

# CT-AI Testdump - CT-AI Books PDF



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## ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	<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 2	<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 3	<ul style="list-style-type: none"><li>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.</li></ul>
Topic 4	<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 5	<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 6	<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 7	<ul style="list-style-type: none"> <li>systems from those required for conventional systems.</li> </ul>
Topic 8	<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>

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### ISTQB Certified Tester AI Testing Exam Sample Questions (Q73-Q78):

#### NEW QUESTION # 73

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

SELECT ONE OPTION

- A. Robustness
- B. High complexity
- C. Self-learning
- D. Non-determinism

**Answer: A**

Explanation:

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.

References:

\* 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.

#### NEW QUESTION # 74

Which machine learning approach is most suitable for predicting customer purchase probability?

Choose ONE option (1 out of 4)

- A. Unsupervised learning
- B. Supervised learning (classification)
- C. Reinforcement learning
- D. Supervised learning (regression)

**Answer: B**

Explanation:

The ISTQB CT-AI syllabus explains in Section 1.6 - Machine Learning Approach that supervised learning is appropriate when labeled data exists and the goal is to predict an output based on known historical examples. Predicting a customer's purchase probability is a classification task when the output corresponds to discrete categories such as "likely to purchase" vs. "not likely to

purchase." The syllabus gives similar examples in describing classification as the process of assigning instances to predefined classes based on learned patterns in labeled data. Because the retail company wants to determine whether a customer will make a purchase based on marketing actions, classification is the most appropriate choice .

Option A (regression) predicts continuous numeric values and is less suitable because the task centers on categorical likelihood, not estimating exact monetary values. Option C (unsupervised learning) is used when labels are not available-here, the company has labeled purchase histories. Option D (reinforcement learning) requires an interactive environment with reward-driven behavior, which is not applicable to this scenario.

Thus, supervised learning (classification) is the most suitable approach according to the syllabus.

### NEW QUESTION # 75

Which of the following options is an example of the concept of overfitting?

Choose ONE option (1 out of 4)

- A. A model for predicting IT system failures delivers too many false-negative predictions because the failures cannot be adequately explained via the log files used for training.
- B. A previously trained model for recognizing cars is adapted and extended so that it can also identify the make of the car beyond its original function.
- C. A model for the recognition of dogs was trained predominantly with pictures of dogs in parks. On pictures with other animals in parks, dogs are also falsely recognized.
- D. A model for predicting academic performance was trained with data from students at one university.  
The model shows low predictive accuracy when applied to other universities.

**Answer: D**

Explanation:

The ISTQB CT-AI syllabus defines overfitting in Section 3.2 - ML Model Evaluation as a condition where an ML model learns the training data too precisely-including noise and irrelevant detail-resulting in poor performance on unseen data. Overfitting is characterized by high accuracy on training data but low accuracy on validation or real-world data. Option A perfectly matches this definition: a model trained only on one university's student data generalizes poorly to students from other universities. This is a textbook example of overfitting because the model has essentially memorized patterns unique to a narrow dataset, instead of learning generalizable relationships applicable across environments .

Option B instead describes sample bias or inadequate training diversity, not overfitting. Option C involves transfer learning or model extension, unrelated to overfitting. Option D indicates insufficient training data quality or lack of meaningful features, but not overfitting. Only Option A reflects the syllabus definition directly: overly specialized training leading to reduced predictive performance on new data.

Thus, A is the correct and syllabus-aligned example of overfitting.

### NEW QUESTION # 76

A transportation company operates three types of delivery vehicles in its fleet. The vehicles operate at different speeds (slow, medium, and fast). The transportation company is attempting to optimize scheduling and has created an AI-based program to plan routes for its vehicles using records from the medium-speed vehicle traveling to selected destinations. The test team uses this data in metamorphic testing to test the accuracy of the estimated travel times created by the AI route planner with the actual routes and times.

Which of the following describes the next phase of metamorphic testing?

- A. The team uses the same AI route planner to create routes that are longer and shorter but follow the same track. Finally, by driving the fast vehicles on the long routes and slow vehicles on the short routes and vice versa, the AI system will have enough information to infer travel times for all vehicles on all routes.
- B. The team tests the time required for the fast and slow vehicles to travel the same route as the medium vehicle. Then, by calculating the speed difference, they then predict how much faster or slower the vehicles will travel. That information is then used to verify that the arrival time of the vehicles meets the expected result.
- C. The team uses an AI system to select the most dissimilar routes. With this information, any of the AI routes can be metaphorically transformed into a fast or slow route.
- D. The team decomposes each route into the relevant components that affect the travel time such as traffic density and vehicle power. The team then uses statistical analysis to characterize the influence of each component to calculate the fast and slow vehicle route times.

**Answer: B**

#### Explanation:

Metamorphic Testing (MT) is a testing technique that verifies AI-based systems by generating follow-up test cases based on existing test cases. These follow-up test cases adhere to a Metamorphic Relation (MR), ensuring that if the system is functioning correctly, changes in input should result in predictable changes in output.

- \* Metamorphic testing works by transforming source test cases into follow-up test cases
- \* Here, the source test case involves testing the medium-speed vehicle's travel time.
- \* The follow-up test cases are derived by extrapolating travel times for fast and slow vehicles using predictable relationships based on speed differences.
- \* MR states that modifying input should result in a predictable change in output
- \* Since the speed of the vehicle is a known factor, it is possible to predict the new arrival times and verify whether they follow expected trends.
- \* This is a direct application of metamorphic testing principles
- \* In route optimization systems, metamorphic testing often applies transformations to speed, distance, or conditions to verify expected outcomes.
- \* (B) Decomposing each route into traffic density and vehicle power#
- \* While useful for statistical analysis, this approach does not generate follow-up test cases based on a defined metamorphic relation (MR).
- \* (C) Selecting dissimilar routes and transforming them into a fast or slow route#
- \* This does not follow metamorphic testing principles, which require predictable transformations.
- \* (D) Running fast vehicles on long routes and slow vehicles on short routes#
- \* This method does not maintain a controlled MR and introduces too many uncontrolled variables.
- \* Metamorphic testing generates follow-up test cases based on a source test case. "MT is a technique aimed at generating test cases which are based on a source test case that has passed. One or more follow-up test cases are generated by changing (metamorphizing) the source test case based on a metamorphic relation (MR)."
- \* MT has been used for testing route optimization AI systems. "In the area of AI, MT has been used for testing image recognition, search engines, route optimization and voice recognition, among others." Why Option A is Correct? Why Other Options are Incorrect? References from ISTQB Certified Tester AI Testing Study Guide Thus, option A is the correct answer, as it aligns with the principles of metamorphic testing by modifying input speeds and verifying expected results.

#### NEW QUESTION # 77

An engine manufacturing facility wants to apply machine learning to detect faulty bolts. Which of the following would result in bias in the model?

- A. Selecting training data by purposely excluding specific faulty conditions
- B. Selecting training data by purposely including all known faulty conditions
- C. Selecting testing data from a boat manufacturer's bolt longevity data
- D. Selecting testing data from a different dataset than the training dataset

#### Answer: A

#### Explanation:

Bias in AI models often originates from incomplete or non-representative training data. In this case, if the training dataset purposely excludes specific faulty conditions, the machine learning model will fail to learn and detect these conditions in real-world scenarios. This results in:

- \* Sample bias, where the training data is not fully representative of all possible faulty conditions.
- \* Algorithmic bias, where the model prioritizes certain defect types while ignoring others.
- \* B. Selecting training data by purposely including all known faulty conditions# This would help reduce bias by improving model generalization.
- \* C. Selecting testing data from a different dataset than the training dataset# This is a good practice to evaluate model generalization but does not inherently introduce bias.
- \* D. Selecting testing data from a boat manufacturer's bolt longevity data# While using unrelated data can create poor model accuracy, it does not directly introduce bias unless systematic patterns in the incorrect dataset lead to unfair decision-making.

\* Section 8.3 - Testing for Algorithmic, Sample, and Inappropriate Bias states that sample bias can occur if the training dataset is not fully representative of the expected data space, leading to biased predictions.

Why are the other options incorrect? Reference from ISTQB Certified Tester AI Testing Study Guide:

#### NEW QUESTION # 78

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