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ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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	• Test Environments for AI-Based Systems: This section is about factors that differentiate the test environments for AI-based
Topic 3	• systems from those required for conventional systems.

Topic 4	• Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.
Topic 5	• 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 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.

ISTQB Certified Tester AI Testing Exam Sample Questions (Q52-Q57):

NEW QUESTION # 52
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 dataset and a test /validation dataset. A logistic regression model is constructed on the training dataset 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. 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 dataset ensuring no bias is present.
- B. 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.
- C. 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.
- 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.

Answer: B

Explanation:
The syllabus mentions that experience-based testing and EDA are effective for detecting biases:
"Experience-based testing can be used to verify that the training dataset is operationally relevant and identify potential sources of bias. EDA is also useful for exploring the data and understanding any relationships that might lead to bias in the model." (Reference: ISTQB CT-AI Syllabus v1.0, Section 8.3, page 58 of 99)

NEW QUESTION # 53
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. 1,0.9, 0.8
- C. 0.87.0.9. 0.84
- D. 1,0.87,0.84

Answer: C

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: Accuracy=TP+TNTP+TN+FP+FN\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}Accuracy=TP+TN+FP+FNTP+TN Calculation: Accuracy=45+4245+42+8+5=87100=0.87\text{Accuracy} = \frac{45 + 42}{45 + 42 + 8 + 5} = \frac{87}{100} = 0.87Accuracy=45+42+8+545+42=10087=0.87 Recall (Sensitivity):
Recall is the proportion of true positive results in the total actual positives.
Formula: Recall=TPTP+FN\text{Recall} = \frac{TP}{TP + FN}Recall=TP+FNTP Calculation:
Recall=4545+5=4550=0.9\text{Recall} = \frac{45}{45 + 5} = \frac{45}{50} = 0.9Recall=45+545=5045=0.9 Specificity:
Specificity is the proportion of true negative results in the total actual negatives.
Formula: Specificity=TNTN+FP\text{Specificity} = \frac{TN}{TN + FP}Specificity=TN+FPTN Calculation:
Specificity=4242+8=4250=0.84\text{Specificity} = \frac{42}{42 + 8} = \frac{42}{50} = 0.84Specificity=42+842=5042=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 # 54
There is a growing backlog of unresolved defects for your project. You know the developers have an ML model that they have created which has learned which developers work on which type of software and the speed with which they resolve issues. How could you use this model to help reduce the backlog and implement more efficient defect resolution?

- A. Use it to assign defects to the best developer to resolve the problem and to load balance the defect assignments among the developers.
- B. Use it to review the code and determine where more defects are likely to occur so that testing can be targeted to those areas.
- C. Use it to prioritize defects automatically based on the time expected for the fix to be made, the speed of the fix, and the likelihood of regressions.
- D. Use it to determine the root cause of each defect and develop a process improvement plan that can be implemented to remove the most common root causes.

Answer: A

Explanation:
AI and ML models can play a significant role in optimizing defect resolution processes. According to the ISTQB Certified Tester AI

Testing (CT-AI) Syllabus, ML models can be used toanalyze defect reports, prioritize critical defects, and assign defects to developersbased on historical defect resolution patterns.
The key AI applications for defect management include:
* Defect Categorization- NLP techniques can analyze defect reports and classify them based on metadata like severity and impact.
* Defect Prioritization- ML models trained on past defects can predict which issues are likely to cause failures, allowing teams toprioritizethe most critical issues.
* Defect Assignment- AI-based models can suggest which developers are best suited for specific defects, optimizing the resolution process based on past performance and specialization.
From the given answer choices:
* Option A (Automatic Prioritization)is useful but does not directlyreduce backlog efficientlyby considering developer expertise and workload balancing.
* Option C (Root Cause Analysis for Process Improvement)is along-term strategybut does not directly address backlog reduction.
* Option D (Defect Prediction for Testing Focus)helps preemptively identify issues but does not resolve the existing backlog.
Thus,Option Bis the best choice as it aligns with AI's capability toassign defects to the most suitable developersbased on historical data, ensuring efficient defect resolution and backlog reduction.
Certified Tester AI Testing Study Guide References:
* ISTQB CT-AI Syllabus v1.0, Section 11.2 (Using AI to Analyze Reported Defects)
* ISTQB CT-AI Syllabus v1.0, Section 11.5 (Using AI for Defect Prediction).

NEW QUESTION # 55
The stakeholders of a machine learning model have confirmed that they understand the objective and purpose of the model, and ensured that the proposed model aligns with their business priorities. They have also selected a framework and a machine learning model that they will be using.
What should be the next step to progress along the machine learning workflow?

- A. Prepare and pre-process the data that will be used to train and test the model
- B. Tune the machine learning algorithm based on objectives and business priorities
- C. Agree on defined acceptance criteria for the machine learning model
- D. Evaluate the selection of the framework and the model

Answer: B

Explanation:
Themachine learning (ML) workflowfollows a structured sequence of steps. Once stakeholders have agreed on theobjectives, business priorities, and the framework/model selection, the next logical step is to prepare and pre-process the databefore training the model.
* Data Preparationis crucial becausemachine learning models rely heavily on the quality of input data. Poor data can result in biased, inaccurate, or unreliable models.
* The process involvesdata acquisition, cleaning, transformation, augmentation, and feature engineering.
* Preparing the dataensures it is in the right format, free from errors, and representative of the problem domain, leading to better generalization in training.
* A (Tune the ML Algorithm):Hyperparameter tuning occursafter the model has been trainedand evaluated.
* C (Agree on Acceptance Criteria):Acceptance criteria should already have been defined in theinitial objective-setting phasebefore framework and model selection.
* D (Evaluate the Framework and Model):The selection of the framework and ML model has already been completed. The next step isdata preparation, not reevaluation.
* ISTQB CT-AI Syllabus (Section 3.2: ML Workflow - Data Preparation Phase)
* "Data preparation comprises data acquisition, pre-processing, and feature engineering.
Exploratory data analysis (EDA) may be performed alongside these activities".
* "The data used to train, tune, and test the model must be representative of the operational data that will be used by the model".
Why Other Options Are Incorrect:Supporting References from ISTQB Certified Tester AI Testing Study Guide:Conclusion:Since the model selection is complete, thenext step in the ML workflow is to prepare and pre-process the datato ensure it is ready for training and testing. Thus, thecorrect answer is B.

NEW QUESTION # 56
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. Threshold coverage
- D. Neuron coverage

Answer: C

Explanation:
Threshold coverageis 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 least0.75%.
* Threshold-based activation:The test case in the question isexplicitly verifying whether neurons activate only when a certain threshold (0.75%) is exceeded.This aligns perfectly with the definition ofthreshold coverage.
* Common in Neural Network Testing:Threshold coverage is used to measurewhether 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:TheDeepXplore frameworkused a threshold of0.75%to identify incorrect behaviors in neural networks, making this coverage criterion well-documented in AI testing research.
* (B) Neuron Coverage#
* Neuron coverageonly 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 exhibitsboth positive and negative activation values, which isnot relevant to the given scenario(where activation only matters when exceeding a specific threshold).
* (D) Value-Change Coverage#
* This coverage requires each neuron to producetwo activation values that differ by a chosen threshold, but the question focuses onwhether 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 GuideThus,option A is the correct answer, asthreshold coverage ensures the neural network's activation is correctly evaluated based on the required condition (0.75%).

NEW QUESTION # 57
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