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ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.
Topic 2	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 3	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 4	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 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	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 7	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 8	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.
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ISTQB Certified Tester AI Testing Exam Sample Questions (Q12-Q17):

NEW QUESTION # 12

Which ONE of the following activities is MOST relevant when addressing the scenario where you have more than the required amount of data available for the training?

SELECT ONE OPTION

- A. Data augmentation
- B. Data labeling
- C. Data sampling
- D. Feature selection

Answer: C

Explanation:

A . Feature selection

Feature selection is the process of selecting the most relevant features from the data. While important, it is not directly about handling excess data.

B . Data sampling

Data sampling involves selecting a representative subset of the data for training. When there is more data than needed, sampling can be used to create a manageable dataset that maintains the statistical properties of the full dataset.

C . Data labeling

Data labeling involves annotating data for supervised learning. It is necessary for training models but does not address the issue of having excess data.

D . Data augmentation

Data augmentation is used to increase the size of the training dataset by creating modified versions of existing data. It is useful when there is insufficient data, not when there is excess data.

Therefore, the correct answer is B because data sampling is the most relevant activity when dealing with an excess amount of data for training.

NEW QUESTION # 13

You have access to the training data that was used to train an AI-based system. You can review this information and use it as a guideline when creating your tests. What type of characteristic is this?

- A. Autonomy
- B. Accessibility
- C. Transparency
- D. Explorability

Answer: C

Explanation:

The syllabus states:

"Transparency: This is considered to be the ease with which the algorithm and training data used to generate the model can be

determined." Access to the training data is an example of transparency.
(Reference: ISTQB CT-AI Syllabus v1.0, Section 2.7, page 24 of 99)

NEW QUESTION # 14

An airline has created a ML model to project fuel requirements for future flights. The model imports weather data such as wind speeds and temperatures, calculates flight routes based on historical routings from air traffic control, and estimates loads from average passenger and baggage weights. The model performed within an acceptable standard for the airline throughout the summer but as winter set in the load weights became less accurate. After some exploratory data analysis it became apparent that luggage weights were higher in the winter than in summer.

Which of the following statements BEST describes the problem and how it could have been prevented?

- A. The model suffers from a lack of transparency and therefore should be regularly tested to ensure that any progressive errors are detected soon enough for the problem to be mitigated.
- B. The model suffers from corruption and therefore should be reloaded into the computer system being used, preferably with a method of version control to prevent further changes.
- C. The model suffers from drift and therefore should be regularly tested to ensure that any occurrences of drift are detected soon enough for the problem to be mitigated.
- D. The model suffers from drift and therefore the performance standard should be eased until a new model with more transparency can be developed.

Answer: C

Explanation:

The problem described in the question is a classic case of concept drift. Concept drift occurs when the relationship between input variables and the output variable changes over time, leading to a decline in model accuracy.

In this scenario, the average passenger and baggage weights used in the model changed due to seasonal variations, but the model was not updated accordingly. This resulted in inaccurate predictions for fuel requirements in the winter season. This is an example of seasonal drift, where model behavior changes periodically due to recurring trends (e.g., higher luggage weights in winter compared to summer).

To prevent such problems:

* The model should be regularly tested for concept drift against agreed ML functional performance criteria.

* Exploratory Data Analysis (EDA) should be performed periodically to detect gradual changes in input distributions.

* Retraining of the model with updated training data should be done to maintain accuracy.

* If drift is detected, mitigation techniques such as incremental learning, retraining with new data, or adjusting model parameters should be employed.

* Option B (Easing the performance standard instead of addressing drift): Lowering the performance standard is not a solution; it only masks the problem without fixing it. Instead, regular testing and retraining should be used to handle drift properly.

* Option C (Corruption and reloading the model): Model corruption is unrelated to this issue.

Corruption refers to accidental or malicious damage to the model or data, whereas this case is due to a changing data environment.

* Option D (Lack of transparency): Transparency refers to how understandable the model's decisions are, but the problem here is a change in data distributions, making drift the primary concern.

* ISTQB CT-AI Syllabus (Section 7.6: Testing for Concept Drift)

* "The operational environment can change over time without the trained model changing correspondingly. This phenomenon is known as concept drift and typically causes the outputs of the model to become increasingly less accurate and less useful."

* "Systems that may be prone to concept drift should be regularly tested against their agreed ML functional performance criteria to ensure that any occurrences of concept drift are detected soon enough for the problem to be mitigated."

* ISTQB CT-AI Syllabus (Section 7.7: Selecting a Test Approach for an ML System)

* "If concept drift is detected, it may be mitigated by retraining the system with up-to-date training data followed by confirmation testing, regression testing, and possibly A/B testing where the updated system must outperform the original system." Why Other Options Are Incorrect: Supporting References from ISTQB Certified Tester AI Testing Study Guide: Conclusion: Since the question describes a situation where seasonal variations affected input data distributions, the correct answer is A: The model suffers from drift and therefore should be regularly tested to ensure that any occurrences of drift are detected soon enough for the problem to be mitigated.

NEW QUESTION # 15

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 II
- C. I and III
- D. Only III

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 # 16

Upon testing a model used to detect rotten tomatoes, the following data was observed by the test engineer, based on certain number of tomato images.

Confusion Matrix	Actually Rotten	Actually Fresh
Predicted Rotten	45	8
Predicted Fresh	5	42



For this confusion matrix which combinations of values of accuracy, recall, and specificity respectively is CORRECT?

SELECT ONE OPTION

- A. 0.84, 1, 0.9
- B. 0.87, 0.9, 0.84
- C. 1, 0.9, 0.8
- D. 1, 0.87, 0.84

Answer: B

Explanation:

To calculate the accuracy, recall, and specificity from the confusion matrix provided, we use the following formulas:

Confusion Matrix:

Actually Rotten: 45 (True Positive), 8 (False Positive)

Actually Fresh: 5 (False Negative), 42 (True Negative)

Accuracy:

Accuracy is the proportion of true results (both true positives and true negatives) in the total population.

Formula: $\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$

Calculation: $\text{Accuracy} = \frac{45 + 42}{45 + 42 + 8 + 5} = \frac{87}{100} = 0.87$

$\frac{42}{45 + 42 + 8 + 5} = \frac{42}{100} = 0.42$ Accuracy = $\frac{45 + 42 + 8 + 5}{45 + 42 + 8 + 545 + 42} = \frac{100}{10087} = 0.87$ Recall (Sensitivity):

Recall is the proportion of true positive results in the total actual positives.

Formula: $\text{Recall} = \frac{TP}{TP + FN}$ Calculation: $\text{Recall} = \frac{45}{45 + 5} = \frac{45}{50} = 0.9$

Recall = $\frac{45}{45 + 5} = \frac{45}{50} = 0.9$ Specificity: $\text{Specificity} = \frac{TN}{TN + FP}$ Calculation: $\text{Specificity} = \frac{42}{42 + 8} = \frac{42}{50} = 0.84$

Specificity is the proportion of true negative results in the total actual negatives.

Formula: $\text{Specificity} = \frac{TN}{TN + FP}$ Calculation: $\text{Specificity} = \frac{42}{42 + 8} = \frac{42}{50} = 0.84$

Specificity = $\frac{42}{42 + 8} = \frac{42}{50} = 0.84$ Therefore, the correct combinations of accuracy, recall, and specificity are 0.87, 0.9, and 0.84 respectively.

Reference:

ISTQB CT-AI Syllabus, Section 5.1, Confusion Matrix, provides detailed formulas and explanations for calculating various metrics including accuracy, recall, and specificity.

"ML Functional Performance Metrics" (ISTQB CT-AI Syllabus, Section 5).

NEW QUESTION # 17

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