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## ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none"><li>Test Environments for AI-Based Systems: This section is about factors that differentiate the test environments for AI-based</li></ul>
Topic 2	<ul style="list-style-type: none"><li>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.</li></ul>
Topic 3	<ul style="list-style-type: none"><li>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.</li></ul>

Topic 4	<ul style="list-style-type: none"> <li>• systems from those required for conventional systems.</li> </ul>
Topic 5	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 6	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 7	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 8	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 9	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 10	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Topic 11	<ul style="list-style-type: none"> <li>• Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.</li> </ul>

## ISTQB Certified Tester AI Testing Exam Sample Questions (Q34-Q39):

### NEW QUESTION # 34

A local business has a mail pickup/delivery robot for their office. The robot currently uses a track to move between pickup/drop off locations. When it arrives at a destination, the robot stops to allow a human to remove or deposit mail.

The office has decided to upgrade the robot to include AI capabilities that allow the robot to perform its duties without a track, without running into obstacles, and without human intervention.

The test team is creating a list of new and previously established test objectives and acceptance criteria to be used in the testing of the robot upgrade. Which of the following test objectives will test an AI quality characteristic for this system?

- A. The robot must record the time of each delivery which is compiled into a report
- **B. The robot must evolve to optimize its routing**
- C. The robot must recharge for no more than six hours a day
- D. The robot must complete 99.99% of its deliveries each day

**Answer: B**

Explanation:

AI-based systems have specific quality characteristics, including evolution, autonomy, and adaptability. A test objective that evaluates whether an AI system evolves to improve performance over time directly aligns with AI quality characteristics.

Explanation of Answer Choices:

\* Option A: The robot must evolve to optimize its routing.

\* Correct. Evolution is an AI quality characteristic that ensures the system learns from past experiences and adapts to improve efficiency.

\* Option B: The robot must recharge for no more than six hours a day.

\* Incorrect. This is an operational constraint rather than an AI-specific quality characteristic.

\* Option C: The robot must record the time of each delivery which is compiled into a report.

\* Incorrect. Logging data does not relate to AI quality characteristics like adaptability or autonomy.

\* Option D: The robot must complete 99.99% of its deliveries each day.

\* Incorrect. This is a performance target rather than an AI quality characteristic.

ISTQB CT-AI Syllabus References:

\* Evolution as an AI Quality Characteristic: "Check how well the system learns from its own experience. Check how well the system copes when the profile of data changes (i.e., concept drift)".

Thus, Option A is the best choice as it directly tests an AI quality characteristic (evolution) in the upgraded autonomous robot.

### NEW QUESTION # 35

Pairwise testing can be used in the context of self-driving cars for controlling an explosion in the number of combinations of parameters.

Which ONE of the following options is LEAST likely to be a reason for this incredible growth of parameters?

SELECT ONE OPTION

- A. Different features like ADAS, Lane Change Assistance etc.
- B. Different weather conditions
- C. Different Road Types
- **D. ML model metrics to evaluate the functional performance**

**Answer: D**

Explanation:

Pairwise testing is used to handle the large number of combinations of parameters that can arise in complex systems like self-driving cars. The question asks which of the given options is least likely to be a reason for the explosion in the number of parameters.

\* Different Road Types (A): Self-driving cars must operate on various road types, such as highways, city streets, rural roads, etc. Each road type can have different characteristics, requiring the car's system to adapt and handle different scenarios. Thus, this is a significant factor contributing to the growth of parameters.

\* Different Weather Conditions (B): Weather conditions such as rain, snow, fog, and bright sunlight significantly affect the performance of self-driving cars. The car's sensors and algorithms must adapt to these varying conditions, which adds to the number of parameters that need to be considered.

\* ML Model Metrics to Evaluate Functional Performance (C): While evaluating machine learning (ML) model performance is crucial, it does not directly contribute to the explosion of parameter combinations in the same way that road types, weather conditions, and car features do. Metrics are used to measure and assess performance but are not themselves variable conditions that the system must handle.

\* Different Features like ADAS, Lane Change Assistance, etc. (D): Advanced Driver Assistance Systems (ADAS) and other features add complexity to self-driving cars. Each feature can have multiple settings and operational modes, contributing to the overall number of parameters.

Hence, the least likely reason for the incredible growth in the number of parameters is C. ML model metrics to evaluate the functional performance.

References:

\* ISTQB CT-AI Syllabus Section 9.2 on Pairwise Testing discusses the application of this technique to manage the combinations of different variables in AI-based systems, including those used in self-driving cars.

\* Sample Exam Questions document, Question #29 provides context for the explosion in parameter combinations in self-driving cars and highlights the use of pairwise testing as a method to manage this complexity.

### NEW QUESTION # 36

Which of the following is correct regarding the layers of a deep neural network?

- A. There must be a minimum of five total layers to be considered deep
- **B. There is at least one internal hidden layer**
- C. There is only an input and output layer
- D. The output layer is not connected with the other layers to maintain integrity

**Answer: B**

Explanation:

A deep neural network (DNN) is a type of artificial neural network that consists of multiple layers between the input and output layers. The ISTQB Certified Tester AI Testing (CT-AI) Syllabus outlines the following characteristics of a DNN:

\* Structure of a Deep Neural Network:

\* ADNN comprises at least three types of layers:

\* Input layer: Receives the input data.

\* Hidden layers: Perform complex feature extraction and transformations.

\* Output layer: Produces the final prediction or classification.

\* Analysis of Answer Choices:

\* A (Only input and output layers) # Incorrect, as a DNN must have at least one hidden layer.

- \* B (At least one internal hidden layer)# Correct, as a neural network must have hidden layers to be considered deep.
  - \* C (Minimum of five layers required)# Incorrect, as there is no strict definition that requires at least five layers.
  - \* D (Output layer is not connected to other layers)# Incorrect, as the output layer must be connected to the hidden layers.
- Thus, Option B is the correct answer, as a deep neural network must have at least one hidden layer.
- Certified Tester AI Testing Study Guide References:
- \* ISTQB CT-AI Syllabus v1.0, Section 6.1 (Neural Networks and Deep Neural Networks)
  - \* ISTQB CT-AI Syllabus v1.0, Section 6.2 (Structure of Deep Neural Networks).

### NEW QUESTION # 37

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 - 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

- **A. I and II**
- B. Only III
- C. I and III
- D. Only II

**Answer: A**

Explanation:

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.

References:

\* 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.

### NEW QUESTION # 38

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

**Answer: D**

Explanation:

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

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

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