

# 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 company is converting a large number of unstructured paper receipts into images. The company wants to create a model based on natural language processing (NLP) to find relevant entities such as date, location, and notes, as well as some custom entities such as receipt numbers.

The company is using optical character recognition (OCR) to extract text for data labeling. However, documents are in different structures and formats, and the company is facing challenges with setting up the manual workflows for each document type. Additionally, the company trained a named entity recognition (NER) model for custom entity detection using a small sample size. This model has a very low confidence score and will require retraining with a large dataset.

Which solution for text extraction and entity detection will require the LEAST amount of effort?

- A. Extract text from receipt images by using Amazon Textract.
- B. Use the Amazon SageMaker BlazingText algorithm to train on the text for entities and custom entities.
- C. Extract text from receipt images by using a deep learning OCR model from the AWS Marketplace.
- D. Use the NER deep learning model to extract entities.
- E. Extract text from receipt images by using Amazon Textract.
- F. Use Amazon Comprehend for entity detection, and use Amazon Comprehend custom entity recognition for custom entity detection.
- G. Extract text from receipt images by using a deep learning OCR model from the AWS Marketplace.
- H. Use Amazon Comprehend for entity detection, and use Amazon Comprehend custom entity recognition for custom entity detection.

**Answer:** C

#### NEW QUESTION 3

A retail company wants to update its customer support system. The company wants to implement automatic routing of customer claims to different queues to prioritize the claims by category.

Currently, an operator manually performs the category assignment and routing. After the operator classifies and routes the claim, the company stores the claim's record in a central database. The claim's record includes the claim's category.

The company has no data science team or experience in the field of machine learning (ML). The company's small development team needs a solution that requires no ML expertise.

Which solution meets these requirements?

- A. Export the database to a .csv file with two columns: claim\_label and claim\_text.
- B. Use the Amazon SageMaker Object2Vec algorithm and the .csv file to train a model.
- C. Use SageMaker to deploy the model to an inference endpoint.
- D. Develop a service in the application to use the inference endpoint to process incoming claims, predict the labels, and route the claims to the appropriate queue.
- E. Export the database to a .csv file with one column: claim\_text.
- F. Use the Amazon SageMaker Latent Dirichlet Allocation (LDA) algorithm and the .csv file to train a model.
- G. Use the LDA algorithm to detect labels automatically.
- H. Use SageMaker to deploy the model to an inference endpoint.
- I. Develop a service in the application to use the inference endpoint to process incoming claims, predict the labels, and route the claims to the appropriate queue.
- J. Use Amazon Textract to process the database and automatically detect two columns: claim\_label and claim\_text.
- K. Use Amazon Comprehend custom classification and the extracted information to train the custom classifier.
- L. Develop a service in the application to use the Amazon Comprehend API to process incoming claims, predict the labels, and route the claims to the appropriate queue.
- M. Export the database to a .csv file with two columns: claim\_label and claim\_text.
- N. Use Amazon Comprehend custom classification and the .csv file to train the custom classifier.
- O. Develop a service in the application to use the Amazon Comprehend API to process incoming claims, predict the labels, and route the claims to the appropriate queue.

**Answer:** C

#### NEW QUESTION 4

A data scientist has a dataset of machine part images stored in Amazon Elastic File System (Amazon EFS). The data scientist needs to use Amazon SageMaker to create and train an image classification machine learning model based on this dataset. Because of budget and time constraints, management wants the data scientist to create and train a model with the least number of steps and integration work required.

How should the data scientist meet these requirements?

- A. Mount the EFS file system to a SageMaker notebook and run a script that copies the data to an Amazon FSx for Lustre file system.
- B. Run the SageMaker training job with the FSx for Lustre file system as the data source.

- C. Launch a transient Amazon EMR cluster
- D. Configure steps to mount the EFS file system and copy the data to an Amazon S3 bucket by using S3DistC
- E. Run the SageMaker training job with Amazon S3 as the data source.
- F. Mount the EFS file system to an Amazon EC2 instance and use the AWS CLI to copy the data to an Amazon S3 bucket
- G. Run the SageMaker training job with Amazon S3 as the data source.
- H. Run a SageMaker training job with an EFS file system as the data source.

**Answer:** A

#### NEW QUESTION 5

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.

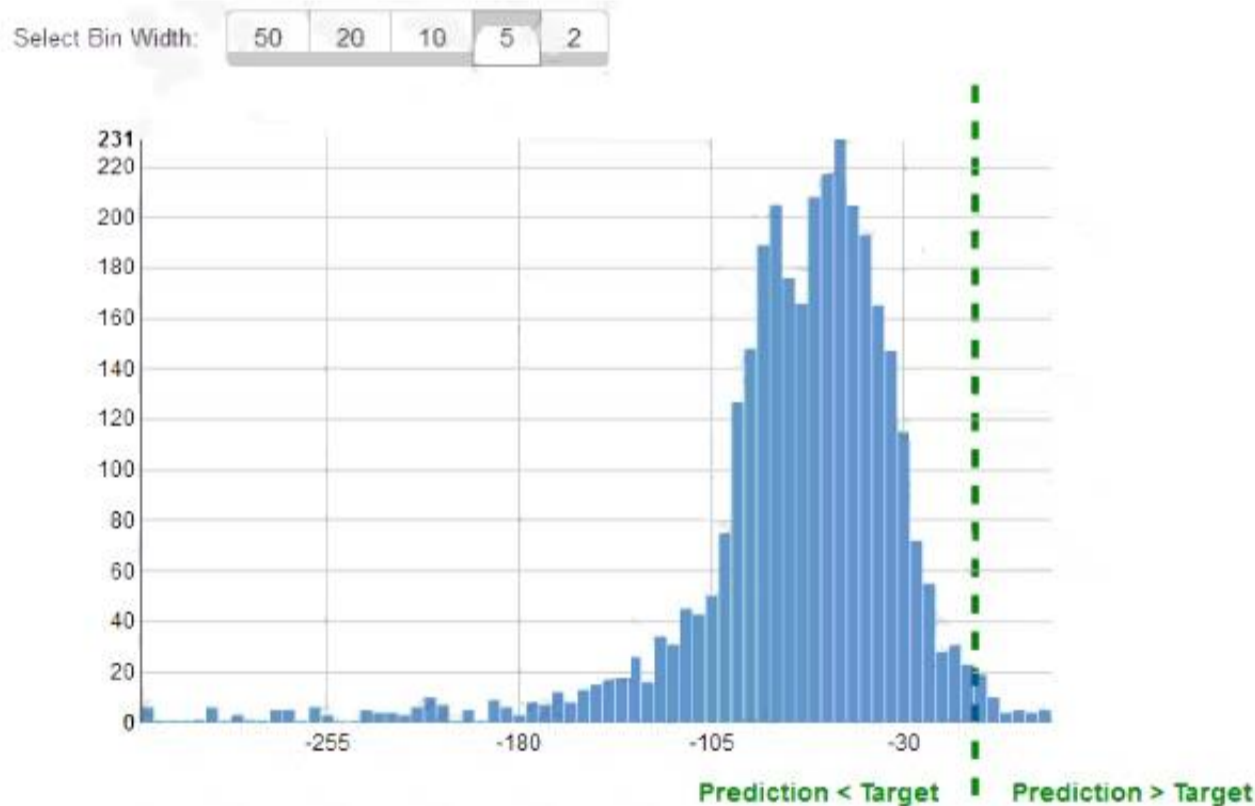
**Answer:** C

#### Explanation:

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

#### NEW QUESTION 6

While reviewing the histogram for residuals on regression evaluation data a Machine Learning Specialist notices that the residuals do not form a zero-centered bell shape as shown. What does this mean?



- A. The model might have prediction errors over a range of target values.
- B. The dataset cannot be accurately represented using the regression model
- C. There are too many variables in the model
- D. The model is predicting its target values perfectly.

**Answer:** D

#### NEW QUESTION 7

A machine learning (ML) specialist is using Amazon SageMaker hyperparameter optimization (HPO) to improve a model's accuracy. The learning rate parameter is specified in the following HPO configuration:

```
{
  "Name": "learning_rate",
  "MaxValue": "0.0001",
  "MinValue": "0.1"
}
```

During the results analysis, the ML specialist determines that most of the training jobs had a learning rate between 0.01 and 0.1. The best result had a learning rate of less than 0.01. Training jobs need to run regularly over a changing dataset. The ML specialist needs to find a tuning mechanism that uses different learning rates more evenly from the provided range between MinValue and MaxValue.

Which solution provides the MOST accurate result?

A. Modify the HPO configuration as follows: C:\Users\Admin\Desktop\Data\Odt data\Untitled.jpg Select the most accurate hyperparameter configuration form this HPO job.

```
{
  "Name": "learning_rate",
  "MaxValue" : "0.0001",
  "MinValue": "0.1"
  "ScalingType": "ReverseLogarithmic"
}
```

B. Run three different HPO jobs that use different learning rates form the following intervals for MinValue and MaxValue while using the same number of training jobs for each HPO job:[0.01, 0.1][0.001, 0.01][0.0001, 0.001] Select the most accurate hyperparameter configuration form these three HPO jobs.

C. Modify the HPO configuration as follows: C:\Users\Admin\Desktop\Data\Odt data\Untitled.jpg

```
{
  "Name": "learning_rate",
  "MaxValue" : "0.0001",
  "MinValue": "0.1"
  "ScalingType": "Logarithmic"
}
```

Select the most accurate hyperparameter configuration form this training job.

D. Run three different HPO jobs that use different learning rates form the following intervals for MinValue and MaxValu

E. Divide the number of training jobs for each HPO job by three:[0.01, 0.1][0.001, 0.01][0.0001, 0.001] Select the most accurate hyperparameter configuration form these three HPO jobs.

**Answer: C**

#### NEW QUESTION 8

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

**Answer: A**

#### NEW QUESTION 9

A Machine Learning Specialist is implementing a full Bayesian network on a dataset that describes public transit in New York City. One of the random variables is discrete, and represents the number of minutes New Yorkers wait for a bus given that the buses cycle every 10 minutes, with a mean of 3 minutes.

Which prior probability distribution should the ML Specialist use for this variable?

- A. Poisson distribution ,
- B. Uniform distribution
- C. Normal distribution
- D. Binomial distribution

**Answer: A**

#### NEW QUESTION 10

A Machine Learning Specialist is creating a new natural language processing application that processes a dataset comprised of 1 million sentences The aim is to then run Word2Vec to generate embeddings of the sentences and enable different types of predictions

Here is an example from the dataset

"The quck BROWN FOX jumps over the lazy dog "

Which of the following are the operations the Specialist needs to perform to correctly sanitize and prepare the data in a repeatable manner? (Select THREE)

- A. Perform part-of-speech tagging and keep the action verb and the nouns only
- B. Normalize all words by making the sentence lowercase
- C. Remove stop words using an English stopword dictionary.
- D. Correct the typography on "quck" to "quick."
- E. One-hot encode all words in the sentence
- F. Tokenize the sentence into words.

**Answer: BCF**

#### NEW QUESTION 10

A company will use Amazon SageMaker to train and host a machine learning (ML) model for a marketing campaign. The majority of data is sensitive customer data. The data must be encrypted at rest. The company wants AWS to maintain the root of trust for the master keys and wants encryption key usage to be logged. Which implementation will meet these requirements?

- A. Use encryption keys that are stored in AWS Cloud HSM to encrypt the ML data volumes, and to encrypt the model artifacts and data in Amazon S3.
- B. Use SageMaker built-in transient keys to encrypt the ML data volume
- C. Enable default encryption for new Amazon Elastic Block Store (Amazon EBS) volumes.
- D. Use customer managed keys in AWS Key Management Service (AWS KMS) to encrypt the ML data volumes, and to encrypt the model artifacts and data in Amazon S3.
- E. Use AWS Security Token Service (AWS STS) to create temporary tokens to encrypt the ML storage volumes, and to encrypt the model artifacts and data in Amazon S3.

**Answer:** C

#### NEW QUESTION 11

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:** C

#### NEW QUESTION 14

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 dataset?

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

**Answer:** C

#### NEW QUESTION 16

A company is setting up an Amazon SageMaker environment. The corporate data security policy does not allow communication over the internet. How can the company enable the Amazon SageMaker service without enabling direct internet access to Amazon SageMaker notebook instances?

- A. Create a NAT gateway within the corporate VPC.
- B. Route Amazon SageMaker traffic through an on-premises network.
- C. Create Amazon SageMaker VPC interface endpoints within the corporate VPC.
- D. Create VPC peering with Amazon VPC hosting Amazon SageMaker.

**Answer:** A

#### NEW QUESTION 17

An Machine Learning Specialist discover the following statistics while experimenting on a model.

Experiment 1  
Baseline model  
Train error = 5%  
Test error = 16%

Experiment 2  
The Specialist added more layers and neurons to the model and received the following results:  
Train error = 5.2%  
Test error = 15.7%

Experiment 3  
The Specialist reverted back to the original number of neurons from Experiment 1 and implemented regularization in the neural network, which yielded the following results:  
Train error = 4.7%  
Test error = 9.5%

What can the Specialist learn from the experiments?

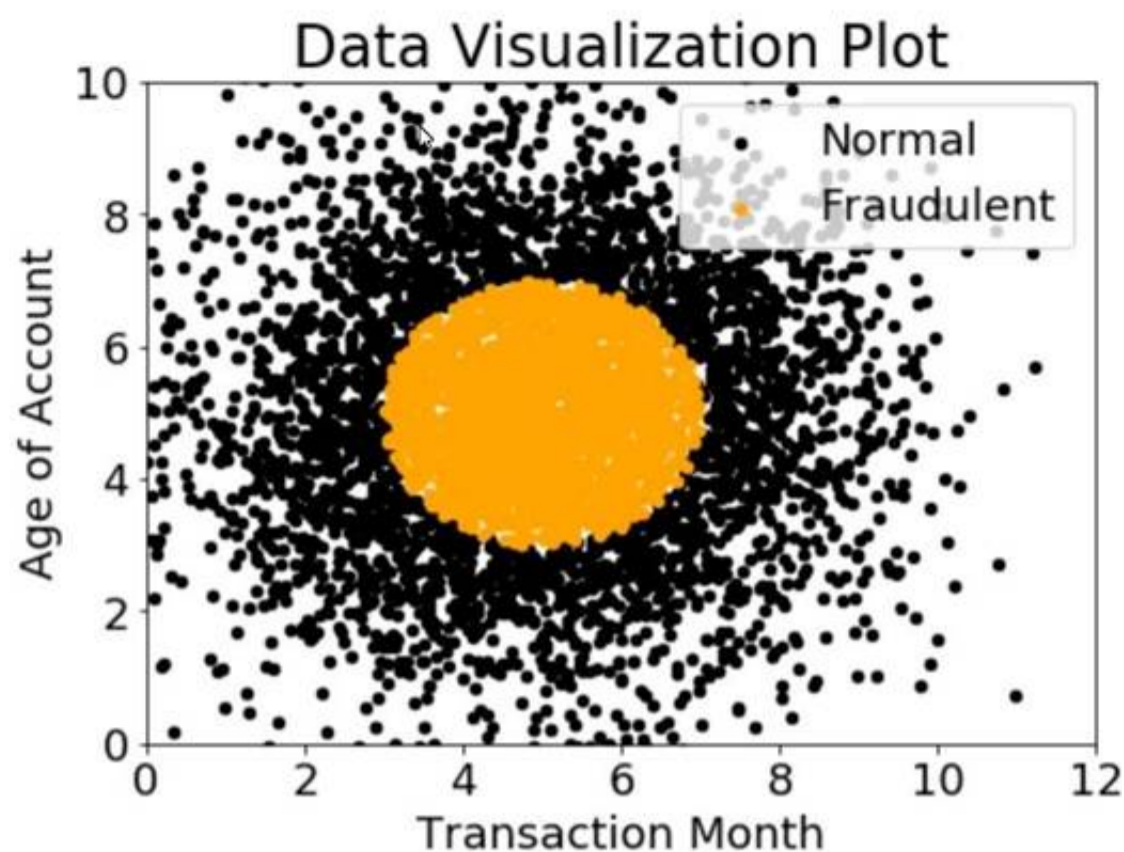
- A. The model in Experiment 1 had a high variance error that was reduced in Experiment 3 by regularization. Experiment 2 shows that there is minimal bias error in Experiment 1.
- B. The model in Experiment 1 had a high bias error that was reduced in Experiment 3 by regularization. Experiment 2 shows that there is minimal variance error in Experiment 1.
- C. The model in Experiment 1 had a high bias error and a high variance error that were reduced in Experiment 3 by regularization. Experiment 2 shows that high bias cannot be reduced by increasing layers and neurons in the model.
- D. The model in Experiment 1 had a high random noise error that was reduced in Experiment 3 by regularization. Experiment 2 shows that random noise cannot be reduced by increasing layers and neurons in the model.

**Answer:** C

#### NEW QUESTION 21

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 accuracy?

- A. Long short-term memory (LSTM) model with scaled exponential linear unit (SELL)
- B. Logistic regression
- C. Support vector machine (SVM) with non-linear kernel
- D. Single perceptron with tanh activation function

**Answer: C**

#### NEW QUESTION 25

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 27

A large company has developed a B1 application that generates reports and dashboards using data collected from various operational metrics. The company wants to provide executives with an enhanced experience so they can use natural language to get data from the reports. The company wants the executives to be able to ask questions using written and spoken interfaces.

Which combination of services can be used to build this conversational interface? (Select THREE)

- A. Alexa for Business
- B. Amazon Connect
- C. Amazon Lex
- D. Amazon Polly
- E. Amazon Comprehend
- F. Amazon Transcribe

**Answer: BEF**

#### NEW QUESTION 30

A Machine Learning Specialist is configuring automatic model tuning in Amazon SageMaker.

When using the hyperparameter optimization feature, which of the following guidelines should be followed to improve optimization?

Choose the maximum number of hyperparameters supported by

- A. Amazon SageMaker to search the largest number of combinations possible
- B. Specify a very large hyperparameter range to allow Amazon SageMaker to cover every possible value.
- C. Use log-scaled hyperparameters to allow the hyperparameter space to be searched as quickly as possible
- D. Execute only one hyperparameter tuning job at a time and improve tuning through successive rounds of experiments

**Answer: C**

#### NEW QUESTION 35

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 do?

- 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 36

A Machine Learning Specialist wants to bring a custom algorithm to Amazon SageMaker. The Specialist implements the algorithm in a Docker container supported by Amazon SageMaker.

How should the Specialist package the Docker container so that Amazon SageMaker can launch the training correctly?

- A. Modify the bash\_profile file in the container and add a bash command to start the training program
- B. Use CMD config in the Dockerfile to add the training program as a CMD of the image
- C. Configure the training program as an ENTRYPOINT named train
- D. Copy the training program to directory /opt/ml/train

**Answer:** B

#### NEW QUESTION 39

A company is using Amazon Polly to translate plaintext documents to speech for automated company announcements. However, company acronyms are being mispronounced in the current documents. How should a Machine Learning Specialist address this issue for future documents'?

- A. Convert current documents to SSML with pronunciation tags
- B. Create an appropriate pronunciation lexicon.
- C. Output speech marks to guide in pronunciation
- D. Use Amazon Lex to preprocess the text files for pronunciation

**Answer:** A

#### NEW QUESTION 42

A Data Scientist is working on an application that performs sentiment analysis. The validation accuracy is poor and the Data Scientist thinks that the cause may be a rich vocabulary and a low average frequency of words in the dataset.

Which tool should be used to improve the validation accuracy?

- A. Amazon Comprehend syntax analysts and entity detection
- B. Amazon SageMaker BlazingText allow mode
- C. Natural Language Toolkit (NLTK) stemming and stop word removal
- D. Scikit-learn term frequency-inverse document frequency (TF-IDF) vectorizers

**Answer:** A

#### NEW QUESTION 44

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

**Answer:** C

#### NEW QUESTION 48

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 51

A large JSON dataset for a project has been uploaded to a private Amazon S3 bucket. The Machine Learning Specialist wants to securely access and explore the data from an Amazon SageMaker notebook instance. A new VPC was created and assigned to the Specialist.

How can the privacy and integrity of the data stored in Amazon S3 be maintained while granting access to the Specialist for analysis?

- A. Launch the SageMaker notebook instance within the VPC with SageMaker-provided internet access enabled. Use an S3 ACL to open read privileges to the everyone group.
- B. Launch the SageMaker notebook instance within the VPC and create an S3 VPC endpoint for the notebook to access the data. Copy the JSON dataset from Amazon S3 into the ML storage volume on the SageMaker notebook instance and work against the local dataset.
- C. Launch the SageMaker notebook instance within the VPC and create an S3 VPC endpoint for the notebook to access the data. Define a custom S3 bucket.

policy to only allow requests from your VPC to access the S3 bucket  
D. Launch the SageMaker notebook instance within the VPC with SageMaker-provided internet access enable  
E. Generate an S3 pre-signed URL for access to data in the bucket

**Answer:** B

#### NEW QUESTION 54

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 58

A company is running a machine learning prediction service that generates 100 TB of predictions every day. A Machine Learning Specialist must generate a visualization of the daily precision-recall curve from the predictions, and forward a read-only version to the Business team.  
Which solution requires the LEAST coding effort?

- A. Run a daily Amazon EMR workflow to generate precision-recall data, and save the results in Amazon S3. Give the Business team read-only access to S3.
- B. Generate daily precision-recall data in Amazon QuickSight, and publish the results in a dashboard shared with the Business team.
- C. Run a daily Amazon EMR workflow to generate precision-recall data, and save the results in Amazon S3. Visualize the arrays in Amazon QuickSight, and publish them in a dashboard shared with the Business team.
- D. Generate daily precision-recall data in Amazon ES, and publish the results in a dashboard shared with the Business team.

**Answer:** C

#### NEW QUESTION 60

A Machine Learning Specialist needs to create a data repository to hold a large amount of time-based training data for a new model. In the source system, new files are added every hour. Throughout a single 24-hour period, the volume of hourly updates will change significantly. The Specialist always wants to train on the last 24 hours of the data.  
Which type of data repository is the MOST cost-effective solution?

- A. An Amazon EBS-backed Amazon EC2 instance with hourly directories
- B. An Amazon RDS database with hourly table partitions
- C. An Amazon S3 data lake with hourly object prefixes
- D. An Amazon EMR cluster with hourly hive partitions on Amazon EBS volumes

**Answer:** C

#### NEW QUESTION 65

A Machine Learning Specialist is training a model to identify the make and model of vehicles in images. The Specialist wants to use transfer learning and an existing model trained on images of general objects. The Specialist collated a large custom dataset of pictures containing different vehicle makes and models.

- A. Initialize the model with random weights in all layers including the last fully connected layer.
- B. Initialize the model with pre-trained weights in all layers and replace the last fully connected layer.
- C. Initialize the model with random weights in all layers and replace the last fully connected layer.
- D. Initialize the model with pre-trained weights in all layers including the last fully connected layer.

**Answer:** D

#### NEW QUESTION 67

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:** D

#### NEW QUESTION 69

A media company with a very large archive of unlabeled images, text, audio, and video footage wishes to index its assets to allow rapid identification of relevant content by the Research team. The company wants to use machine learning to accelerate the efforts of its in-house researchers who have limited machine learning expertise.

Which is the FASTEST route to index the assets?

- A. Use Amazon Rekognition, Amazon Comprehend, and Amazon Transcribe to tag data into distinct categories/classes.
- B. Create a set of Amazon Mechanical Turk Human Intelligence Tasks to label all footage.
- C. Use Amazon Transcribe to convert speech to text
- D. Use the Amazon SageMaker Neural Topic Model (NTM) and Object Detection algorithms to tag data into distinct categories/classes.
- E. Use the AWS Deep Learning AML and Amazon EC2 GPU instances to create custom models for audio transcription and topic modeling, and use object detection to tag data into distinct categories/classes.

**Answer:** A

#### NEW QUESTION 74

Amazon Connect has recently been tolled out across a company as a contact call center. The solution has been configured to store voice call recordings on Amazon S3.

The content of the voice calls are being analyzed for the incidents being discussed by the call operators. Amazon Transcribe is being used to convert the audio to text, and the output is stored on Amazon S3.

Which approach will provide the information required for further analysis?

- A. Use Amazon Comprehend with the transcribed files to build the key topics
- B. Use Amazon Translate with the transcribed files to train and build a model for the key topics
- C. Use the AWS Deep Learning AML with Gluon Semantic Segmentation on the transcribed files to train and build a model for the key topics
- D. Use the Amazon SageMaker k-Nearest-Neighbors (kNN) algorithm on the transcribed files to generate a word embeddings dictionary for the key topics

**Answer:** B

#### NEW QUESTION 77

A financial company is trying to detect credit card fraud. The company observed that, on average, 2% of credit card transactions were fraudulent. A data scientist trained a classifier on a year's worth of credit card transactions data. The model needs to identify the fraudulent transactions (positives) from the regular ones (negatives). The company's goal is to accurately capture as many positives as possible.

Which metrics should the data scientist use to optimize the model? (Choose two.)

- A. Specificity
- B. False positive rate
- C. Accuracy
- D. Area under the precision-recall curve
- E. True positive rate

**Answer:** DE

#### NEW QUESTION 81

A Data Scientist is developing a machine learning model to classify whether a financial transaction is fraudulent. The labeled data available for training consists of 100,000 non-fraudulent observations and 1,000 fraudulent observations.

The Data Scientist applies the XGBoost algorithm to the data, resulting in the following confusion matrix when the trained model is applied to a previously unseen validation dataset. The accuracy of the model is 99.1%, but the Data Scientist needs to reduce the number of false negatives.

| Predicted \ Actual | 0      | 1   |
|--------------------|--------|-----|
| 0                  | 99,966 | 34  |
| 1                  | 877    | 123 |

Which combination of steps should the Data Scientist take to reduce the number of false negative predictions by the model? (Choose two.)

- A. Change the XGBoost eval\_metric parameter to optimize based on Root Mean Square Error (RMSE).
- B. Increase the XGBoost scale\_pos\_weight parameter to adjust the balance of positive and negative weights.
- C. Increase the XGBoost max\_depth parameter because the model is currently underfitting the data.
- D. Change the XGBoost eval\_metric parameter to optimize based on Area Under the ROC Curve (AUC).
- E. Decrease the XGBoost max\_depth parameter because the model is currently overfitting the data.

**Answer:** BD

#### NEW QUESTION 83

A machine learning specialist is developing a regression model to predict rental rates from rental listings. A variable named Wall\_Color represents the most prominent exterior wall color of the property. The following is the sample data, excluding all other variables:

| Property_ID | Wall_Color |
|-------------|------------|
| 1000        | Red        |
| 1001        | White      |
| 1002        | Green      |

The specialist chose a model that needs numerical input data.

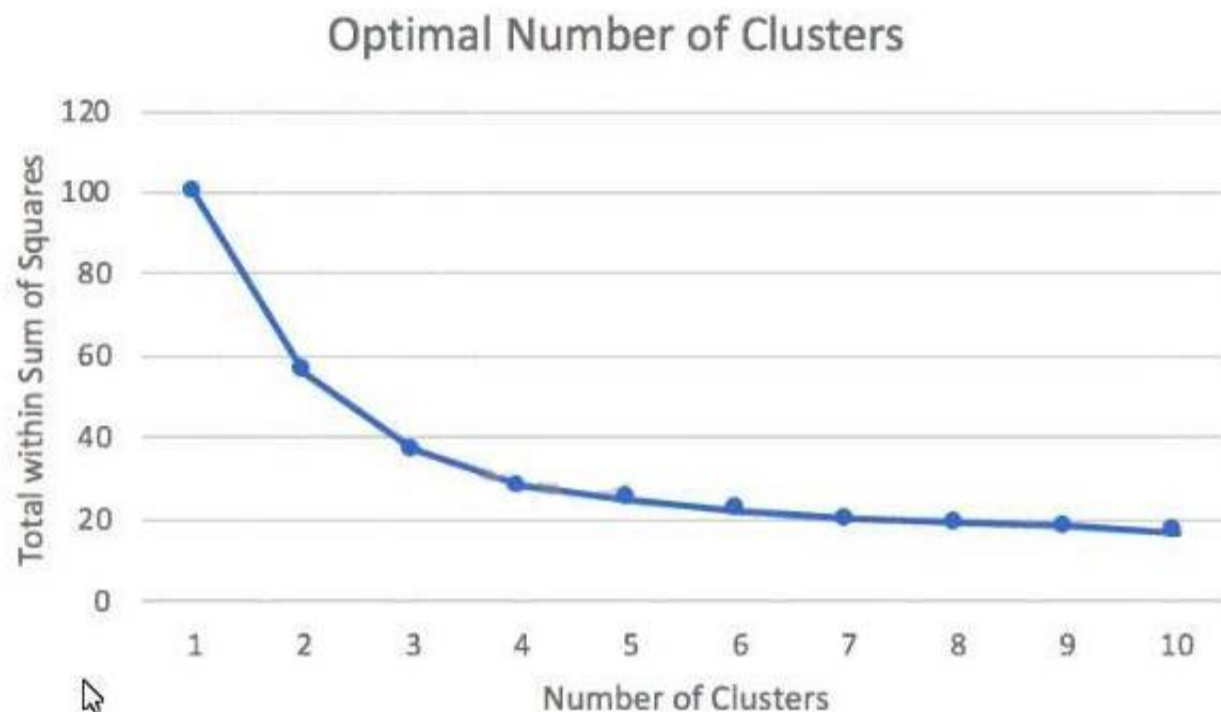
Which feature engineering approaches should the specialist use to allow the regression model to learn from the Wall\_Color data? (Choose two.)

- A. Apply integer transformation and set Red = 1, White = 5, and Green = 10.
- B. Add new columns that store one-hot representation of colors.
- C. Replace the color name string by its length.
- D. Create three columns to encode the color in RGB format.
- E. Replace each color name by its training set frequency.

**Answer:** AD

#### NEW QUESTION 86

A Machine Learning Specialist prepared the following graph displaying the results of k-means for k = [1:10]



Considering the graph, what is a reasonable selection for the optimal choice of k?

- A. 1
- B. 4
- C. 7
- D. 10

**Answer:** C

#### NEW QUESTION 89

A company is building a demand forecasting model based on machine learning (ML). In the development stage, an ML specialist uses an Amazon SageMaker notebook to perform feature engineering during work hours that consumes low amounts of CPU and memory resources. A data engineer uses the same notebook to perform data preprocessing once a day on average that requires very high memory and completes in only 2 hours. The data preprocessing is not configured to use GPU. All the processes are running well on an ml.m5.4xlarge notebook instance.

The company receives an AWS Budgets alert that the billing for this month exceeds the allocated budget. Which solution will result in the MOST cost savings?

- A. Change the notebook instance type to a memory optimized instance with the same vCPU number as the ml.m5.4xlarge instance ha
- B. Stop the notebook when it is not in us
- C. Run both data preprocessing and feature engineering development on that instance.
- D. Keep the notebook instance type and size the sam
- E. Stop the notebook when it is not in us
- F. Run data preprocessing on a P3 instance type with the same memory as the ml.m5.4xlarge instance by using Amazon SageMaker Processing.
- G. Change the notebook instance type to a smaller general purpose instanc
- H. Stop the notebook when it is not in us
- I. Run data preprocessing on an ml.r5 instance with the same memory size as the ml.m5.4xlarge instance by using Amazon SageMaker Processing.
- J. Change the notebook instance type to a smaller general purpose instanc
- K. Stop the notebook when it is not in us
- L. Run data preprocessing on an R5 instance with the same memory size as the ml.m5.4xlarge instance by using the Reserved Instance option.

**Answer:** B

#### NEW QUESTION 92

A Machine Learning Specialist is attempting to build a linear regression model.

Given the displayed residual plot only, what is the MOST likely problem with the model?

- A. Linear regression is inappropriat
- B. The residuals do not have constant variance.
- C. Linear regression is inappropriat
- D. The underlying data has outliers.
- E. Linear regression is appropriat
- F. The residuals have a zero mean.
- G. Linear regression is appropriat

H. The residuals have constant variance.

**Answer:** D

#### NEW QUESTION 93

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 metri
- 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 tabl
- 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 bucke
- J. Call Amazon Comprehend for each post to capture the sentiment in the message and record the sentiment in an Amazon DynamoDB tabl
- 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 bucke
- 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 97

A company is building a line-counting application for use in a quick-service restaurant. The company wants to use video cameras pointed at the line of customers at a given register to measure how many people are in line and deliver notifications to managers if the line grows too long. The restaurant locations have limited bandwidth for connections to external services and cannot accommodate multiple video streams without impacting other operations. Which solution should a machine learning specialist implement to meet these requirements?

- A. Install cameras compatible with Amazon Kinesis Video Streams to stream the data to AWS over the restaurant's existing internet connectio
- B. Write an AWS Lambda function to take an image and send it to Amazon Rekognition to count the number of faces in the imag
- C. Send an Amazon Simple Notification Service (Amazon SNS) notification if the line is too long.
- D. Deploy AWS DeepLens cameras in the restaurant to capture vide
- E. Enable Amazon Rekognition on the AWS DeepLens device, and use it to trigger a local AWS Lambda function when a person is recognize
- F. Use the Lambda function to send an Amazon Simple Notification Service (Amazon SNS) notification if the line is too long.
- G. Build a custom model in Amazon SageMaker to recognize the number of people in an imag
- H. Install cameras compatible with Amazon Kinesis Video Streams in the restauran
- I. Write an AWS Lambda function to take an imag
- J. Use the SageMaker endpoint to call the model to count peopl
- K. Send an Amazon Simple Notification Service (Amazon SNS) notification if the line is too long.
- L. Build a custom model in Amazon SageMaker to recognize the number of people in an imag
- M. Deploy AWS DeepLens cameras in the restauran
- N. Deploy the model to the camera
- O. Deploy an AWS Lambda function to the cameras to use the model to count people and send an Amazon Simple Notification Service (Amazon SNS) notification if the line is too long.

**Answer:** A

#### NEW QUESTION 101

A company wants to create a data repository in the AWS Cloud for machine learning (ML) projects. The company wants to use AWS to perform complete ML lifecycles and wants to use Amazon S3 for the data storage. All of the company's data currently resides on premises and is 40 in size. The company wants a solution that can transfer and automatically update data between the on-premises object storage and Amazon S3. The solution must support encryption, scheduling, monitoring, and data integrity validation. Which solution meets these requirements?

- A. Use the S3 sync command to compare the source S3 bucket and the destination S3 bucke
- B. Determine which source files do not exist in the destination S3 bucket and which source files were modified.
- C. Use AWS Transfer for FTPS to transfer the files from the on-premises storage to Amazon S3.
- D. Use AWS DataSync to make an initial copy of the entire datase
- E. Schedule subsequent incremental transfers of changing data until the final cutover from on premises to AWS.
- F. Use S3 Batch Operations to pull data periodically from the on-premises storag
- G. Enable S3 Versioning on the S3 bucket to protect against accidental overwrites.

**Answer:** C

#### Explanation:

Configure DataSync to make an initial copy of your entire dataset, and schedule subsequent incremental transfers of changing data until the final cut-over from on-premises to AWS.

#### NEW QUESTION 102

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 107

A company has an e-commerce 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 111

A company that runs an online library is implementing a chatbot using Amazon Lex to provide book recommendations based on category. This intent is fulfilled by an AWS Lambda function that queries an Amazon DynamoDB table for a list of book titles, given a particular category. For testing, there are only three categories implemented as the custom slot types: "comedy," "adventure," and "documentary." A machine learning (ML) specialist notices that sometimes the request cannot be fulfilled because Amazon Lex cannot understand the category spoken by users with utterances such as "funny," "fun," and "humor." The ML specialist needs to fix the problem without changing the Lambda code or data in DynamoDB. How should the ML specialist fix the problem?

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

**Answer:** C

#### NEW QUESTION 116

A Machine Learning Specialist is using an Amazon SageMaker notebook instance in a private subnet of a corporate VPC. The ML Specialist has important data stored on the Amazon SageMaker notebook instance's Amazon EBS volume, and needs to take a snapshot of that EBS volume. However, the ML Specialist cannot find the Amazon SageMaker notebook instance's EBS volume or Amazon EC2 instance within the VPC. Why is the ML Specialist not seeing the instance visible in the VPC?

- A. Amazon SageMaker notebook instances are based on the EC2 instances within the customer account, but they run outside of VPCs.
- B. Amazon SageMaker notebook instances are based on the Amazon ECS service within customer accounts.
- C. Amazon SageMaker notebook instances are based on EC2 instances running within AWS service accounts.
- D. Amazon SageMaker notebook instances are based on AWS ECS instances running within AWS service accounts.

**Answer:** C

#### NEW QUESTION 120

A data scientist has developed a machine learning translation model for English to Japanese by using Amazon SageMaker's built-in seq2seq algorithm with 500,000 aligned sentence pairs. While testing with sample sentences, the data scientist finds that the translation quality is reasonable for an example as short as five words. However, the quality becomes unacceptable if the sentence is 100 words long. Which action will resolve the problem?

- A. Change preprocessing to use n-grams.
- B. Add more nodes to the recurrent neural network (RNN) than the largest sentence's word count.
- C. Adjust hyperparameters related to the attention mechanism.
- D. Choose a different weight initialization type.

**Answer:** C

#### Explanation:

<https://docs.aws.amazon.com/sagemaker/latest/dg/seq-2-seq-howitworks.html>

#### NEW QUESTION 121

A company provisions Amazon SageMaker notebook instances for its data science team and creates Amazon VPC interface endpoints to ensure communication between the VPC and the notebook instances. All connections to the Amazon SageMaker API are contained entirely and securely using the AWS network. However, the data science team realizes that individuals outside the VPC can still connect to the notebook instances across the internet. Which set of actions should the data science team take to fix the issue?

- A. Modify the notebook instances' security group to allow traffic only from the CIDR ranges of the VPC.
- B. Apply this security group to all of the notebook instances' VPC interfaces.

- C. Create an IAM policy that allows the sagemaker:CreatePresignedNotebookInstanceUrl and sagemaker:DescribeNotebookInstance actions from only the VPC endpoint
- D. Apply this policy to all IAM users, groups, and roles used to access the notebook instances.
- E. Add a NAT gateway to the VP
- F. Convert all of the subnets where the Amazon SageMaker notebook instances are hosted to private subnet
- G. Stop and start all of the notebook instances to reassign only private IP addresses.
- H. Change the network ACL of the subnet the notebook is hosted in to restrict access to anyone outside the VPC.

**Answer: B**

#### NEW QUESTION 122

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 123

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 128

IT leadership wants Jo transition a company's existing machine learning data storage environment to AWS as a temporary ad hoc solution The company currently uses a custom software process that heavily leverages SQL as a query language and exclusively stores generated csv documents for machine learning The ideal state for the company would be a solution that allows it to continue to use the current workforce of SQL experts The solution must also support the storage of csv and JSON files, and be able to query over semi-structured data The following are high priorities for the company:

- Solution simplicity
- Fast development time
- Low cost
- High flexibility

What technologies meet the company's requirements?

- A. Amazon S3 and Amazon Athena
- B. Amazon Redshift and AWS Glue
- C. Amazon DynamoDB and DynamoDB Accelerator (DAX)
- D. Amazon RDS and Amazon ES

**Answer: B**

#### NEW QUESTION 131

A retail company is using Amazon Personalize to provide personalized product recommendations for its customers during a marketing campaign. The company sees a significant increase in sales of recommended items to existing customers immediately after deploying a new solution version, but these sales decrease a short time after deployment. Only historical data from before the marketing campaign is available for training. How should a data scientist adjust the solution?

- A. Use the event tracker in Amazon Personalize to include real-time user interactions.
- B. Add user metadata and use the HRNN-Metadata recipe in Amazon Personalize.
- C. Implement a new solution using the built-in factorization machines (FM) algorithm in Amazon SageMaker.
- D. Add event type and event value fields to the interactions dataset in Amazon Personalize.

Answer: A

#### NEW QUESTION 135

A Machine Learning Specialist is working with a large company to leverage machine learning within its products. The company wants to group its customers into categories based on which customers will and will not churn within the next 6 months. The company has labeled the data available to the Specialist. Which machine learning model type should the Specialist use to accomplish this task?

- A. Linear regression
- B. Classification
- C. Clustering
- D. Reinforcement learning

Answer: B

#### Explanation:

The goal of classification is to determine to which class or category a data point (customer in our case) belongs to. For classification problems, data scientists would use historical data with predefined target variables AKA labels (churner/non-churner) – answers that need to be predicted – to train an algorithm. With classification, businesses can answer the following questions:

- Will this customer churn or not?
- Will a customer renew their subscription?
- Will a user downgrade a pricing plan?
- Are there any signs of unusual customer behavior?

#### NEW QUESTION 140

A machine learning (ML) specialist is administering a production Amazon SageMaker endpoint with model monitoring configured. Amazon SageMaker Model Monitor detects violations on the SageMaker endpoint, so the ML specialist retrains the model with the latest dataset. This dataset is statistically representative of the current production traffic. The ML specialist notices that even after deploying the new SageMaker model and running the first monitoring job, the SageMaker endpoint still has violations.

What should the ML specialist do to resolve the violations?

- A. Manually trigger the monitoring job to re-evaluate the SageMaker endpoint traffic sample.
- B. Run the Model Monitor baseline job again on the new training set.
- C. Configure Model Monitor to use the new baseline.
- D. Delete the endpoint and recreate it with the original configuration.
- E. Retrain the model again by using a combination of the original training set and the new training set.

Answer: B

#### NEW QUESTION 141

A company offers an online shopping service to its customers. The company wants to enhance the site's security by requesting additional information when customers access the site from locations that are different from their normal location. The company wants to update the process to call a machine learning (ML) model to determine when additional information should be requested.

The company has several terabytes of data from its existing ecommerce web servers containing the source IP addresses for each request made to the web server. For authenticated requests, the records also contain the login name of the requesting user.

Which approach should an ML specialist take to implement the new security feature in the web application?

- A. Use Amazon SageMaker Ground Truth to label each record as either a successful or failed access attempt
- B. Use Amazon SageMaker to train a binary classification model using the factorization machines (FM) algorithm.
- C. Use Amazon SageMaker to train a model using the IP Insights algorithm
- D. Schedule updates and retraining of the model using new log data nightly.
- E. Use Amazon SageMaker Ground Truth to label each record as either a successful or failed access attempt
- F. Use Amazon SageMaker to train a binary classification model using the IP Insights algorithm.
- G. Use Amazon SageMaker to train a model using the Object2Vec algorithm
- H. Schedule updates and retraining of the model using new log data nightly.

Answer: C

#### NEW QUESTION 143

A telecommunications company is developing a mobile app for its customers. The company is using an Amazon SageMaker hosted endpoint for machine learning model inferences.

Developers want to introduce a new version of the model for a limited number of users who subscribed to a preview feature of the app. After the new version of the model is tested as a preview, developers will evaluate its accuracy. If a new version of the model has better accuracy, developers need to be able to gradually release the new version for all users over a fixed period of time.

How can the company implement the testing model with the LEAST amount of operational overhead?

- A. Update the ProductionVariant data type with the new version of the model by using the CreateEndpointConfig operation with the InitialVariantWeight parameter set to 0. Specify the TargetVariant parameter for InvokeEndpoint calls for users who subscribed to the preview feature
- B. When the new version of the model is ready for release, gradually increase InitialVariantWeight until all users have the updated version.
- C. Configure two SageMaker hosted endpoints that serve the different versions of the model
- D. Create an Application Load Balancer (ALB) to route traffic to both endpoints based on the TargetVariant query string parameter
- E. Reconfigure the app to send the TargetVariant query string parameter for users who subscribed to the preview feature
- F. When the new version of the model is ready for release, change the ALB's routing algorithm to weighted until all users have the updated version.
- G. Update the DesiredWeightsAndCapacity data type with the new version of the model by using the UpdateEndpointWeightsAndCapacities operation with the DesiredWeight parameter set to 0. Specify the TargetVariant parameter for InvokeEndpoint calls for users who subscribed to the preview feature
- H. When the new version of the model is ready for release, gradually increase DesiredWeight until all users have the updated version.
- I. Configure two SageMaker hosted endpoints that serve the different versions of the model
- J. Create an Amazon Route 53 record that is configured with a simple routing policy and that points to the current version of the model

- K. Configure the mobile app to use the endpoint URL for users who subscribed to the preview feature and to use the Route 53 record for other user
- L. When the new version of the model is ready for release, add a new model version endpoint to Route 53, and switch the policy to weighted until all users have the updated version.

**Answer:** D

#### NEW QUESTION 146

An employee found a video clip with audio on a company's social media feed. The language used in the video is Spanish. English is the employee's first language, and they do not understand Spanish. The employee wants to do a sentiment analysis. What combination of services is the MOST efficient to accomplish the task?

- A. Amazon Transcribe, Amazon Translate, and Amazon Comprehend
- B. Amazon Transcribe, Amazon Comprehend, and Amazon SageMaker seq2seq
- C. Amazon Transcribe, Amazon Translate, and Amazon SageMaker Neural Topic Model (NTM)
- D. Amazon Transcribe, Amazon Translate, and Amazon SageMaker BlazingText

**Answer:** A

#### NEW QUESTION 150

A company has raw user and transaction data stored in AmazonS3 a MySQL database, and Amazon RedShift A Data Scientist needs to perform an analysis by joining the three datasets from Amazon S3, MySQL, and Amazon RedShift, and then calculating the average-of a few selected columns from the joined data Which AWS service should the Data Scientist use?

- A. Amazon Athena
- B. Amazon Redshift Spectrum
- C. AWS Glue
- D. Amazon QuickSight

**Answer:** A

#### NEW QUESTION 155

A Machine Learning Specialist is given a structured dataset on the shopping habits of a company's customer base. The dataset contains thousands of columns of data and hundreds of numerical columns for each customer. The Specialist wants to identify whether there are natural groupings for these columns across all customers and visualize the results as quickly as possible. What approach should the Specialist take to accomplish these tasks?

- A. Embed the numerical features using the t-distributed stochastic neighbor embedding (t-SNE) algorithm and create a scatter plot.
- B. Run k-means using the Euclidean distance measure for different values of k and create an elbow plot.
- C. Embed the numerical features using the t-distributed stochastic neighbor embedding (t-SNE) algorithm and create a line graph.
- D. Run k-means using the Euclidean distance measure for different values of k and create box plots for each numerical column within each cluster.

**Answer:** B

#### NEW QUESTION 160

A machine learning specialist works for a fruit processing company and needs to build a system that categorizes apples into three types. The specialist has collected a dataset that contains 150 images for each type of apple and applied transfer learning on a neural network that was pretrained on ImageNet with this dataset. The company requires at least 85% accuracy to make use of the model. After an exhaustive grid search, the optimal hyperparameters produced the following: 68% accuracy on the training set 67% accuracy on the validation set What can the machine learning specialist do to improve the system's accuracy?

- A. Upload the model to an Amazon SageMaker notebook instance and use the Amazon SageMaker HPO feature to optimize the model's hyperparameters.
- B. Add more data to the training set and retrain the model using transfer learning to reduce the bias.
- C. Use a neural network model with more layers that are pretrained on ImageNet and apply transfer learning to increase the variance.
- D. Train a new model using the current neural network architecture.

**Answer:** B

#### NEW QUESTION 163

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 165

A Machine Learning Specialist is assigned a TensorFlow project using Amazon SageMaker for training, and needs to continue working for an extended period with no Wi-Fi access.

Which approach should the Specialist use to continue working?

- A. Install Python 3 and boto3 on their laptop and continue the code development using that environment.
- B. Download the TensorFlow Docker container used in Amazon SageMaker from GitHub to their local environment, and use the Amazon SageMaker Python SDK to test the code.
- C. Download TensorFlow from tensorflow.org to emulate the TensorFlow kernel in the SageMaker environment.
- D. Download the SageMaker notebook to their local environment then install Jupyter Notebooks on their laptop and continue the development in a local notebook.

**Answer: D**

#### NEW QUESTION 166

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 171

A data scientist wants to use Amazon Forecast to build a forecasting model for inventory demand for a retail company. The company has provided a dataset of historic inventory demand for its products as a .csv file stored in an Amazon S3 bucket. The table below shows a sample of the dataset.

| timestamp  | item_id    | demand | category    | lead_time |
|------------|------------|--------|-------------|-----------|
| 2019-12-14 | uni_000736 | 120    | hardware    | 90        |
| 2020-01-31 | uni_003429 | 98     | hardware    | 30        |
| 2020-03-04 | uni_000211 | 234    | accessories | 10        |

How should the data scientist transform the data?

- A. Use ETL jobs in AWS Glue to separate the dataset into a target time series dataset and an item metadata dataset
- B. Upload both datasets as .csv files to Amazon S3.
- C. Use a Jupyter notebook in Amazon SageMaker to separate the dataset into a related time series dataset and an item metadata dataset
- D. Upload both datasets as tables in Amazon Aurora.
- E. Use AWS Batch jobs to separate the dataset into a target time series dataset, a related time series dataset, and an item metadata dataset
- F. Upload them directly to Forecast from a local machine.
- G. Use a Jupyter notebook in Amazon SageMaker to transform the data into the optimized protobuf recordIO forma
- H. Upload the dataset in this format to Amazon S3.

**Answer: A**

#### Explanation:

<https://docs.aws.amazon.com/forecast/latest/dg/dataset-import-guidelines-troubleshooting.html>

#### NEW QUESTION 173

A machine learning specialist is developing a proof of concept for government users whose primary concern is security. The specialist is using Amazon SageMaker to train a convolutional neural network (CNN) model for a photo classifier application. The specialist wants to protect the data so that it cannot be accessed and transferred to a remote host by malicious code accidentally installed on the training container.

Which action will provide the MOST secure protection?

- A. Remove Amazon S3 access permissions from the SageMaker execution role.
- B. Encrypt the weights of the CNN model.
- C. Encrypt the training and validation dataset.
- D. Enable network isolation for training jobs.

**Answer: D**

#### NEW QUESTION 175

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 179

A Machine Learning Specialist is working for an online retailer that wants to run analytics on every customer visit, processed through a machine learning pipeline. The data needs to be ingested by Amazon Kinesis Data Streams at up to 100 transactions per second, and the JSON data blob is 100 KB in size. What is the MINIMUM number of shards in Kinesis Data Streams the Specialist should use to successfully ingest this data?

- A. 1 shards
- B. 10 shards
- C. 100 shards
- D. 1,000 shards

**Answer:** B

#### NEW QUESTION 181

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 use?

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

**Answer:** D

#### NEW QUESTION 185

A Machine Learning Specialist wants to determine the appropriate SageMakerVariant Invocations Per Instance setting for an endpoint automatic scaling configuration. The Specialist has performed a load test on a single instance and determined that peak requests per second (RPS) without service degradation is about 20 RPS. As this is the first deployment, the Specialist intends to set the invocation safety factor to 0.5. Based on the stated parameters and given that the invocations per instance setting is measured on a per-minute basis, what should the Specialist set as the sageMakervariantinvocationsPerinstance setting?

- A. 10
- B. 30
- C. 600
- D. 2,400

**Answer:** C

#### NEW QUESTION 186

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 ECR
- 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 188

A data scientist uses an Amazon SageMaker notebook instance to conduct data exploration and analysis. This requires certain Python packages that are not natively available on Amazon SageMaker to be installed on the notebook instance. How can a machine learning specialist ensure that required packages are automatically available on the notebook instance for the data scientist to use?

- A. Install AWS Systems Manager Agent on the underlying Amazon EC2 instance and use Systems Manager Automation to execute the package installation commands.

- B. Create a Jupyter notebook file (.ipynb) with cells containing the package installation commands to execute and place the file under the /etc/init directory of each Amazon SageMaker notebook instance.
- C. Use the conda package manager from within the Jupyter notebook console to apply the necessary conda packages to the default kernel of the notebook.
- D. Create an Amazon SageMaker lifecycle configuration with package installation commands and assign the lifecycle configuration to the notebook instance.

**Answer:** D

**Explanation:**

<https://docs.aws.amazon.com/sagemaker/latest/dg/nbi-add-external.html>

#### NEW QUESTION 191

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 193

A Machine Learning Specialist is designing a scalable data storage solution for Amazon SageMaker. There is an existing TensorFlow-based model implemented as a train.py script that relies on static training data that is currently stored as TFRecords.

Which method of providing training data to Amazon SageMaker would meet the business requirements with the LEAST development overhead?

- A. Use Amazon SageMaker script mode and use train.py unchanged
- B. Point the Amazon SageMaker training invocation to the local path of the data without reformatting the training data.
- C. Use Amazon SageMaker script mode and use train.py unchanged
- D. Put the TFRecord data into an Amazon S3 bucket
- E. Point the Amazon SageMaker training invocation to the S3 bucket without reformatting the training data.
- F. Rewrite the train.py script to add a section that converts TFRecords to protobuf and ingests the protobuf data instead of TFRecords.
- G. Prepare the data in the format accepted by Amazon SageMaker
- H. Use AWS Glue or AWS Lambda to reformat and store the data in an Amazon S3 bucket.

**Answer:** B

**Explanation:**

<https://github.com/aws-samples/amazon-sagemaker-script-mode/blob/master/tf-horovod-inference-pipeline/train>

#### NEW QUESTION 195

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

What should the company do to reduce the processing time of loan applications?

- A. Configure Amazon Textract to route low-confidence predictions to Amazon SageMaker Ground Truth. Perform a manual review on those words before performing a business validation.
- B. Use an Amazon Textract synchronous operation instead of an asynchronous operation.
- C. Configure Amazon Textract to route low-confidence predictions to Amazon Augmented AI (AmazonA2I). Perform a manual review on those words before performing a business validation.
- D. Use Amazon Rekognition's feature to detect text in an image to extract the data from scanned images. Use this information to process the loan applications.

**Answer:** C

#### NEW QUESTION 197

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 198

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 do?

- 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 CreateTrainingJob request body

**Answer: B**

#### NEW QUESTION 202

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 jo
- 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 204

A Machine Learning Specialist is required to build a supervised image-recognition model to identify a cat. The ML Specialist performs some tests and records the following results for a neural network-based image classifier:

Total number of images available = 1,000 Test set images = 100 (constant test set)

The ML Specialist notices that, in over 75% of the misclassified images, the cats were held upside down by their owners.

Which techniques can be used by the ML Specialist to improve this specific test error?

- A. Increase the training data by adding variation in rotation for training images.
- B. Increase the number of epochs for model training.
- C. Increase the number of layers for the neural network.
- D. Increase the dropout rate for the second-to-last layer.

**Answer: A**

#### NEW QUESTION 209

A Machine Learning Specialist is planning to create a long-running Amazon EMR cluster. The EMR cluster will have 1 master node, 10 core nodes, and 20 task nodes. To save on costs, the Specialist will use Spot Instances in the EMR cluster.

Which nodes should the Specialist launch on Spot Instances?

- A. Master node
- B. Any of the core nodes
- C. Any of the task nodes
- D. Both core and task nodes

**Answer: A**

#### NEW QUESTION 212

For the given confusion matrix, what is the recall and precision of the model?

|           |     | Actual |    |
|-----------|-----|--------|----|
|           |     | Yes    | No |
| Predicted | Yes | 12     | 3  |
|           | No  | 1      | 9  |

- A. Recall = 0.92 Precision = 0.84
- B. Recall = 0.84 Precision = 0.8

- C. Recall = 0.92 Precision = 0.8
- D. Recall = 0.8 Precision = 0.92

**Answer:** C

#### NEW QUESTION 214

A city wants to monitor its air quality to address the consequences of air pollution. A Machine Learning Specialist needs to forecast the air quality in parts per million of contaminants for the next 2 days in the city. As this is a prototype, only daily data from the last year is available. Which model is MOST likely to provide the best results in Amazon SageMaker?

- A. Use the Amazon SageMaker k-Nearest-Neighbors (kNN) algorithm on the single time series consisting of the full year of data with a predictor\_type of regressor.
- B. Use Amazon SageMaker Random Cut Forest (RCF) on the single time series consisting of the full year of data.
- C. Use the Amazon SageMaker Linear Learner algorithm on the single time series consisting of the full year of data with a predictor\_type of regressor.
- D. Use the Amazon SageMaker Linear Learner algorithm on the single time series consisting of the full year of data with a predictor\_type of classifier.

**Answer:** C

#### NEW QUESTION 219

A Machine Learning Specialist is working with multiple data sources containing billions of records that need to be joined. What feature engineering and model development approach should the Specialist take with a dataset this large?

- A. Use an Amazon SageMaker notebook for both feature engineering and model development.
- B. Use an Amazon SageMaker notebook for feature engineering and Amazon ML for model development.
- C. Use Amazon EMR for feature engineering and Amazon SageMaker SDK for model development.
- D. Use Amazon ML for both feature engineering and model development.

**Answer:** B

#### NEW QUESTION 224

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