

Introduction to TensorFlow 2.0

Quiz Question Answers

Introduction to TensorFlow

Question 1

Which of the following statements is true of TensorFlow?

*D: TensorFlow is a scalable and multi platform programming interface for implementing and running machine learning algorithms, including convenience wrappers for deep learning.

Question 2

A tensor is an n-dimensional array of data. Its dimension determines its rank.

*A: True

Question 3

How does TensorFlow represent numeric computations?

*A: Using a Directed Acyclic Graph (or DAG)

Question 4

How can we improve the calculation speed in TensorFlow, without losing accuracy?

*A: Using GPU

API Hierarchy

Question 1

Which are useful components when building custom Neural Network models?

- A: tf.losses
- B: tf.metrics
- C: tf.optimizers
- *D: All of the above.

Question 2

Which processing units can you run TensorFlow?

- A: CPU
- B: GPU
- C: TPU
- *D: All of the above

Question 3

Which high level APIs are used for distributed training?

- A: tf.estimator
- B: tf.keras
- C: tf.data
- *D: All of the above

Question 4

You need to build a custom machine learning model. What are your options?

B: We can use an estimator.

C: We can use a high-level API such as Keras.

*D: Both B and C

Question 5

Which of the following API's are not used in the TensorFlow abstraction layers?

*D: tf.image

Question 6

Which API is used to build performant, complex input pipelines from simple, re-usable pieces that will feed your model's training or evaluation loops.

*B: tf.data.Dataset

Tensors and Variables

Question 1

What operations can be performed on tensors?

A: They can be reshaped

B: They can be sliced

*C: Both A and B

Question 2

Which is an example of a rank 2 tensor?

*A: Shape: [3,4]

Question 3

Which of the following is true when we compute a loss gradient?

A: TensorFlow records all operations executed inside the context of a `tf.GradientTape` onto a tape.

B: It uses tape and the gradients associated with each recorded operation to compute the gradients.

C: The computed gradient of a recorded computation will be used in reverse mode differentiation.

*D: All of the above

Question 4

Which of the following produces tensors that can be modified?

*B: `tf.variable`

Question 5

What is the significance of `tf.Variable()`?

*A: `Atf.Variable` represents a tensor whose value can be changed by running ops on it. Specific ops allow you to read and modify the values of this tensor. Higher level libraries like `tf.keras` use `tf.Variable` to store model parameters.

Getting the data ready for model training

Question 1

Which is true regarding feature columns?

*C: Feature columns describe how the model should use raw input data from your features dictionary.

Question 2

Please select all TRUE statements. Note that an answer may be deemed "partially correct" but true.

A: A bucketized column helps with discretizing continuous feature values.

B: Feature columns describe how the model should use raw input data from your features dictionary.

C: A feature column provides methods for the input data to be properly transformed before sending it to a model for training.

*D: All of the above

Question 3

In the video example, property type is listed as a _____.

*B: String

Training on Large Datasets with tf.data API

Question 1

What are distinct ways to create a dataset?

A: A data source constructs a Dataset from data stored in memory or in one or more files.

B: A data transformation constructs a dataset from one or more tf.data.Dataset objects.

*C: Both A and B

Question 2

Which dataset is used to instantiate a Dataset object which is comprised of lines from one or more text files?

*A: TextLineDataset

Question 3

The _____ format is a simple format for storing a sequence of binary records. Using _____ can be useful for standardizing input data and optimizing performance.

*B: TFRecordDataset

Question 4

The dataset object which has fixed-length records from one or more binary files?

*B: FixedLengthRecordDataset

Question 5

Which method is invoked on the dataset - which triggers creation and execution of two operations?

*D: iter

Question 6

From_tensors() combines the input and returns a dataset with a separate element while from_tensor_slices() creates a dataset with a single element for each row of the input tensor?

*B: False

Question 7

Which of the following are primary purposes of Neural Network embeddings?

A: Finding nearest neighbors in the embedding space. These can be used to make recommendations based on user interests or cluster categories.

B: As input to a machine learning model for a supervised task.

C: For visualization of concepts and relations between categories.

*D: All of the above

Design and Build Input Data Pipeline

Question 1

Which of the following is a type of feature column?

A: Categorical feature column

B: Bucketized feature column

C: Crossed feature column

*D: All of the above

Question 2

In the training phase of ML, which component is not a part of the training phase?

*C: Served Model

Question 3

What are the multiple ways to feed TensorFlow models with data?

A: TextLineDataset

B: TFRecordDataset

C: FixedLengthRecordDataset

*D: All of the above

Question 4

What is the role of the tf.data API in TensorFlow?

*B: It enables you to build complex input pipelines from simple, reusable pieces.

Question 5

Which components are part of the ML pipeline?

A: Data Extraction

B: Data Analysis

C: Data Exploration

*D: All of the above

Activation Functions

Question 1

Non-linearity helps in training your data at a much faster rate and with more accuracy without the loss of your important information?

*A: True

Question 2

The activation function which is linear in the positive domain and the function is 0 in the negative domain?

*C: ReLU

Question 3

During the training process, each additional layer in your network can successively reduce signal vs. noise. How can we fix this?

*B: Use non-saturating, nonlinear activation functions such as ReLUs.

Question 4

How can we solve the problem called internal covariate shift?

*A: Batch normalization

Question 5

How can we stop ReLU layers from dying?

*D: Lower your learning rates

Neural Networks with TF2 and Keras

Question 1

Which model is appropriate for a plain stack of layers ?

*B: Sequential

Question 2

How does Adam (optimization algorithm) help in compiling the Keras model?

A: By updating network weights iteratively based on training data.

B: By diagonal rescaling of the gradients.

*C: Both A & B

Question 3

The predict function in the tf.keras API returns what?

*A: Numpy array(s) of predictions

Question 4

What are the parameters involved while compiling the Keras model?

A: Optimizer

B: Loss function

C: Evaluation metrics

*D: All of the above.

Question 5

What is the significance of the Fit method while training a Keras model ?

*B: Defines the number of epochs

Question 6

What are the weaknesses of the Keras Functional API?

A: It doesn't support dynamic architectures. The Functional API treats models as DAGs of layers. This is true for most deep learning architectures, but not all: for instance, recursive networks or Tree RNNs do not follow this assumption and cannot be implemented in the Functional API.

B: Sometimes we have to write from scratch and need to build subclasses. When writing advanced architectures, you may want to do things that are outside the scope of "defining a DAG of layers": for instance, you may want to expose multiple custom training and inference methods on your model instance. This requires subclassing.

*C: Both A & B

The Keras Functional API

Question 1

Select the correct statement regarding the Keras Functional API.

*B: Unlike the Keras Sequential API, we have to provide the shape of the input to the model.

Question 2

The Keras Functional API can be characterized by having:

*A: Multiple inputs and outputs and models with shared layers.

Question 3

Select the correct statement regarding the Keras Sequential and Functional API's.

*C: The core data structure of Keras is a model, which let us organize and design layers. Sequential and Functional are two ways to build Keras models. The Sequential model is the simplest type of model (a linear stock of layers). If we need to build arbitrary graphs of layers, the Keras Functional API can do that for us.

Question 4

Which of the following is correct regarding the Keras Functional API?

*A: The input layer needs to have shape(p,) where p is the number of rows in your training matrix. For example:

```
inputs = Input(shape=(3,))
```

Regularization

Question 1

The activations in regularization is scaled by which of the following ?

*B: $1 / (1 - \text{dropout probability})$

Question 2

How does regularization help build generalizable models ?

*A: By adding dropout layers to our neural networks.

Question 3

The L2 regularization provides which of the following?

*C: It adds a sum of the squared parameter weights term to the loss function.

Question 4

Which of the following statements is true?

*A: L2 regularization will keep the weight values smaller and L1 regularization will make the model sparser by dropping poor features.

Question 5

Which is an approximate equivalent of L2 regularization?

*C: Early Stopping

Serving Models in the Cloud

Question 1

Choose the correct workflow to serve your model in the cloud.

*B: Create the model --> train and evaluate your model --> save your model --> serve your model

Question 2

Which statement is true?

*A: To serve our model for others to use, we export the model file and deploy the model as a service.

Question 3

Which statement is true?

*C: (EXPORT_PATH) is the directory in which to write the SavedModel.

Question 4

Which of the following statements is true?

*A: SavedModel is a universal serialization format for TensorFlow models. SavedModel provides a "language neutral format" to save your machine learning models that is both recoverable and hermetic.

Course Summary

Question 1

The Keras Functional API provides which of the following?

A: It allows you to define multiple input or output models.

B: It allows you to define ad hoc acyclic network graphs.

C: It allows you to define a model that shares layers.

*D: All of the above

Question 2

Which statement is correct?

*A: In the Keras Functional API, models are created by specifying their inputs and outputs in a graph of layers. That means that a single graph of layers can be used to generate multiple models.

Question 3

What is TensorFlow Data Validation?

*B: It is a tool that can be used to analyze data to find potential problems in data.

Question 4

How to Input Feature Columns to a Keras Model?

*A: We can use a DenseFeatures layer to input them to a Keras model.

Question 5

When is the Keras Sequential model not appropriate?

A: Your model has multiple inputs or multiple outputs.

B: Any of your layers has multiple inputs or multiple outputs.

C: You need to do layer sharing or non-linear topology.

*D: All of the above