Amazon S3. Use the S3 Put event to trigger an AWS Lambda function that transforms the data into Apache Parquet or ORC format and inserts it into an Amazon RDS PostgreSQL database.
- E. Have the Analysts query and run dashboards from the RDS database.
- F. Use Amazon Kinesis Data Analytics to ingest the streaming data and perform real-time SQL queries to convert the records to Apache Parquet before delivering to Amazon S3. Have the Analysts query the data directly from Amazon S3 using Amazon Athena and connect to BI tools using the Athena Java Database Connectivity (JDBC) connector.

**Answer:** A

#### NEW QUESTION 2

A medical imaging company wants to train a computer vision model to detect areas of concern on patients' CT scans. The company has a large collection of unlabeled CT scans that are linked to each patient and stored in an Amazon S3 bucket. The scans must be accessible to authorized users only. A machine learning engineer needs to build a labeling pipeline.

Which set of steps should the engineer take to build the labeling pipeline with the LEAST effort?

- A. Create a workforce with AWS Identity and Access Management (IAM). Build a labeling tool on Amazon EC2 Queue images for labeling by using Amazon Simple Queue Service (Amazon SQS). Write the labeling instructions.
- B. Create an Amazon Mechanical Turk workforce and manifest file.
- C. Create a labeling job by using the built-in image classification task type in Amazon SageMaker Ground Truth.
- D. Write the labeling instructions.
- E. Create a private workforce and manifest file.
- F. Create a labeling job by using the built-in bounding box task type in Amazon SageMaker Ground Truth.
- G. Write the labeling instructions.
- H. Create a workforce with Amazon Cognito.
- I. Build a labeling web application with AWS Amplify.
- J. Build a labeling workflow backend using AWS Lambda.
- K. Write the labeling instructions.

**Answer:** C

#### Explanation:

<https://docs.aws.amazon.com/sagemaker/latest/dg/sms-workforce-private.html>

#### NEW QUESTION 3

A Machine Learning Specialist is using Apache Spark for pre-processing training data. As part of the Spark pipeline, the Specialist wants to use Amazon SageMaker for training a model and hosting it. Which of the following would the Specialist do to integrate the Spark application with SageMaker? (Select THREE.)

- A. Download the AWS SDK for the Spark environment.
- B. Install the SageMaker Spark library in the Spark environment.
- C. Use the appropriate estimator from the SageMaker Spark Library to train a model.
- D. Compress the training data into a ZIP file and upload it to a pre-defined Amazon S3 bucket.
- E. Use the `sageMakerMode`.
- F. Use the `transform` method to get inferences from the model hosted in SageMaker.
- G. Convert the `DataFrame` object to a CSV file, and use the CSV file as input for obtaining inferences from SageMaker.

**Answer:** DEF

#### NEW QUESTION 4

A manufacturer of car engines collects data from cars as they are being driven. The data collected includes timestamp, engine temperature, rotations per minute (RPM), and other sensor readings. The company wants to predict when an engine is going to have a problem so it can notify drivers in advance to get engine maintenance. The engine data is loaded into a data lake for training.

Which is the MOST suitable predictive model that can be deployed into production?

- A. Add labels over time to indicate which engine faults occur at what time in the future to turn this into a supervised learning problem. Use a recurrent neural network (RNN) to train the model to recognize when an engine might need maintenance for a certain fault.
- B. This data requires an unsupervised learning algorithm. Use Amazon SageMaker k-means to cluster the data.
- C. Add labels over time to indicate which engine faults occur at what time in the future to turn this into a supervised learning problem. Use a convolutional neural network (CNN) to train the model to recognize when an engine might need maintenance for a certain fault.
- D. This data is already formulated as a time series. Use Amazon SageMaker `seq2seq` to model the time series.

**Answer:** B

#### NEW QUESTION 5

A bank wants to launch a low-rate credit promotion. The bank is located in a town that recently experienced economic hardship. Only some of the bank's

customers were affected by the crisis, so the bank's credit team must identify which customers to target with the promotion. However, the credit team wants to make sure that loyal customers' full credit history is considered when the decision is made. The bank's data science team developed a model that classifies account transactions and understands credit eligibility. The data science team used the XGBoost algorithm to train the model. The team used 7 years of bank transaction historical data for training and hyperparameter tuning over the course of several days. The accuracy of the model is sufficient, but the credit team is struggling to explain accurately why the model denies credit to some customers. The credit team has almost no skill in data science. What should the data science team do to address this issue in the MOST operationally efficient manner?

- A. Use Amazon SageMaker Studio to rebuild the mode
- B. Create a notebook that uses the XGBoost training container to perform model trainin
- C. Deploy the model at an endpoint
- D. Enable Amazon SageMaker Model Monitor to store inference
- E. Use the inferences to create Shapley values that help explain model behavio
- F. Create a chart that shows features and SHapley Additive explanation (SHAP) values to explain to the credit team how the features affect the model outcomes.
- G. Use Amazon SageMaker Studio to rebuild the mode
- H. Create a notebook that uses the XGBoost training container to perform model trainin
- I. Activate Amazon SageMaker Debugger, and configure it to calculate and collect Shapley value
- J. Create a chart that shows features and SHapley Additive explanation (SHAP) values to explain to the credit team how the features affect the model outcomes.
- K. Create an Amazon SageMaker notebook instanc
- L. Use the notebook instance and the XGBoost library to locally retrain the mode
- M. Use the plot\_importance() method in the Python XGBoost interface to create a feature importance char
- N. Use that chart to explain to the credit team how the features affect the model outcomes.
- O. Use Amazon SageMaker Studio to rebuild the mode
- P. Create a notebook that uses the XGBoost training container to perform model trainin
- Q. Deploy the model at an endpoint
- R. Use Amazon SageMakerProcessing to post-analyze the model and create a feature importance explainability chart automatically for the credit team.

Answer: C

#### NEW QUESTION 6

A Machine Learning Specialist at a company sensitive to security is preparing a dataset for model training. The dataset is stored in Amazon S3 and contains Personally Identifiable Information (PII). The dataset:

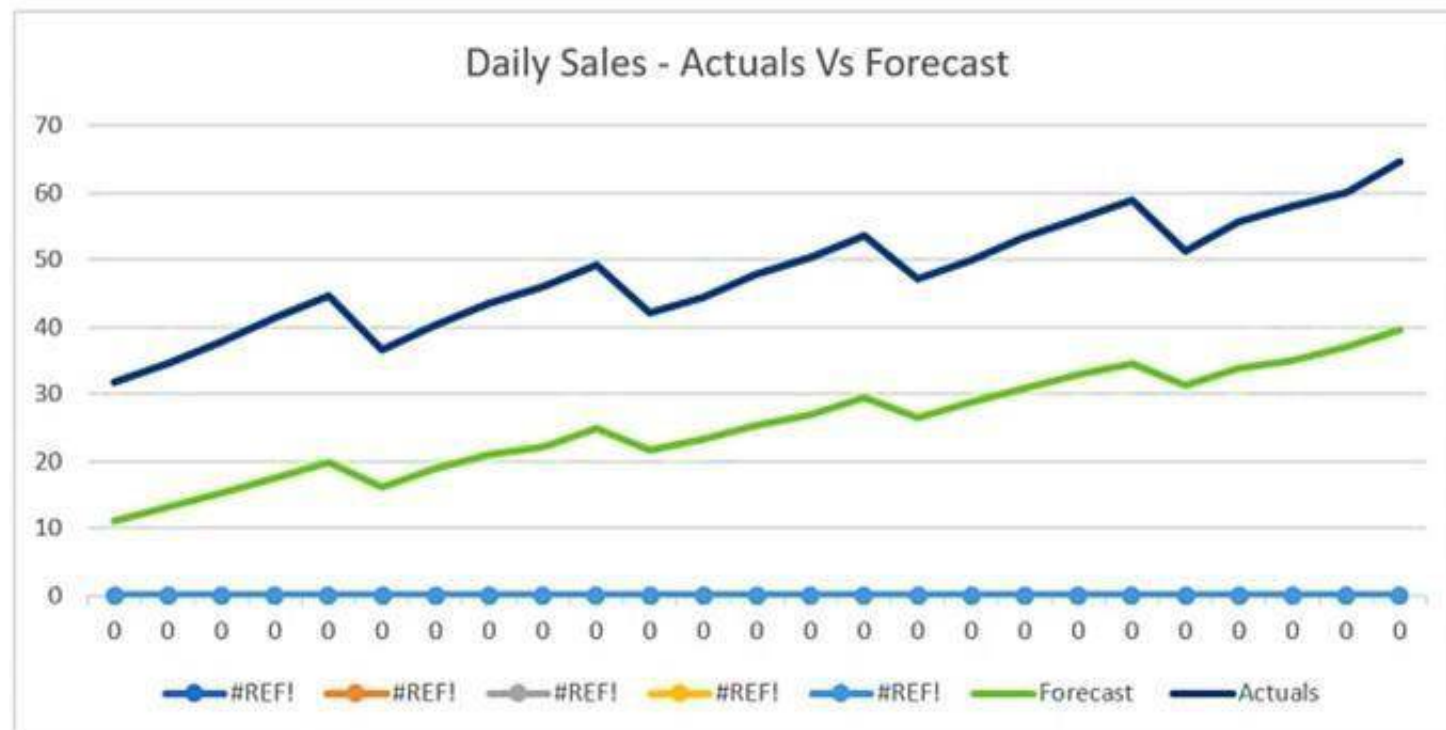
- \* Must be accessible from a VPC only.
- \* Must not traverse the public internet. How can these requirements be satisfied?

- A. Create a VPC endpoint and apply a bucket access policy that restricts access to the given VPC endpoint and the VPC.
- B. Create a VPC endpoint and apply a bucket access policy that allows access from the given VPC endpoint and an Amazon EC2 instance.
- C. Create a VPC endpoint and use Network Access Control Lists (NACLs) to allow traffic between only the given VPC endpoint and an Amazon EC2 instance.
- D. Create a VPC endpoint and use security groups to restrict access to the given VPC endpoint and an Amazon EC2 instance.

Answer: B

#### NEW QUESTION 7

The displayed graph is from a forecasting model for testing a time series.



Considering the graph only, which conclusion should a Machine Learning Specialist make about the behavior of the model?

- A. The model predicts both the trend and the seasonality well.
- B. The model predicts the trend well, but not the seasonality.
- C. The model predicts the seasonality well, but not the trend.
- D. The model does not predict the trend or the seasonality well.

Answer: D

#### NEW QUESTION 8

A financial services company wants to adopt Amazon SageMaker as its default data science environment. The company's data scientists run machine learning (ML) models on confidential financial data. The company is worried about data egress and wants an ML engineer to secure the environment. Which mechanisms can the ML engineer use to control data egress from SageMaker? (Choose three.)

- A. Connect to SageMaker by using a VPC interface endpoint powered by AWS PrivateLink.
- B. Use SCPs to restrict access to SageMaker.
- C. Disable root access on the SageMaker notebook instances.
- D. Enable network isolation for training jobs and models.
- E. Restrict notebook presigned URLs to specific IPs used by the company.
- F. Protect data with encryption at rest and in transi
- G. Use AWS Key Management Service (AWS KMS) to manage encryption keys.

**Answer:** BDE

**Explanation:**

<https://aws.amazon.com/blogs/machine-learning/millennium-management-secure-machine-learning-using-amaz>

**NEW QUESTION 9**

A company wants to use automatic speech recognition (ASR) to transcribe messages that are less than 60 seconds long from a voicemail-style application. The company requires the correct identification of 200 unique product names, some of which have unique spellings or pronunciations. The company has 4,000 words of Amazon SageMaker Ground Truth voicemail transcripts it can use to customize the chosen ASR model. The company needs to ensure that everyone can update their customizations multiple times each hour. Which approach will maximize transcription accuracy during the development phase?

- A. Use a voice-driven Amazon Lex bot to perform the ASR customizatio
- B. Create customer slots within the bot that specifically identify each of the required product name
- C. Use the Amazon Lex synonym mechanism to provide additional variations of each product name as mis-transcriptions are identified in development.
- D. Use Amazon Transcribe to perform the ASR customizatio
- E. Analyze the word confidence scores in the transcript, and automatically create or update a custom vocabulary file with any word that has a confidence score below an acceptable threshold valu
- F. Use this updated custom vocabulary file in all future transcription tasks.
- G. Create a custom vocabulary file containing each product name with phonetic pronunciations, and use it with Amazon Transcribe to perform the ASR customizatio
- H. Analyze the transcripts and manually update the custom vocabulary file to include updated or additional entries for those names that are not being correctly identified.
- I. Use the audio transcripts to create a training dataset and build an Amazon Transcribe custom language mode
- J. Analyze the transcripts and update the training dataset with a manually corrected version of transcripts where product names are not being transcribed correctl
- K. Create an updated custom language model.

**Answer:** A

**NEW QUESTION 10**

A Machine Learning Specialist is packaging a custom ResNet model into a Docker container so the company can leverage Amazon SageMaker for training The Specialist is using Amazon EC2 P3 instances to train the model and needs to properly configure the Docker container to leverage the NVIDIA GPUs What does the Specialist need to do1?

- A. Bundle the NVIDIA drivers with the Docker image
- B. Build the Docker container to be NVIDIA-Docker compatible
- C. Organize the Docker container's file structure to execute on GPU instances.
- D. Set the GPU flag in the Amazon SageMaker Create TrainingJob request body

**Answer:** A

**NEW QUESTION 10**

A Data Scientist received a set of insurance records, each consisting of a record ID, the final outcome among 200 categories, and the date of the final outcome. Some partial information on claim contents is also provided, but only for a few of the 200 categories. For each outcome category, there are hundreds of records distributed over the past 3 years. The Data Scientist wants to predict how many claims to expect in each category from month to month, a few months in advance. What type of machine learning model should be used?

- A. Classification month-to-month using supervised learning of the 200 categories based on claim contents.
- B. Reinforcement learning using claim IDs and timestamps where the agent will identify how many claims ineach category to expect from month to month.
- C. Forecasting using claim IDs and timestamps to identify how many claims in each category to expect frommonth to month.
- D. Classification with supervised learning of the categories for which partial information on claim contents isprovided, and forecasting using claim IDs and timestamps for all other categories.

**Answer:** C

**NEW QUESTION 11**

An ecommerce company is automating the categorization of its products based on images. A data scientist has trained a computer vision model using the Amazon SageMaker image classification algorithm. The images for each product are classified according to specific product lines. The accuracy of the model is too low when categorizing new products. All of the product images have the same dimensions and are stored within an Amazon S3 bucket. The company wants to improve the model so it can be used for new products as soon as possible. Which steps would improve the accuracy of the solution? (Choose three.)

- A. Use the SageMaker semantic segmentation algorithm to train a new model to achieve improved accuracy.
- B. Use the Amazon Rekognition DetectLabels API to classify the products in the dataset.
- C. Augment the images in the datase
- D. Use open source libraries to crop, resize, flip, rotate, and adjust the brightness and contrast of the images.
- E. Use a SageMaker notebook to implement the normalization of pixels and scaling of the image
- F. Store the new dataset in Amazon S3.
- G. Use Amazon Rekognition Custom Labels to train a new model.
- H. Check whether there are class imbalances in the product categories, and apply oversampling or undersampling as require
- I. Store the new dataset in Amazon S3.



**Answer:** BCE

#### NEW QUESTION 12

A Machine Learning Specialist is configuring Amazon SageMaker so multiple Data Scientists can access notebooks, train models, and deploy endpoints. To ensure the best operational performance, the Specialist needs to be able to track how often the Scientists are deploying models, GPU and CPU utilization on the deployed SageMaker endpoints, and all errors that are generated when an endpoint is invoked.

Which services are integrated with Amazon SageMaker to track this information? (Select TWO.)

- A. AWS CloudTrail
- B. AWS Health
- C. AWS Trusted Advisor
- D. Amazon CloudWatch
- E. AWS Config

**Answer:** AD

#### NEW QUESTION 15

A real-estate company is launching a new product that predicts the prices of new houses. The historical data for the properties and prices is stored in .csv format in an Amazon S3 bucket. The data has a header, some categorical fields, and some missing values. The company's data scientists have used Python with a common open-source library to fill the missing values with zeros. The data scientists have dropped all of the categorical fields and have trained a model by using the open-source linear regression algorithm with the default parameters.

The accuracy of the predictions with the current model is below 50%. The company wants to improve the model performance and launch the new product as soon as possible.

Which solution will meet these requirements with the LEAST operational overhead?

- A. Create a service-linked role for Amazon Elastic Container Service (Amazon ECS) with access to the S3 bucket
- B. Create an ECS cluster that is based on an AWS Deep Learning Containers image
- C. Write the code to perform the feature engineering
- D. Train a logistic regression model for predicting the price, pointing to the bucket with the dataset
- E. Wait for the training job to complete
- F. Perform the inferences.
- G. Create an Amazon SageMaker notebook with a new IAM role that is associated with the notebook
- H. Pull the dataset from the S3 bucket
- I. Explore different combinations of feature engineering transformations, regression algorithms, and hyperparameters
- J. Compare all the results in the notebook, and deploy the most accurate configuration in an endpoint for predictions.
- K. Create an IAM role with access to Amazon S3, Amazon SageMaker, and AWS Lambda
- L. Create a training job with the SageMaker built-in XGBoost model pointing to the bucket with the dataset
- M. Specify the price as the target feature
- N. Wait for the job to complete
- O. Load the model artifact to a Lambda function for inference on prices of new houses.
- P. Create an IAM role for Amazon SageMaker with access to the S3 bucket
- Q. Create a SageMaker AutoML job with SageMaker Autopilot pointing to the bucket with the dataset
- R. Specify the price as the target attribute
- S. Wait for the job to complete
- T. Deploy the best model for predictions.

**Answer:** A

#### NEW QUESTION 20

A real estate company wants to create a machine learning model for predicting housing prices based on a historical dataset. The dataset contains 32 features.

Which model will meet the business requirement?

- A. Logistic regression
- B. Linear regression
- C. K-means
- D. Principal component analysis (PCA)

**Answer:** B

#### NEW QUESTION 24

Example Corp has an annual sale event from October to December. The company has sequential sales data from the past 15 years and wants to use Amazon ML to predict the sales for this year's upcoming event. Which method should Example Corp use to split the data into a training dataset and evaluation dataset?

- A. Pre-split the data before uploading to Amazon S3
- B. Have Amazon ML split the data randomly.
- C. Have Amazon ML split the data sequentially.
- D. Perform custom cross-validation on the data

**Answer:** C

#### NEW QUESTION 26

A company that promotes healthy sleep patterns by providing cloud-connected devices currently hosts a sleep tracking application on AWS. The application collects device usage information from device users. The company's Data Science team is building a machine learning model to predict if and when a user will stop utilizing the company's devices. Predictions from this model are used by a downstream application that determines the best approach for contacting users.

The Data Science team is building multiple versions of the machine learning model to evaluate each version against the company's business goals. To measure long-term effectiveness, the team wants to run multiple versions of the model in parallel for long periods of time, with the ability to control the portion of inferences served by the models.

Which solution satisfies these requirements with MINIMAL effort?

- A. Build and host multiple models in Amazon SageMaker
- B. Create multiple Amazon SageMaker endpoints, one for each mode
- C. Programmatically control invoking different models for inference at the application layer.
- D. Build and host multiple models in Amazon SageMaker
- E. Create an Amazon SageMaker endpoint configuration with multiple production variant
- F. Programmatically control the portion of the inferences served by the multiple models by updating the endpoint configuration.
- G. Build and host multiple models in Amazon SageMaker Neo to take into account different types of medical device
- H. Programmatically control which model is invoked for inference based on the medical device type.
- I. Build and host multiple models in Amazon SageMaker
- J. Create a single endpoint that accesses multiple model
- K. Use Amazon SageMaker batch transform to control invoking the different models through the single endpoint.

**Answer: B**

**Explanation:**

A/B testing with Amazon SageMaker is required in the Exam. In A/B testing, you test different variants of your models and compare how each variant performs. Amazon SageMaker enables you to test multiple models or model versions behind the `same endpoint` using `production variants`. Each production variant identifies a machine learning (ML) model and the resources deployed for hosting the model. To test multiple models by `distributing traffic` between them, specify the `percentage of the traffic` that gets routed to each model by specifying the `weight` for each `production variant` in the endpoint configuration.  
<https://docs.aws.amazon.com/sagemaker/latest/dg/model-ab-testing.html#model-testing-target-variant>

**NEW QUESTION 29**

A Machine Learning Specialist is deciding between building a naive Bayesian model or a full Bayesian network for a classification problem. The Specialist computes the Pearson correlation coefficients between each feature and finds that their absolute values range between 0.1 to 0.95. Which model describes the underlying data in this situation?

- A. A naive Bayesian model, since the features are all conditionally independent.
- B. A full Bayesian network, since the features are all conditionally independent.
- C. A naive Bayesian model, since some of the features are statistically dependent.
- D. A full Bayesian network, since some of the features are statistically dependent.

**Answer: C**

**NEW QUESTION 33**

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

**Answer: C**

**NEW QUESTION 37**

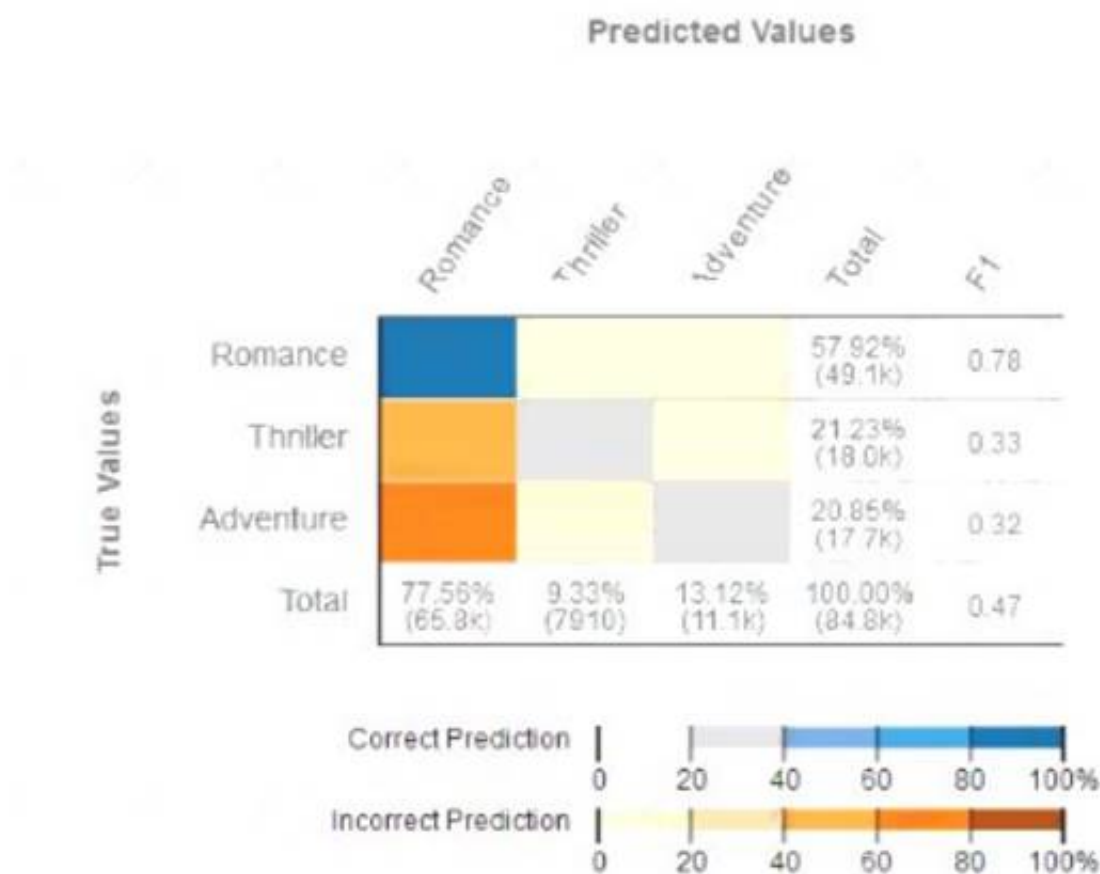
A technology startup is using complex deep neural networks and GPU compute to recommend the company's products to its existing customers based upon each customer's habits and interactions. The solution currently pulls each dataset from an Amazon S3 bucket before loading the data into a TensorFlow model pulled from the company's Git repository that runs locally. This job then runs for several hours while continually outputting its progress to the same S3 bucket. The job can be paused, restarted, and continued at any time in the event of a failure, and is run from a central queue. Senior managers are concerned about the complexity of the solution's resource management and the costs involved in repeating the process regularly. They ask for the workload to be automated so it runs once a week, starting Monday and completing by the close of business Friday. Which architecture should be used to scale the solution at the lowest cost?

- A. Implement the solution using AWS Deep Learning Containers and run the container as a job using AWS Batch on a GPU-compatible Spot Instance
- B. Implement the solution using a low-cost GPU-compatible Amazon EC2 instance and use the AWS Instance Scheduler to schedule the task
- C. Implement the solution using AWS Deep Learning Containers, run the workload using AWS Fargate running on Spot Instances, and then schedule the task using the built-in task scheduler
- D. Implement the solution using Amazon ECS running on Spot Instances and schedule the task using the ECS service scheduler

**Answer: C**

**NEW QUESTION 42**

Given the following confusion matrix for a movie classification model, what is the true class frequency for Romance and the predicted class frequency for Adventure?



- A. The true class frequency for Romance is 77.56% and the predicted class frequency for Adventure is 20.85%
- B. The true class frequency for Romance is 57.92% and the predicted class frequency for Adventure is 13.12%
- C. The true class frequency for Romance is 0.78 and the predicted class frequency for Adventure is (0.47 - 0.32).
- D. The true class frequency for Romance is 77.56% \* 0.78 and the predicted class frequency for Adventure is 20.85% \* 0.32

Answer: B

**Explanation:**

<https://docs.aws.amazon.com/machine-learning/latest/dg/multiclass-model-insights.html>

**NEW QUESTION 47**

A company is launching a new product and needs to build a mechanism to monitor comments about the company and its new product on social media. The company needs to be able to evaluate the sentiment expressed in social media posts, and visualize trends and configure alarms based on various thresholds. The company needs to implement this solution quickly, and wants to minimize the infrastructure and data science resources needed to evaluate the messages. The company already has a solution in place to collect posts and store them within an Amazon S3 bucket. What services should the data science team use to deliver this solution?

- A. Train a model in Amazon SageMaker by using the BlazingText algorithm to detect sentiment in the corpus of social media post
- B. Expose an endpoint that can be called by AWS Lambda
- C. Trigger a Lambda function when posts are added to the S3 bucket to invoke the endpoint and record the sentiment in an Amazon DynamoDB table and in a custom Amazon CloudWatch metric
- D. Use CloudWatch alarms to notify analysts of trends.
- E. Train a model in Amazon SageMaker by using the semantic segmentation algorithm to model the semantic content in the corpus of social media post
- F. Expose an endpoint that can be called by AWS Lambda
- G. Trigger a Lambda function when objects are added to the S3 bucket to invoke the endpoint and record the sentiment in an Amazon DynamoDB table
- H. Schedule a second Lambda function to query recently added records and send an Amazon Simple Notification Service (Amazon SNS) notification to notify analysts of trends.
- I. Trigger an AWS Lambda function when social media posts are added to the S3 bucket
- J. Call Amazon Comprehend for each post to capture the sentiment in the message and record the sentiment in an Amazon DynamoDB table
- K. Schedule a second Lambda function to query recently added records and send an Amazon Simple Notification Service (Amazon SNS) notification to notify analysts of trends.
- L. Trigger an AWS Lambda function when social media posts are added to the S3 bucket
- M. Call Amazon Comprehend for each post to capture the sentiment in the message and record the sentiment in a custom Amazon CloudWatch metric and in S3. Use CloudWatch alarms to notify analysts of trends.

Answer: A

**NEW QUESTION 51**

An aircraft engine manufacturing company is measuring 200 performance metrics in a time-series. Engineers want to detect critical manufacturing defects in near-real time during testing. All of the data needs to be stored for offline analysis. What approach would be the MOST effective to perform near-real time defect detection?

- A. Use AWS IoT Analytics for ingestion, storage, and further analysis
- B. Use Jupyter notebooks from within AWS IoT Analytics to carry out analysis for anomalies.
- C. Use Amazon S3 for ingestion, storage, and further analysis
- D. Use an Amazon EMR cluster to carry out Apache Spark ML k-means clustering to determine anomalies.
- E. Use Amazon S3 for ingestion, storage, and further analysis
- F. Use the Amazon SageMaker Random Cut Forest (RCF) algorithm to determine anomalies.
- G. Use Amazon Kinesis Data Firehose for ingestion and Amazon Kinesis Data Analytics Random Cut Forest (RCF) to perform anomaly detection
- H. Use Kinesis Data Firehose to store data in Amazon S3 for further analysis.

Answer: B



#### NEW QUESTION 54

A manufacturing company asks its Machine Learning Specialist to develop a model that classifies defective parts into one of eight defect types. The company has provided roughly 100000 images per defect type for training. During the initial training of the image classification model, the Specialist notices that the validation accuracy is 80%, while the training accuracy is 90%. It is known that human-level performance for this type of image classification is around 90%. What should the Specialist consider to fix this issue?

- A. A longer training time
- B. Making the network larger
- C. Using a different optimizer
- D. Using some form of regularization

Answer: D

#### NEW QUESTION 58

A company has an ecommerce website with a product recommendation engine built in TensorFlow. The recommendation engine endpoint is hosted by Amazon SageMaker. Three compute-optimized instances support the expected peak load of the website.

Response times on the product recommendation page are increasing at the beginning of each month. Some users are encountering errors. The website receives the majority of its traffic between 8 AM and 6 PM on weekdays in a single time zone.

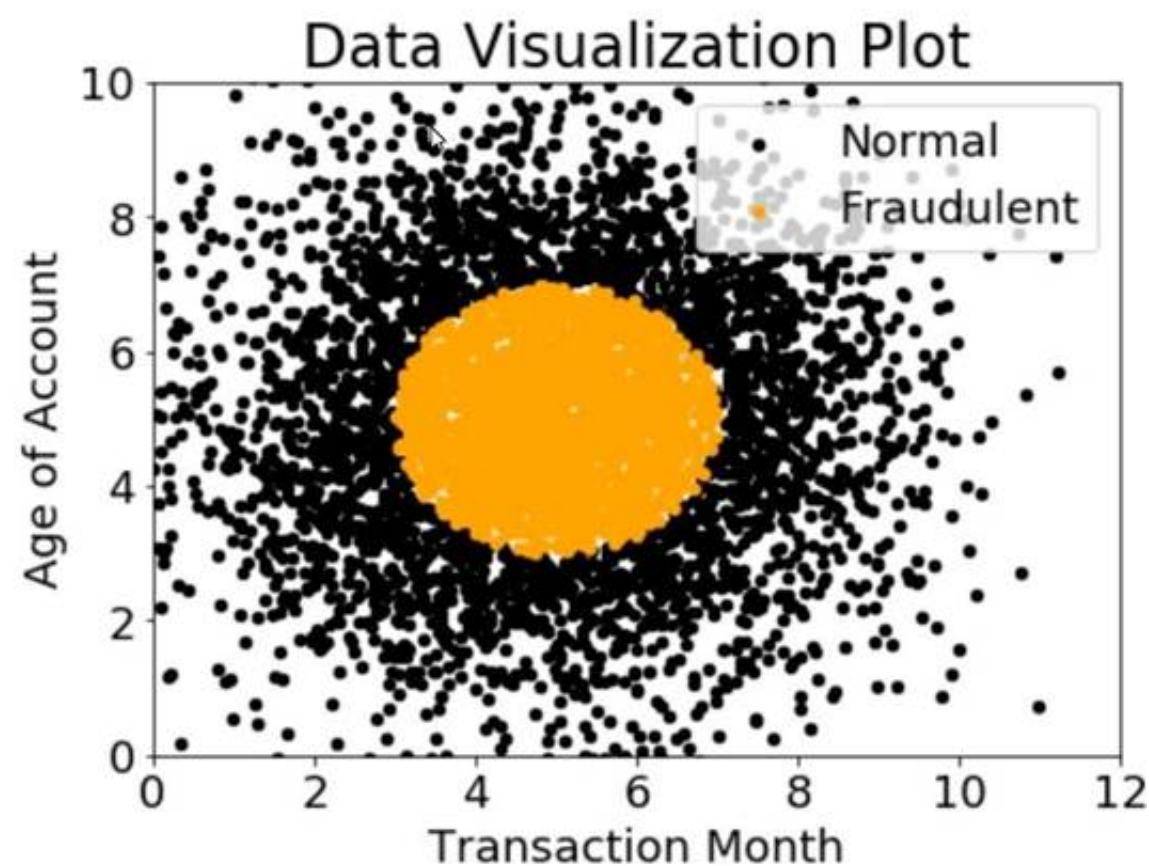
Which of the following options are the MOST effective in solving the issue while keeping costs to a minimum? (Choose two.)

- A. Configure the endpoint to use Amazon Elastic Inference (EI) accelerators.
- B. Create a new endpoint configuration with two production variants.
- C. Configure the endpoint to automatically scale with the `InvocationsPerInstance` metric.
- D. Deploy a second instance pool to support a blue/green deployment of models.
- E. Reconfigure the endpoint to use burstable instances.

Answer: BD

#### NEW QUESTION 59

A company wants to classify user behavior as either fraudulent or normal. Based on internal research, a Machine Learning Specialist would like to build a binary classifier based on two features: age of account and transaction month. The class distribution for these features is illustrated in the figure provided.



Based on this information, which model would have the HIGHEST recall with respect to the fraudulent class?

- A. Decision tree
- B. Linear support vector machine (SVM)
- C. Naive Bayesian classifier
- D. Single Perceptron with sigmoidal activation function

Answer: C

#### NEW QUESTION 63

A Data Engineer needs to build a model using a dataset containing customer credit card information. How can the Data Engineer ensure the data remains encrypted and the credit card information is secure?

- A. Use a custom encryption algorithm to encrypt the data and store the data on an Amazon SageMaker instance in a VP
- B. Use the SageMaker DeepAR algorithm to randomize the credit card numbers.
- C. Use an IAM policy to encrypt the data on the Amazon S3 bucket and Amazon Kinesis to automatically discard credit card numbers and insert fake credit card numbers.
- D. Use an Amazon SageMaker launch configuration to encrypt the data once it is copied to the SageMaker instance in a VP
- E. Use the SageMaker principal component analysis (PCA) algorithm to reduce the length of the credit card numbers.
- F. Use AWS KMS to encrypt the data on Amazon S3 and Amazon SageMaker, and redact the credit card numbers from the customer data with AWS Glue.

Answer: D



#### NEW QUESTION 67

A data scientist must build a custom recommendation model in Amazon SageMaker for an online retail company. Due to the nature of the company's products, customers buy only 4-5 products every 5-10 years. So, the company relies on a steady stream of new customers. When a new customer signs up, the company collects data on the customer's preferences. Below is a sample of the data available to the data scientist.

timestamp	user_id	product_id	preference_1	...	preference_10
2020-03-04	90	25	0	...	0.374
2020-03-04	90	61	0	...	0.374
2020-02-21	203	56	1	...	0.098

How should the data scientist split the dataset into a training and test set for this use case?

- A. Shuffle all interaction dat
- B. Split off the last 10% of the interaction data for the test set.
- C. Identify the most recent 10% of interactions for each use
- D. Split off these interactions for the test set.
- E. Identify the 10% of users with the least interaction dat
- F. Split off all interaction data from these users for the test set.
- G. Randomly select 10% of the user
- H. Split off all interaction data from these users for the test set.

**Answer:** B

#### Explanation:

<https://aws.amazon.com/blogs/machine-learning/building-a-customized-recommender-system-in-amazon-sagem>

#### NEW QUESTION 71

A company that manufactures mobile devices wants to determine and calibrate the appropriate sales price for its devices. The company is collecting the relevant data and is determining data features that it can use to train machine learning (ML) models. There are more than 1,000 features, and the company wants to determine the primary features that contribute to the sales price.

Which techniques should the company use for feature selection? (Choose three.)

- A. Data scaling with standardization and normalization
- B. Correlation plot with heat maps
- C. Data binning
- D. Univariate selection
- E. Feature importance with a tree-based classifier
- F. Data augmentation

**Answer:** CDF

#### NEW QUESTION 75

When submitting Amazon SageMaker training jobs using one of the built-in algorithms, which common parameters MUST be specified? (Select THREE.)

- A. The training channel identifying the location of training data on an Amazon S3 bucket.
- B. The validation channel identifying the location of validation data on an Amazon S3 bucket.
- C. The IAM role that Amazon SageMaker can assume to perform tasks on behalf of the users.
- D. Hyperparameters in a JSON array as documented for the algorithm used.
- E. The Amazon EC2 instance class specifying whether training will be run using CPU or GPU.
- F. The output path specifying where on an Amazon S3 bucket the trained model will persist.

**Answer:** CEF

#### NEW QUESTION 77

A Machine Learning Specialist receives customer data for an online shopping website. The data includes demographics, past visits, and locality information. The Specialist must develop a machine learning approach to identify the customer shopping patterns, preferences and trends to enhance the website for better service and smart recommendations.

Which solution should the Specialist recommend?

- A. Latent Dirichlet Allocation (LDA) for the given collection of discrete data to identify patterns in the customer database.
- B. A neural network with a minimum of three layers and random initial weights to identify patterns in the customer database
- C. Collaborative filtering based on user interactions and correlations to identify patterns in the customer database
- D. Random Cut Forest (RCF) over random subsamples to identify patterns in the customer database

**Answer:** C

#### NEW QUESTION 82

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 daily sales over the last 3 week
- B. In addition, create a histogram of the daily sales from before that period.
- C. Create a histogram of the model errors over the last 3 week
- D. In addition, create a histogram of the model errors from before that period.

- E. Create a line chart with the weekly mean absolute error (MAE) of the model.
- F. Create a scatter plot of daily sales versus model error for the last 3 week
- G. In addition, create a scatter plot of daily sales versus model error from before that period.

**Answer:** C

#### NEW QUESTION 87

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

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

**Answer:** D

#### NEW QUESTION 89

A company has video feeds and images of a subway train station. The company wants to create a deep learning model that will alert the station manager if any passenger crosses the yellow safety line when there is no train in the station. The alert will be based on the video feeds. The company wants the model to detect the yellow line, the passengers who cross the yellow line, and the trains in the video feeds. This task requires labeling. The video data must remain confidential. A data scientist creates a bounding box to label the sample data and uses an object detection model. However, the object detection model cannot clearly demarcate the yellow line, the passengers who cross the yellow line, and the trains. Which labeling approach will help the company improve this model?

- A. Use Amazon Rekognition Custom Labels to label the dataset and create a custom Amazon Rekognition object detection mode
- B. Create a private workforce
- C. Use Amazon Augmented AI (Amazon A2I) to review the low-confidence predictions and retrain the custom Amazon Rekognition model.
- D. Use an Amazon SageMaker Ground Truth object detection labeling tas
- E. Use Amazon Mechanical Turk as the labeling workforce.
- F. Use Amazon Rekognition Custom Labels to label the dataset and create a custom Amazon Rekognition object detection mode
- G. Create a workforce with a third-party AWS Marketplace vendo
- H. Use Amazon Augmented AI (Amazon A2I) to review the low-confidence predictions and retrain the custom Amazon Rekognition model.
- I. Use an Amazon SageMaker Ground Truth semantic segmentation labeling tas
- J. Use a private workforce as the labeling workforce.

**Answer:** B

#### NEW QUESTION 93

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.

**Answer:** B

#### Explanation:

Many developers want to implement the famous Amazon model that was used to power the “People who bought this also bought these items” feature on Amazon.com. This model is based on a method called Collaborative Filtering. It takes items such as movies, books, and products that were rated highly by a set of users and recommending them to other users who also gave them high ratings. This method works well in domains where explicit ratings or implicit user actions can be gathered and analyzed.

#### NEW QUESTION 96

The chief editor for a product catalog wants the research and development team to build a machine learning system that can be used to detect whether or not individuals in a collection of images are wearing the company's retail brand. The team has a set of training data. Which machine learning algorithm should the researchers use that BEST meets their requirements?

- A. Latent Dirichlet Allocation (LDA)
- B. Recurrent neural network (RNN)
- C. K-means
- D. Convolutional neural network (CNN)

**Answer:** D

#### NEW QUESTION 99

A Machine Learning Specialist is building a supervised model that will evaluate customers' satisfaction with their mobile phone service based on recent usage The model's output should infer whether or not a customer is likely to switch to a competitor in the next 30 days Which of the following modeling techniques should the Specialist use1?

- A. Time-series prediction
- B. Anomaly detection
- C. Binary classification
- D. Regression

**Answer:** D

#### NEW QUESTION 102

A company is building a predictive maintenance model based on machine learning (ML). The data is stored in a fully private Amazon S3 bucket that is encrypted at rest with AWS Key Management Service (AWS KMS) CMKs. An ML specialist must run data preprocessing by using an Amazon SageMaker Processing job that is triggered from code in an Amazon SageMaker notebook. The job should read data from Amazon S3, process it, and upload it back to the same S3 bucket. The preprocessing code is stored in a container image in Amazon Elastic Container Registry (Amazon ECR). The ML specialist needs to grant permissions to ensure a smooth data preprocessing workflow.

Which set of actions should the ML specialist take to meet these requirements?

- A. Create an IAM role that has permissions to create Amazon SageMaker Processing jobs, S3 read and write access to the relevant S3 bucket, and appropriate KMS and ECR permission
- B. Attach the role to the SageMaker notebook instance
- C. Create an Amazon SageMaker Processing job from the notebook.
- D. Create an IAM role that has permissions to create Amazon SageMaker Processing job
- E. Attach the role to the SageMaker notebook instance
- F. Create an Amazon SageMaker Processing job with an IAM role that has read and write permissions to the relevant S3 bucket, and appropriate KMS and ECR permissions.
- G. Create an IAM role that has permissions to create Amazon SageMaker Processing jobs and to access Amazon EC
- H. Attach the role to the SageMaker notebook instance
- I. Set up both an S3 endpoint and a KMS endpoint in the default VPC
- J. Create Amazon SageMaker Processing jobs from the notebook.
- K. Create an IAM role that has permissions to create Amazon SageMaker Processing job
- L. Attach the role to the SageMaker notebook instance
- M. Set up an S3 endpoint in the default VPC
- N. Create Amazon SageMaker Processing jobs with the access key and secret key of the IAM user with appropriate KMS and ECR permissions.

**Answer:** D

#### NEW QUESTION 104

An insurance company is developing a new device for vehicles that uses a camera to observe drivers' behavior and alert them when they appear distracted. The company created approximately 10,000 training images in a controlled environment that a Machine Learning Specialist will use to train and evaluate machine learning models.

During the model evaluation, the Specialist notices that the training error rate diminishes faster as the number of epochs increases and the model is not accurately inferring on the unseen test images.

Which of the following should be used to resolve this issue? (Select TWO)

- A. Add vanishing gradient to the model
- B. Perform data augmentation on the training data
- C. Make the neural network architecture complex.
- D. Use gradient checking in the model
- E. Add L2 regularization to the model

**Answer:** BD

#### NEW QUESTION 106

A retail company is selling products through a global online marketplace. The company wants to use machine learning (ML) to analyze customer feedback and identify specific areas for improvement. A developer has built a tool that collects customer reviews from the online marketplace and stores them in an Amazon S3 bucket. This process yields a dataset of 40 reviews. A data scientist building the ML models must identify additional sources of data to increase the size of the dataset.

Which data sources should the data scientist use to augment the dataset of reviews? (Choose three.)

- A. Emails exchanged by customers and the company's customer service agents
- B. Social media posts containing the name of the company or its products
- C. A publicly available collection of news articles
- D. A publicly available collection of customer reviews
- E. Product sales revenue figures for the company
- F. Instruction manuals for the company's products

**Answer:** BDF

#### NEW QUESTION 111

During mini-batch training of a neural network for a classification problem, a Data Scientist notices that training accuracy oscillates. What is the MOST likely cause of this issue?

- A. The class distribution in the dataset is imbalanced
- B. Dataset shuffling is disabled
- C. The batch size is too big
- D. The learning rate is very high

**Answer:** B

#### NEW QUESTION 113

A Machine Learning Specialist has built a model using Amazon SageMaker built-in algorithms and is not getting expected accurate results. The Specialist wants to use hyperparameter optimization to increase the model's accuracy.

Which method is the MOST repeatable and requires the LEAST amount of effort to achieve this?

- A. Launch multiple training jobs in parallel with different hyperparameters
- B. Create an AWS Step Functions workflow that monitors the accuracy in Amazon CloudWatch Logs and relaunches the training job with a defined list of hyperparameters



- C. Create a hyperparameter tuning job and set the accuracy as an objective metric.
- D. Create a random walk in the parameter space to iterate through a range of values that should be used for each individual hyperparameter

**Answer:** B

#### NEW QUESTION 118

A Machine Learning Specialist must build out a process to query a dataset on Amazon S3 using Amazon Athena. The dataset contains more than 800,000 records stored as plaintext CSV files. Each record contains 200 columns and is approximately 1.5 MB in size. Most queries will span 5 to 10 columns only. How should the Machine Learning Specialist transform the dataset to minimize query runtime?

- A. Convert the records to Apache Parquet format
- B. Convert the records to JSON format
- C. Convert the records to GZIP CSV format
- D. Convert the records to XML format

**Answer:** A

#### Explanation:

Using compressions will reduce the amount of data scanned by Amazon Athena, and also reduce your S3 bucket storage. It's a Win-Win for your AWS bill. Supported formats: GZIP, LZO, SNAPPY (Parquet) and ZLIB.

#### NEW QUESTION 119

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': 201} # 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. Increase the max\_depth parameter value.
- B. Lower the max\_depth parameter value.
- C. Update the objective to binary:logistic.
- D. Lower the min\_child\_weight parameter value.

**Answer:** B

#### NEW QUESTION 122

A data scientist is using the Amazon SageMaker Neural Topic Model (NTM) algorithm to build a model that recommends tags from blog posts. The raw blog post data is stored in an Amazon S3 bucket in JSON format. During model evaluation, the data scientist discovered that the model recommends certain stopwords such as "a," "an," and "the" as tags to certain blog posts, along with a few rare words that are present only in certain blog entries. After a few iterations of tag review with the content team, the data scientist notices that the rare words are unusual but feasible. The data scientist also must ensure that the tag recommendations of the generated model do not include the stopwords.

What should the data scientist do to meet these requirements?

- A. Use the Amazon Comprehend entity recognition API operation
- B. Remove the detected words from the blog post data
- C. Replace the blog post data source in the S3 bucket.
- D. Run the SageMaker built-in principal component analysis (PCA) algorithm with the blog post data from the S3 bucket as the data source
- E. Replace the blog post data in the S3 bucket with the results of the training job.
- F. Use the SageMaker built-in Object Detection algorithm instead of the NTM algorithm for the training job to process the blog post data.
- G. Remove the stopwords from the blog post data by using the Count Vectorizer function in the scikit-learn library
- H. Replace the blog post data in the S3 bucket with the results of the vectorizer.

**Answer:** D

#### NEW QUESTION 124

A manufacturing company has structured and unstructured data stored in an Amazon S3 bucket. A Machine Learning Specialist wants to use SQL to run queries on this data.

Which solution requires the LEAST effort to be able to query this data?

- A. Use AWS Data Pipeline to transform the data and Amazon RDS to run queries.
- B. Use AWS Glue to catalogue the data and Amazon Athena to run queries.
- C. Use AWS Batch to run ETL on the data and Amazon Aurora to run the queries.
- D. Use AWS Lambda to transform the data and Amazon Kinesis Data Analytics to run queries.

**Answer:** B

#### NEW QUESTION 129

A manufacturer is operating a large number of factories with a complex supply chain relationship where unexpected downtime of a machine can cause production to stop at several factories. A data scientist wants to analyze sensor data from the factories to identify equipment in need of preemptive maintenance and then dispatch a service team to prevent unplanned downtime. The sensor readings from a single machine can include up to 200 data points including temperatures, voltages, vibrations, RPMs, and pressure readings.

To collect this sensor data, the manufacturer deployed Wi-Fi and LANs across the factories. Even though many factory locations do not have reliable or high-speed internet connectivity, the manufacturer would like to maintain near-real-time inference capabilities.

Which deployment architecture for the model will address these business requirements?

- A. Deploy the model in Amazon SageMake
- B. Run sensor data through this model to predict which machines need maintenance.
- C. Deploy the model on AWS IoT Greengrass in each factor
- D. Run sensor data through this model to infer which machines need maintenance.
- E. Deploy the model to an Amazon SageMaker batch transformation job
- F. Generate inferences in a daily batch report to identify machines that need maintenance.
- G. Deploy the model in Amazon SageMaker and use an IoT rule to write data to an Amazon DynamoDB table. Consume a DynamoDB stream from the table with an AWS Lambda function to invoke the endpoint.

**Answer:** B

#### Explanation:

<https://aws.amazon.com/blogs/iot/industrial-iot-from-condition-based-monitoring-to-predictive-quality-to-digitiz> <https://aws.amazon.com/blogs/iot/using-aws-iot-for-predictive-maintenance/>

#### NEW QUESTION 133

A Machine Learning Specialist is developing recommendation engine for a photography blog. Given a picture, the recommendation engine should show a picture that captures similar objects. The Specialist would like to create a numerical representation feature to perform nearest-neighbor searches.

What actions would allow the Specialist to get relevant numerical representations?

- A. Reduce image resolution and use reduced resolution pixel values as features
- B. Use Amazon Mechanical Turk to label image content and create a one-hot representation indicating the presence of specific labels
- C. Run images through a neural network pre-trained on ImageNet, and collect the feature vectors from the penultimate layer
- D. Average colors by channel to obtain three-dimensional representations of images.

**Answer:** A

#### NEW QUESTION 138

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