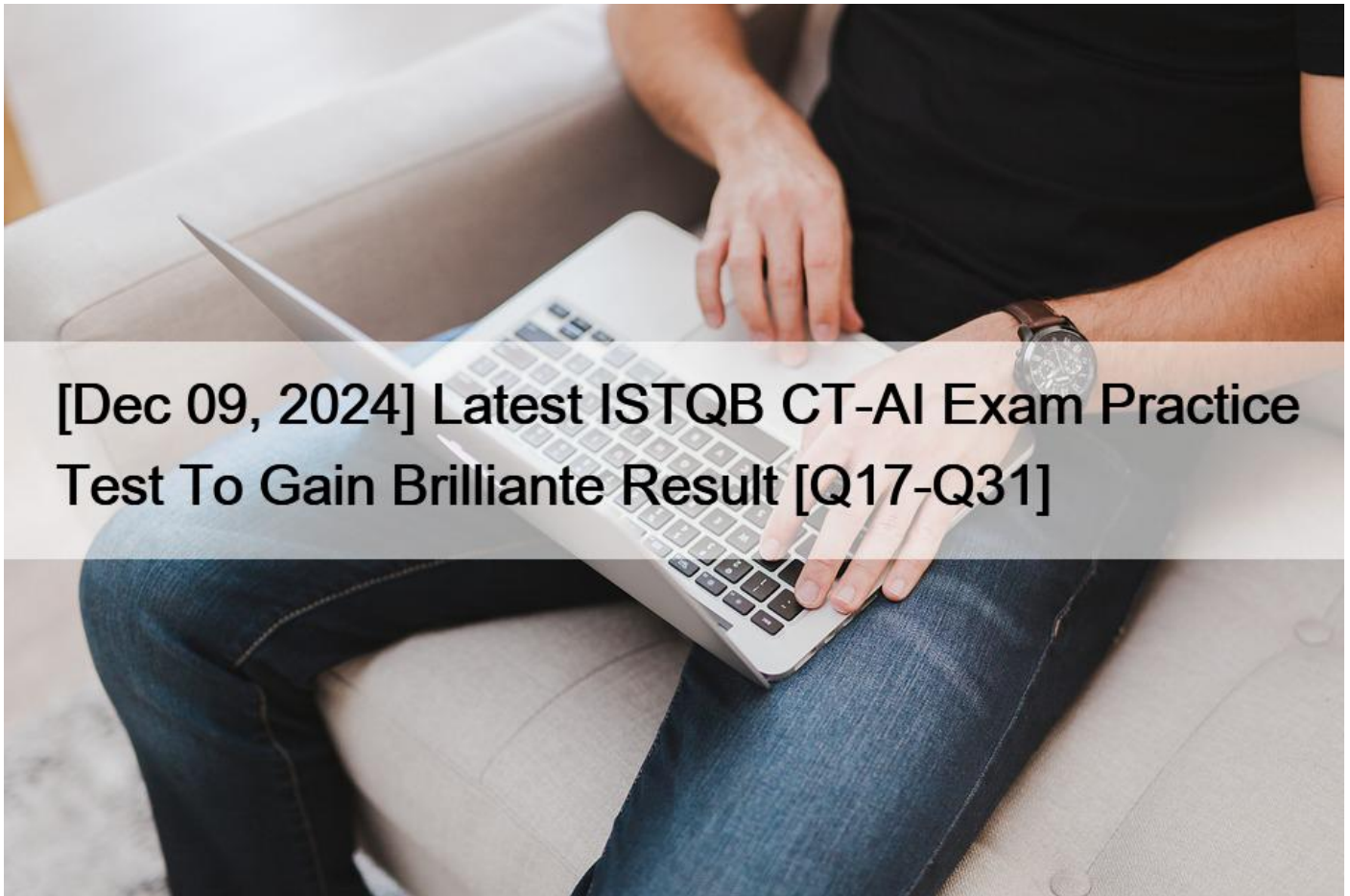


## [Dec 09, 2024] Latest ISTQB CT-AI Exam Practice Test To Gain Brilliant Result [Q17-Q31]



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### QUESTION 17

In a certain coffee producing region of Colombia, there have been some severe weather storms, resulting in massive losses in production. This caused a massive drop in stock price of coffee.

Which ONE of the following types of testing SHOULD be performed for a machine learning model for stock-price prediction to detect influence of such phenomenon as above on price of coffee stock.

SELECT ONE OPTION

- \* Testing for accuracy
- \* Testing for bias
- \* Testing for concept drift
- \* Testing for security
- \* Type of Testing for Stock-Price Prediction Models: Concept drift refers to the change in the statistical properties of the target

variable over time. Severe weather storms causing massive losses in coffee production and affecting stock prices would require testing for concept drift to ensure that the model adapts to new patterns in data over time.

\* Reference: ISTQB\_CT-AI\_Syllabus\_v1.0, Section 7.6 Testing for Concept Drift, which explains the need to test for concept drift in models that might be affected by changing external factors.

## QUESTION 18

BioSearch is creating an AI model used for predicting cancer occurrence via examining X-Ray images. The accuracy of the model in isolation has been found to be good. However, the users of the model started complaining of the poor quality of results, especially inability to detect real cancer cases, when put to practice in the diagnosis lab, leading to stopping of the usage of the model.

A testing expert was called in to find the deficiencies in the test planning which led to the above scenario.

Which ONE of the following options would you expect to MOST likely be the reason to be discovered by the test expert?

### SELECT ONE OPTION

- \* A lack of similarity between the training and testing data.
- \* The input data has not been tested for quality prior to use for testing.
- \* A lack of focus on choosing the right functional-performance metrics.
- \* A lack of focus on non-functional requirements testing.

The question asks which deficiency is most likely to be discovered by the test expert given the scenario of poor real-world performance despite good isolated accuracy.

A lack of similarity between the training and testing data (A): This is a common issue in ML where the model performs well on training data but poorly on real-world data due to a lack of representativeness in the training data. This leads to poor generalization to new, unseen data.

The input data has not been tested for quality prior to use for testing (B): While data quality is important, this option is less likely to be the primary reason for the described issue compared to the representativeness of training data.

A lack of focus on choosing the right functional-performance metrics (C): Proper metrics are crucial, but the issue described seems more related to the data mismatch rather than metric selection.

A lack of focus on non-functional requirements testing (D): Non-functional requirements are important, but the scenario specifically mentions issues with detecting real cancer cases, pointing more towards data issues.

Reference:

ISTQB CT-AI Syllabus Section 4.2 on Training, Validation, and Test Datasets emphasizes the importance of using representative datasets to ensure the model generalizes well to real-world data.

Sample Exam Questions document, Question #40 addresses issues related to data representativeness and model generalization.

## QUESTION 19

Data used for an object detection ML system was found to have been labelled incorrectly in many cases.

Which ONE of the following options is most likely the reason for this problem?

#### SELECT ONE OPTION

- \* Security issues
- \* Accuracy issues
- \* Privacy issues
- \* Bias issues

The question refers to a problem where data used for an object detection ML system was labelled incorrectly. This issue is most closely related to accuracy issues. Here's a detailed explanation:

**Accuracy Issues:** The primary goal of labeling data in machine learning is to ensure that the model can accurately learn and make predictions based on the given labels. Incorrectly labeled data directly impacts the model's accuracy, leading to poor performance because the model learns incorrect patterns.

**Why Not Other Options:**

**Security Issues:** This pertains to data breaches or unauthorized access, which is not relevant to the problem of incorrect data labeling.

**Privacy Issues:** This concerns the protection of personal data and is not related to the accuracy of data labeling.

**Bias Issues:** While bias in data can affect model performance, it specifically refers to systematic errors or prejudices in the data rather than outright incorrect labeling.

#### QUESTION 20

Which ONE of the following statements correctly describes the importance of flexibility for AI systems?

#### SELECT ONE OPTION

- \* AI systems are inherently flexible.
- \* AI systems require changing of operational environments; therefore, flexibility is required.
- \* Flexible AI systems allow for easier modification of the system as a whole.
- \* Self-learning systems are expected to deal with new situations without explicitly having to program for it.

Flexibility in AI systems is crucial for various reasons, particularly because it allows for easier modification and adaptation of the system as a whole.

**AI systems are inherently flexible (A):** This statement is not correct. While some AI systems may be designed to be flexible, they are not inherently flexible by nature. Flexibility depends on the system's design and implementation.

**AI systems require changing operational environments; therefore, flexibility is required (B):** While it's true that AI systems may need to operate in changing environments, this statement does not directly address the importance of flexibility for the modification of the system.

**Flexible AI systems allow for easier modification of the system as a whole (C):** This statement correctly describes the importance of flexibility. Being able to modify AI systems easily is critical for their maintenance, adaptation to new requirements, and improvement.

**Self-learning systems are expected to deal with new situations without explicitly having to program for it (D):** This statement relates to the adaptability of self-learning systems rather than their overall flexibility for modification.

Hence, the correct answer is C. Flexible AI systems allow for easier modification of the system as a whole.

Reference:

ISTQB CT-AI Syllabus Section 2.1 on Flexibility and Adaptability discusses the importance of flexibility in AI systems and how it enables easier modification and adaptability to new situations.

Sample Exam Questions document, Question #30 highlights the importance of flexibility in AI systems.

## QUESTION 21

A system was developed for screening the X-rays of patients for potential malignancy detection (skin cancer). A workflow system has been developed to screen multiple cancers by using several individually trained ML models chained together in the workflow.

Testing the pipeline could involve multiple kind of tests (I &#8211; III):

- I . Pairwise testing of combinations
- II . Testing each individual model for accuracy
- III . A/B testing of different sequences of models

Which ONE of the following options contains the kinds of tests that would be MOST APPROPRIATE to include in the strategy for optimal detection?

SELECT ONE OPTION

- \* Only III
- \* I and II
- \* I and III
- \* Only II

The question asks which combination of tests would be most appropriate to include in the strategy for optimal detection in a workflow system using multiple ML models.

Pairwise testing of combinations (I): This method is useful for testing interactions between different components in the workflow to ensure they work well together, identifying potential issues in the integration.

Testing each individual model for accuracy (II): Ensuring that each model in the workflow performs accurately on its own is crucial before integrating them into a combined workflow.

A/B testing of different sequences of models (III): This involves comparing different sequences to determine which configuration yields the best results. While useful, it might not be as fundamental as pairwise and individual accuracy testing in the initial stages.

Reference:

ISTQB CT-AI Syllabus Section 9.2 on Pairwise Testing and Section 9.3 on Testing ML Models emphasize the importance of testing interactions and individual model accuracy in complex ML workflows.

## QUESTION 22

Which ONE of the following options describes a scenario of A/B testing the LEAST?

SELECT ONE OPTION

- \* A comparison of two different websites for the same company to observe from a user acceptance perspective.
- \* A comparison of two different offers in a recommendation system to decide on the more effective offer for same users.
- \* A comparison of the performance of an ML system on two different input datasets.
- \* A comparison of the performance of two different ML implementations on the same input data.

A/B testing, also known as split testing, is a method used to compare two versions of a product or system to determine which one performs better. It is widely used in web development, marketing, and machine learning to optimize user experiences and model performance. Here's why option C is the least descriptive of an A/B testing scenario:

Understanding A/B Testing:

In A/B testing, two versions (A and B) of a system or feature are tested against each other. The objective is to measure which version performs better based on predefined metrics such as user engagement, conversion rates, or other performance indicators.

Application in Machine Learning:

In ML systems, A/B testing might involve comparing two different models, algorithms, or system configurations on the same set of data to observe which yields better results.

Why Option C is the Least Descriptive:

Option C describes comparing the performance of an ML system on two different input datasets. This scenario focuses on the input data variation rather than the comparison of system versions or features, which is the essence of A/B testing. A/B testing typically involves a controlled experiment with two versions being tested under the same conditions, not different datasets.

Clarifying the Other Options:

A . A comparison of two different websites for the same company to observe from a user acceptance perspective: This is a classic example of A/B testing where two versions of a website are compared.

B . A comparison of two different offers in a recommendation system to decide on the more effective offer for the same users: This is another example of A/B testing in a recommendation system.

D . A comparison of the performance of two different ML implementations on the same input data: This fits the A/B testing model where two implementations are compared under the same conditions.

Reference:

ISTQB CT-AI Syllabus, Section 9.4, A/B Testing, explains the methodology and application of A/B testing in various contexts.

&#8220;Understanding A/B Testing&#8221; (ISTQB CT-AI Syllabus).

## QUESTION 23

Which ONE of the following describes a situation of back-to-back testing the LEAST?

SELECT ONE OPTION

- \* Comparison of the results of a current neural network model ML model implemented in platform A (for example Pytorch) with a similar neural network model ML model implemented in platform B (for example Tensorflow), for the same data.
- \* Comparison of the results of a home-grown neural network model ML model with results in a neural network model implemented in a standard implementation (for example Pytorch) for same data

- \* Comparison of the results of a neural network ML model with a current decision tree ML model for the same data.
  - \* Comparison of the results of the current neural network ML model on the current data set with a slightly modified data set.
- Back-to-back testing is a method where the same set of tests are run on multiple implementations of the system to compare their outputs. This type of testing is typically used to ensure consistency and correctness by comparing the outputs of different implementations under identical conditions. Let's analyze the options given:

A . Comparison of the results of a current neural network model ML model implemented in platform A (for example Pytorch) with a similar neural network model ML model implemented in platform B (for example Tensorflow), for the same data.

This option describes a scenario where two different implementations of the same type of model are being compared using the same dataset. This is a typical back-to-back testing situation.

B . Comparison of the results of a home-grown neural network model ML model with results in a neural network model implemented in a standard implementation (for example Pytorch) for the same data.

This option involves comparing a custom implementation with a standard implementation, which is also a typical back-to-back testing scenario to validate the custom model against a known benchmark.

C . Comparison of the results of a neural network ML model with a current decision tree ML model for the same data.

This option involves comparing two different types of models (a neural network and a decision tree). This is not a typical scenario for back-to-back testing because the models are inherently different and would not be expected to produce identical results even on the same data.

D . Comparison of the results of the current neural network ML model on the current data set with a slightly modified data set.

This option involves comparing the outputs of the same model on slightly different datasets. This could be seen as a form of robustness testing or sensitivity analysis, but not typical back-to-back testing as it doesn't involve comparing multiple implementations.

Based on this analysis, option C is the one that describes a situation of back-to-back testing the least because it compares two fundamentally different models, which is not the intent of back-to-back testing.

## QUESTION 24

Which ONE of the following characteristics is the least likely to cause safety related issues for an AI system?

SELECT ONE OPTION

- \* Non-determinism
- \* Robustness
- \* High complexity
- \* Self-learning

The question asks which characteristic is least likely to cause safety-related issues for an AI system. Let's evaluate each option:

Non-determinism (A): Non-deterministic systems can produce different outcomes even with the same inputs, which can lead to unpredictable behavior and potential safety issues.

Robustness (B): Robustness refers to the ability of the system to handle errors, anomalies, and unexpected inputs gracefully. A robust system is less likely to cause safety issues because it can maintain functionality under varied conditions.



High complexity (C): High complexity in AI systems can lead to difficulties in understanding, predicting, and managing the system's behavior, which can cause safety-related issues.

Self-learning (D): Self-learning systems adapt based on new data, which can lead to unexpected changes in behavior. If not properly monitored and controlled, this can result in safety issues.

Reference:

ISTQB CT-AI Syllabus Section 2.8 on Safety and AI discusses various factors affecting the safety of AI systems, emphasizing the importance of robustness in maintaining safe operation.

### QUESTION 25

Which ONE of the following types of coverage SHOULD be used if test cases need to cause each neuron to achieve both positive and negative activation values?

SELECT ONE OPTION

- \* Value coverage
- \* Threshold coverage
- \* Sign change coverage
- \* Neuron coverage
- \* Coverage for Neuron Activation Values: Sign change coverage is used to ensure that test cases cause each neuron to achieve both positive and negative activation values. This type of coverage ensures that the neurons are thoroughly tested under different activation states.

\* Reference: ISTQB\_CT-AI\_Syllabus\_v1.0, Section 6.2 Coverage Measures for Neural Networks, which details different types of coverage measures, including sign change coverage.

### QUESTION 26

Which ONE of the following tests is LEAST likely to be performed during the ML model testing phase?

SELECT ONE OPTION

- \* Testing the accuracy of the classification model.
- \* Testing the API of the service powered by the ML model.
- \* Testing the speed of the training of the model.
- \* Testing the speed of the prediction by the model.

The question asks which test is least likely to be performed during the ML model testing phase. Let's consider each option:

Testing the accuracy of the classification model (A): Accuracy testing is a fundamental part of the ML model testing phase. It ensures that the model correctly classifies the data as intended and meets the required performance metrics.

Testing the API of the service powered by the ML model (B): Testing the API is crucial, especially if the ML model is deployed as part of a service. This ensures that the service integrates well with other systems and that the API performs as expected.

Testing the speed of the training of the model (C): This is least likely to be part of the ML model testing phase. The speed of training is more relevant during the development phase when optimizing and tuning the model. During testing, the focus is more on the model's performance and behavior rather than how quickly it was trained.

Testing the speed of the prediction by the model (D): Testing the speed of prediction is important to ensure that the model meets performance requirements in a production environment, especially for real-time applications.

Reference:

ISTQB CT-AI Syllabus Section 3.2 on ML Workflow and Section 5 on ML Functional Performance Metrics discuss the focus of testing during the model testing phase, which includes accuracy and prediction speed but not the training speed.

### QUESTION 27

A software component uses machine learning to recognize the digits from a scan of handwritten numbers. In the scenario above, which type of Machine Learning (ML) is this an example of?

SELECT ONE OPTION

- \* Reinforcement learning
- \* Regression
- \* Classification
- \* Clustering

Recognizing digits from a scan of handwritten numbers using machine learning is an example of classification. Here's a breakdown:

**Classification:** This type of machine learning involves categorizing input data into predefined classes. In this scenario, the input data (handwritten digits) are classified into one of the 10 digit classes (0-9).

**Why Not Other Options:**

**Reinforcement Learning:** This involves learning by interacting with an environment to achieve a goal, which does not fit the problem of recognizing digits.

**Regression:** This is used for predicting continuous values, not discrete categories like digit recognition.

**Clustering:** This involves grouping similar data points together without predefined classes, which is not the case here.

### QUESTION 28

Which ONE of the following options BEST DESCRIBES clustering?

SELECT ONE OPTION

- \* Clustering is classification of a continuous quantity.
- \* Clustering is supervised learning.
- \* Clustering is done without prior knowledge of output classes.
- \* Clustering requires you to know the classes.

Clustering is a type of machine learning technique used to group similar data points into clusters. It is a key concept in unsupervised learning, where the algorithm tries to find patterns or groupings in data without prior knowledge of output classes. Let's analyze each option:

A . Clustering is classification of a continuous quantity.

This is incorrect. Classification typically involves discrete categories, whereas clustering involves grouping similar data points. Classification of continuous quantities is generally referred to as regression.



B . Clustering is supervised learning.

This is incorrect. Clustering is an unsupervised learning technique because it does not rely on labeled data.

C . Clustering is done without prior knowledge of output classes.

This is correct. In clustering, the algorithm groups data points into clusters without any prior knowledge of the classes. It discovers the inherent structure in the data.

D . Clustering requires you to know the classes.

This is incorrect. Clustering does not require prior knowledge of classes. Instead, it aims to identify and form the classes or groups based on the data itself.

Therefore, the correct answer is C because clustering is an unsupervised learning technique done without prior knowledge of output classes.

## QUESTION 29

An image classification system is being trained for classifying faces of humans. The distribution of the data is 70% ethnicity A and 30% for ethnicities B, C and D. Based ONLY on the above information, which of the following options BEST describes the situation of this image classification system?

### SELECT ONE OPTION

- \* This is an example of expert system bias.
  - \* This is an example of sample bias.
  - \* This is an example of hyperparameter bias.
  - \* This is an example of algorithmic bias.
- A . This is an example of expert system bias.

Expert system bias refers to bias introduced by the rules or logic defined by experts in the system, not by the data distribution.

B . This is an example of sample bias.

Sample bias occurs when the training data is not representative of the overall population that the model will encounter in practice. In this case, the over-representation of ethnicity A (70%) compared to B, C, and D (30%) creates a sample bias, as the model may become biased towards better performance on ethnicity A.

C . This is an example of hyperparameter bias.

Hyperparameter bias relates to the settings and configurations used during the training process, not the data distribution itself.

D . This is an example of algorithmic bias.

Algorithmic bias refers to biases introduced by the algorithmic processes and decision-making rules, not directly by the distribution of training data.

Based on the provided information, option B (sample bias) best describes the situation because the training data is skewed towards ethnicity A, potentially leading to biased model performance.

### QUESTION 30

Which ONE of the following options does NOT describe an AI technology related characteristic which differentiates AI test environments from other test environments?

#### SELECT ONE OPTION

- \* Challenges resulting from low accuracy of the models.
- \* The challenge of mimicking undefined scenarios generated due to self-learning
- \* The challenge of providing explainability to the decisions made by the system.
- \* Challenges in the creation of scenarios of human handover for autonomous systems.

AI test environments have several unique characteristics that differentiate them from traditional test environments. Let's evaluate each option:

A . Challenges resulting from low accuracy of the models.

Low accuracy is a common challenge in AI systems, especially during initial development and training phases. Ensuring the model performs accurately in varied and unpredictable scenarios is a critical aspect of AI testing.

B . The challenge of mimicking undefined scenarios generated due to self-learning.

AI systems, particularly those that involve machine learning, can generate undefined or unexpected scenarios due to their self-learning capabilities. Mimicking and testing these scenarios is a unique challenge in AI environments.

C . The challenge of providing explainability to the decisions made by the system.

Explainability, or the ability to understand and articulate how an AI system arrives at its decisions, is a significant and unique challenge in AI testing. This is crucial for trust and transparency in AI systems.

D . Challenges in the creation of scenarios of human handover for autonomous systems.

While important, the creation of scenarios for human handover in autonomous systems is not a characteristic unique to AI test environments. It is more related to the operational and deployment challenges of autonomous systems rather than the intrinsic technology-related characteristics of AI .

Given the above points, option D is the correct answer because it describes a challenge related to operational deployment rather than a technology-related characteristic unique to AI test environments.

### QUESTION 31

Arihant Meditation is a startup using AI to aid people in deeper and better meditation based on analysis of various factors such as time and duration of the meditation, pulse and blood pressure, EEG patterns etc. among others. Their model accuracy and other functional performance parameters have not yet reached their desired level.

Which ONE of the following factors is NOT a factor affecting the ML functional performance?

#### SELECT ONE OPTION

- \* The data pipeline
- \* The quality of the labeling
- \* Biased data

- \* The number of classes
- \* Factors Affecting ML Functional Performance: The data pipeline, quality of the labeling, and biased data are all factors that significantly affect the performance of machine learning models. The number of classes, while relevant for the model structure, is not a direct factor affecting the performance metrics such as accuracy or bias.
- \* Reference: ISTQB\_CT-AI\_Syllabus\_v1.0, Sections on Data Quality and its Effect on the ML Model and ML Functional Performance Metrics.

### ISTQB CT-AI Exam Syllabus Topics:

Topic Details

Topic 1- Introduction to AI: This exam section covers topics such as the AI effect and how it influences the definition of AI. It covers how to distinguish between narrow AI, general AI, and super AI; moreover, the topics covered include describing how standards apply to AI-based systems.

Topic 2- Methods and Techniques for the Testing of AI-Based Systems: In this section, the focus is on explaining how the testing of ML systems can help prevent adversarial attacks and data poisoning.

Topic 3- Test Environments for AI-Based Systems: This section is about factors that differentiate the test environments for AI-based

Topic 4- Testing AI-Specific Quality Characteristics: In this section, the topics covered are about the challenges in testing created by the self-learning of AI-based systems.

Topic 5- Quality Characteristics for AI-Based Systems: This section covers topics covered how to explain the importance of flexibility and adaptability as characteristics of AI-based systems and describes the vitality of managing evolution for AI-based systems. It also covers how to recall the characteristics that make it difficult to use AI-based systems in safety-related applications.

Topic 6- Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.

Topic 7- ML: Data: This section of the exam covers explaining the activities and challenges related to data preparation. It also covers how to test datasets create an ML model and recognize how poor data quality can cause problems with the resultant ML model.

Topic 8- Testing AI-Based Systems Overview: In this section, focus is given to how system specifications for AI-based systems can create challenges in testing and explain automation bias and how this affects testing.

Topic 9- Neural Networks and Testing: This section of the exam covers defining the structure and function of a neural network including a DNN and the different coverage measures for neural networks.

Topic 10- Machine Learning ML: This section includes the classification and regression as part of supervised learning, explaining the factors involved in the selection of ML algorithms, and demonstrating underfitting and overfitting.

Topic 11- ML Functional Performance Metrics: In this section, the topics covered include how to calculate the ML functional performance metrics from a given set of confusion matrices.

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