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ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none">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 2	<ul style="list-style-type: none">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.
Topic 3	<ul style="list-style-type: none">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 4	<ul style="list-style-type: none">Test Environments for AI-Based Systems: This section is about factors that differentiate the test environments for AI-based
Topic 5	<ul style="list-style-type: none">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 6	<ul style="list-style-type: none">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 7	<ul style="list-style-type: none">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.

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ISTQB Certified Tester AI Testing Exam Sample Questions (Q33-Q38):

NEW QUESTION # 33

A bank wants to use an algorithm to determine which applicants should be given a loan. The bank hires a data scientist to construct a logistic regression model to predict whether the applicant will repay the loan or not.

The bank has enough data on past customers to randomly split the data into a training data set and a test/validation data set. A logistic regression model is constructed on the training data set using the following independent variables:

Gender
Marital status
Number of dependents
Education
Income
Loan amount
Loan term
Credit score

The model reveals that those with higher credit scores and larger total incomes are more likely to repay their loans. The data scientist has suggested that there might be bias present in the model based on previous models created for other banks.

Given this information, what is the best test approach to check for potential bias in the model?

- A. Back-to-back testing should be used to compare the model created using the training data set to another model created using the test data set, if the two models significantly differ, it will indicate there is bias in the original model.
- B. A/B testing should be used to verify that the test data set does not detect any bias that might have been introduced by the original training data. If the two models significantly differ, it will indicate there is bias in the original model.
- C. Acceptance testing should be used to make sure the algorithm is suitable for the customer. The team can re-work the acceptance criteria such that the algorithm is sure to correctly predict the remaining applicants that have been set aside for the validation data set ensuring no bias is present.
- D. Experienced-based testing should be used to confirm that the training data set is operationally relevant. This can include applying exploratory data analysis (EDA) to check for bias within the training data set.

Answer: D

Explanation:

Bias in an AI system occurs when the training data contains inherent prejudices that cause the model to make unfair predictions. Experience-based testing, particularly Exploratory Data Analysis (EDA), helps uncover these biases by analyzing patterns, distributions, and potential discriminatory factors in the training data.

* Option A."Experience-based testing should be used to confirm that the training data set is operationally relevant. This can include applying exploratory data analysis (EDA) to check for bias within the training data set."

* This is the correct answer. EDA involves examining the dataset for bias, inconsistencies, or missing values, ensuring fairness in ML model predictions.

* Option B."Back-to-back testing should be used to compare the model created using the training data set to another model created using the test data set. If the two models significantly differ, it will indicate there is bias in the original model."

* Back-to-back testing is used for regression testing and to compare versions of an AI system but is not primarily used to detect bias.

* Option C."Acceptance testing should be used to make sure the algorithm is suitable for the customer.

The team can re-work the acceptance criteria such that the algorithm is sure to correctly predict the remaining applicants that have been set aside for the validation data set ensuring no bias is present."

* Acceptance testing focuses on meeting predefined business requirements rather than detecting and mitigating bias.

* Option D."A/B testing should be used to verify that the test data set does not detect any bias that might have been introduced by the original training data. If the two models significantly differ, it will indicate there is bias in the original model."

* A/B testing is used for evaluating variations of a model rather than for explicitly identifying bias.

* Bias Testing Methods:"AI-based systems should be tested for algorithmic bias, sample bias, and inappropriate bias. Experience-based testing and EDA are useful for detecting bias".

* Exploratory Data Analysis (EDA):"EDA helps uncover potential bias in training data through visualization and statistical analysis". Analysis of the Answer Options:ISTQB CT-AI Syllabus References:Thus,Option A is the best choice for detecting bias in the loan applicant model.

NEW QUESTION # 34

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

- A. Accuracy issues
- B. Privacy issues
- C. Security issues
- D. Bias issues

Answer: A

Explanation:

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.

NEW QUESTION # 35

A mobile app start-up company is implementing an AI-based chat assistant for e-commerce customers. In the process of planning the testing, the team realizes that the specifications are insufficient.

Which testing approach should be used to test this system?

- A. Exploratory testing
- B. Equivalence partitioning
- C. Static analysis
- D. State transition testing

Answer: A

Explanation:

The syllabus describes exploratory testing as especially useful when there are poor specifications or test oracle problems: "Exploratory testing is especially useful when there are poor specifications or test oracle problems, which is often the case for AI-based systems." (Reference: ISTQB CT-AI Syllabus v1.0, Section 9.6, page 70 of 99)

NEW QUESTION # 36

A neural network has been designed and created to assist day-traders improve efficiency when buying and selling commodities in a rapidly changing market. Suppose the test team executes a test on the neural network where each neuron is examined. For this network the shortest path indicates a buy, and it will only occur when the one-day predicted value of the commodity is greater than the spot price by 0.75%. The neurons are stimulated by entering commodity prices and testers verify that they activate only when the future value exceeds the spot price by at least 0.75%.

Which of the following statements BEST explains the type of coverage being tested on the neural network?

- A. Value-change coverage

- B. Sign-change coverage
- C. Neuron coverage
- D. **Threshold coverage**

Answer: D

Explanation:

Threshold coverage is a specific type of coverage measure used in neural network testing. It ensures that each neuron in the network achieves an activation value greater than a specified threshold. This is particularly relevant to the scenario described, where testers verify that neurons activate only when the future value of the commodity exceeds the spot price by at least 0.75%.

* Threshold-based activation: The test case in the question is explicitly verifying whether neurons activate only when a certain threshold (0.75%) is exceeded. This aligns perfectly with the definition of threshold coverage.

* Common in Neural Network Testing: Threshold coverage is used to measure whether each neuron in a neural network reaches a specified activation value, ensuring that the neural network behaves as expected when exposed to different test inputs.

* Precedent in Research: The DeepXplore framework used a threshold of 0.75% to identify incorrect behaviors in neural networks, making this coverage criterion well-documented in AI testing research.

* (B) Neuron Coverage#

* Neuron coverage only checks whether a neuron activates (non-zero value) at some point during testing. It does not consider specific activation thresholds, making it less precise for this scenario.

* (C) Sign-Change Coverage#

* This coverage measures whether each neuron exhibits both positive and negative activation values, which is not relevant to the given scenario (where activation only matters when exceeding a specific threshold).

* (D) Value-Change Coverage#

* This coverage requires each neuron to produce two activation values that differ by a chosen threshold, but the question focuses on whether activation occurs beyond a fixed threshold, not changes in activation values.

* Threshold coverage ensures that neurons exceed a given activation threshold! Full threshold coverage requires that each neuron in the neural network achieves an activation value greater than a specified threshold. The researchers who created the DeepXplore framework suggested neuron coverage should be measured based on an activation value exceeding a threshold, changing based on the situation." Why is Threshold Coverage Correct? Why Other Options are Incorrect? References from ISTQB Certified Tester AI Testing Study Guide Thus, option A is the correct answer, as threshold coverage ensures the neural network's activation is correctly evaluated based on the required condition (0.75%).

NEW QUESTION # 37

Which of the following statements about the structure and function of neural networks is true?

Choose ONE option (1 out of 4)

- A. The input layer of a deep neural network must have at least as many neurons as its output layer
- B. The bias of a neuron is determined by the activation values of the neurons in the previous layer
- C. A single-layer perceptron is NOT a neural network
- D. **Training a neural network only changes the values of the weights at the connections between neurons**

Answer: D

Explanation:

Section 1.7 - Neural Networks of the ISTQB CT-AI syllabus explains that neural networks consist of neurons connected by weighted links. During training, learning occurs by adjusting the weights on these connections. This is the essence of gradient descent and backpropagation. Option B correctly states this behavior: only the weights are modified, not the activation functions, neuron counts, or architectural structure.

Option A is incorrect because a neuron's bias is not determined by previous activations; it is an independent trainable parameter added to the weighted input sum. Option C is incorrect because the syllabus states that a single-layer perceptron is a valid type of neural network, although limited to linearly separable problems.

Option D is incorrect because no rule requires the number of input neurons to exceed or equal the number of output neurons. Instead, input neurons correspond to the number of features, while output neurons correspond to tasks or classes.

Therefore, Option B precisely reflects the syllabus definition of what changes during neural network training.

NEW QUESTION # 38

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