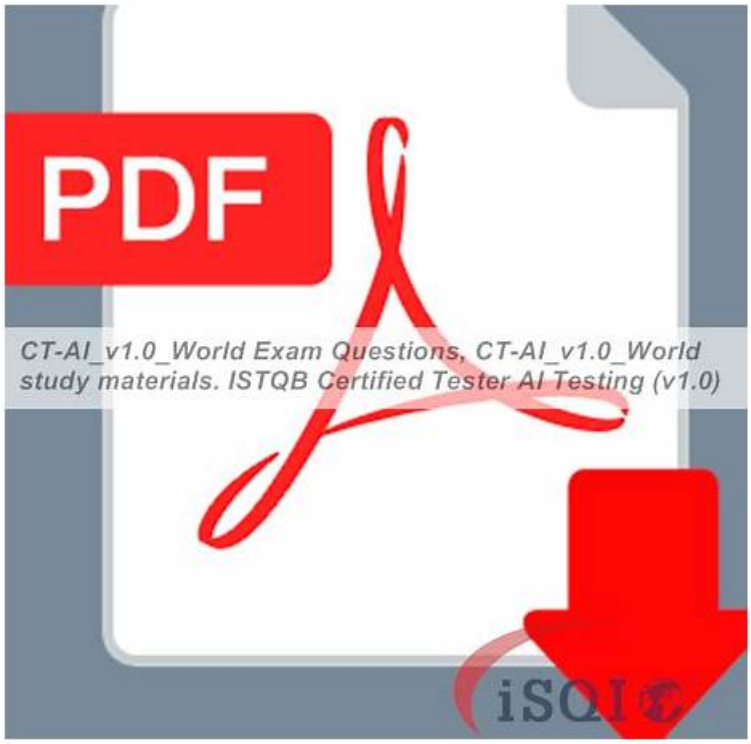
CT-AI Test Objectives Pdf, CT-AI Exam Bible



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ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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 2	• 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 3	• 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 4	• Test Environments for AI-Based Systems: This section is about factors that differentiate the test environments for AI-based
Topic 5	• 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 6	• 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 7	• 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 8	• Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.
Topic 9	• 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 10	• systems from those required for conventional systems.

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ISTQB Certified Tester AI Testing Exam Sample Questions (Q46-Q51):

NEW QUESTION # 46
Which ONE of the following tests is MOST likely to describe a useful test to help detect different kinds of biases in ML pipeline?
SELECT ONE OPTION

- A. Test the model during model evaluation for data bias.
- B. Testing the data pipeline for any sources for algorithmic bias.
- C. Testing the distribution shift in the training data for inappropriate bias.
- D. Check the input test data for potential sample bias.

Answer: A

Explanation:
Detecting biases in the ML pipeline involves various tests to ensure fairness and accuracy throughout the ML process.
Testing the distribution shift in the training data for inappropriate bias (A): This involves checking if there is any shift in the data distribution that could lead to bias in the model. It is an important test but not the most direct method for detecting biases.
Test the model during model evaluation for data bias (B): This is a critical stage where the model is evaluated to detect any biases in the data it was trained on. It directly addresses potential data biases in the model.
Testing the data pipeline for any sources for algorithmic bias (C): This test is crucial as it helps identify biases that may originate from the data processing and transformation stages within the pipeline. Detecting sources of algorithmic bias ensures that the model does not inherit biases from these processes.
Check the input test data for potential sample bias (D): While this is an important step, it focuses more on the input data and less on the overall data pipeline.
Hence, the most likely useful test to help detect different kinds of biases in the ML pipeline is B. Test the model during model evaluation for data bias.
Reference:
ISTQB CT-AI Syllabus Section 8.3 on Testing for Algorithmic, Sample, and Inappropriate Bias discusses various tests that can be performed to detect biases at different stages of the ML pipeline.
Sample Exam Questions document, Question #32 highlights the importance of evaluating the model for biases.

NEW QUESTION # 47
Which of the following statements about ML functional performance metrics is correct?
Choose ONE option (1 out of 4)

- A. Metrics used to measure clustering include intra-cluster metrics that measure the proximity of a cluster's data points.
- B. The R-squared metric indicates how well the model distinguishes between different classes based on the ROC curve.
- C. The receiver operating characteristic curve shows, depending on parameters, how well the model distinguishes between different clusters.
- D. The silhouette coefficient describes how well the regression model fits the dependent variables.

Answer: A

Explanation:
The ISTQB CT-AI syllabus explains ML performance metrics in Section3.2 - Evaluating ML Models. For clustering, which is an unsupervised learning method, the syllabus lists metrics such asintra-cluster distance, inter-cluster distance, and coherence measures. Intra-cluster metrics evaluate how close data points are within a cluster, which directly corresponds to Option A.
Option B is incorrect becauseR-squaredis a regression metric measuring goodness-of-fit, not classification performance, and has no connection to ROC curves. Option C is wrong because thesilhouette coefficientis also a clustering metric, measuring cohesion vs. separation-not regression accuracy. Option D is incorrect because ROC curves evaluatebinary or multiclass classification, not clustering.
Thus, OptionAis the only accurate statement based on the syllabus.

NEW QUESTION # 48
The activation value output for a neuron in a neural network is obtained by applying computation to the neuron.
Which ONE of the following options BEST describes the inputs used to compute the activation value?
SELECT ONE OPTION

- A. Individual bias at the neuron level, and activation values of neurons in the previous layer.
- B. Individual bias at the neuron level, activation values of neurons in the previous layer, and weights assigned to the connections between the neurons.
- C. Activation values of neurons in the previous layer, and weights assigned to the connections between the neurons.
- D. Individual bias at the neuron level, and weights assigned to the connections between the neurons.

Answer: B

Explanation:
In a neural network, the activation value of a neuron is determined by a combination of inputs from the previous layer, the weights of the connections, and the bias at the neuron level. Here's a detailed breakdown:
Inputs for Activation Value:
Activation Values of Neurons in the Previous Layer: These are the outputs from neurons in the preceding layer that serve as inputs to the current neuron.
Weights Assigned to the Connections: Each connection between neurons has an associated weight, which determines the strength and direction of the input signal.
Individual Bias at the Neuron Level: Each neuron has a bias value that adjusts the input sum, allowing the activation function to be shifted.
Calculation:
The activation value is computed by summing the weighted inputs from the previous layer and adding the bias.
Formula: $z=\sum(wiai)+bz = \sum (w_i \cdot a_i) + bz=\sum(wiai)+b$, where wiw_iwi are the weights, aia_iai are the activation values from the previous layer, and bbb is the bias.
The activation function (e.g., sigmoid, ReLU) is then applied to this sum to get the final activation value.
Why Option A is Correct:
Option A correctly identifies all components involved in computing the activation value: the individual bias, the activation values of the previous layer, and the weights of the connections.
Eliminating Other Options:
B . Activation values of neurons in the previous layer, and weights assigned to the connections between the neurons: This option misses the bias, which is crucial.
C . Individual bias at the neuron level, and weights assigned to the connections between the neurons: This option misses the activation values from the previous layer.
D . Individual bias at the neuron level, and activation values of neurons in the previous layer: This option misses the weights, which are essential.
Reference:
ISTQB CT-AI Syllabus, Section 6.1, Neural Networks, discusses the components and functioning of neurons in a neural network.
"Neural Network Activation Functions" (ISTQB CT-AI Syllabus, Section 6.1.1).

NEW QUESTION # 49
A startup company has implemented a new facial recognition system for a banking application for mobile devices. The application is intended to learn at run-time on the device to determine if the user should be granted access. It also sends feedback over the Internet to the application developers. The application deployment resulted in continuous restarts of the mobile devices.
Which of the following is the most likely cause of the failure?

- A. Mobile operating systems cannot process machine learning algorithms.
- B. The training, processing, and diagnostic generation are too computationally intensive for the mobile device hardware to handle.
- C. The feedback requires a physical connection and cannot be sent over the Internet.
- D. The size of the application is consuming too much of the phone's storage capacity.

Answer: B

Explanation:
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Facial recognition applications involvecomplex computational tasks, including:
* Feature Extraction- Identifying unique facial landmarks.
* Model Training and Updates- Continuous learning and adaptation of user data.
* Image Processing- Handling real-time image recognition under various lighting and angles.
In this scenario, themobile device is experiencing continuous restarts, which suggestsa resource overloadcaused by excessive processing demands.
* Mobile devices have limited computational power.
* Unlike servers, mobile devices lack powerful GPUs/TPUs required for deep learning models.
* On-device learning is computationally expensive.
* The model is likely performingreal-time learning, which can overwhelm the CPU and RAM.
* Continuous feedback transmission may cause overheating.
* If the system is running multiple processes-training, inference, and network communication-it can overload system resources and cause crashes.
* (A) The feedback requires a physical connection and cannot be sent over the Internet.#(Incorrect)
* Feedback transmission over the internet is common for cloud-based AI services.This is not the cause of the issue.
* (B) Mobile operating systems cannot process machine learning algorithms.#(Incorrect)
* Many mobile applications use ML models efficiently. The problem here is thehigh computational intensity, not the OS's ability to run ML algorithms.
* (C) The size of the application is consuming too much of the phone's storage capacity.#(Incorrect)
* Storage issues typically result in installation failures or lag,not device restarts.The issue here isprocessing overload, not storage space.
* AI-based applications require significant computational power."The computational intensity of AI- based applications can pose a challenge when deployed on resource-limited devices."
* Edge devices may struggle with processing complex ML workloads."Deploying AI models on mobile or edge devices requires optimization, as these devices have limited processing capabilities compared to cloud environments." Why is Option D Correct?Why Other Options are Incorrect?References from ISTQB Certified Tester AI Testing Study GuideThus,option D is the correct answer, as thecomputational demands of the facial recognition system are too high for the mobile hardware to handle, causing continuous restarts.

NEW QUESTION # 50
Max. Score: 2
Al-enabled medical devices are used nowadays for automating certain parts of the medical diagnostic processes. Since these are life-critical process the relevant authorities are considenng bringing about suitable certifications for these Al enabled medical devices. This certification may involve several facets of Al testing (I - V).
I . Autonomy
II . Maintainability
III . Safety
IV . Transparency
V . Side Effects
Which ONE of the following options contains the three MOST required aspects to be satisfied for the above scenario of certification of Al enabled medical devices?
SELECT ONE OPTION

- A. Aspects II, III and IV
- B. Aspects III, IV, and V
- C. Aspects I, IV, and V
- D. Aspects I, II, and III

Answer: B

Explanation:
For AI-enabled medical devices, the most required aspects for certification are safety, transparency, and side effects. Here's why:
Safety (Aspect III): Critical for ensuring that the AI system does not cause harm to patients.
Transparency (Aspect IV): Important for understanding and verifying the decisions made by the AI system.
Side Effects (Aspect V): Necessary to identify and mitigate any unintended consequences of the AI system.
Why Not Other Options:
Autonomy and Maintainability (Aspects I and II): While important, they are secondary to the immediate concerns of safety, transparency, and managing side effects in life-critical processes.

NEW QUESTION # 51
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