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ISTQB CT-AI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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 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	• 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	• 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	• systems from those required for conventional 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	• 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 8	• 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 9	• Using AI for Testing: In this section, the exam topics cover categorizing the AI technologies used in software testing.

ISTQB Certified Tester AI Testing Exam Sample Questions (Q115-Q120):

NEW QUESTION # 115
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. 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.
- C. 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.
- 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: C

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 # 116
Which ONE of the following characteristics is the least likely to cause safety related issues for an Al system?
SELECT ONE OPTION

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

Answer: B

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 # 117
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. Only II
- B. Only III
- C. I and II
- D. I and III

Answer: C

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.
Reference:
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 # 118
"Splendid Healthcare" has started developing a cancer detection system based on ML. The type of cancer they plan on detecting has 2% prevalence rate in the population of a particular geography. It is required that the model performs well for both normal and cancer patients.
Which ONE of the following combinations requires MAXIMIZATION?
SELECT ONE OPTION

- A. Maximize recall and precision
- B. Maximize precision and accuracy
- C. Maximize specificity number of classes
- D. Maximize accuracy and recall

Answer: A

Explanation:
* Prevalence Rate and Model Performance:
* The cancer detection system being developed by "Splendid Healthcare" needs to account for the fact that the type of cancer has a 2% prevalence rate in the population. This indicates that the dataset is highly imbalanced with far fewer positive (cancer) cases compared to negative (normal) cases.
* Importance of Recall:
* Recall, also known as sensitivity or true positive rate, measures the proportion of actual positive cases that are correctly identified by the model. In medical diagnosis, especially cancer detection, recall is critical because missing a positive case (false negative) could have severe consequences for the patient. Therefore, maximizing recall ensures that most, if not all, cancer cases are detected.
* Importance of Precision:
* Precision measures the proportion of predicted positive cases that are actually positive. High precision reduces the number of false positives, meaning fewer people will be incorrectly diagnosed with cancer. This is also important to avoid unnecessary anxiety and further invasive testing for those who do not have the disease.
* Balancing Recall and Precision:
* In scenarios where both false negatives and false positives have significant consequences, it is crucial to balance recall and precision. This balance ensures that the model is not only good at detecting positive cases but also accurate in its predictions, reducing both types of errors.
* Accuracy and Specificity:
* While accuracy (the proportion of total correct predictions) is important, it can be misleading in imbalanced datasets. In this case, high accuracy could simply result from the model predicting the majority class (normal) correctly. Specificity (true negative rate) is also important, but for a cancer detection system, recall and precision take precedence to ensure positive cases are correctly and accurately identified.
* Conclusion:
* Therefore, for a cancer detection system with a low prevalence rate, maximizing both recall and precision is crucial to ensure effective and accurate detection of cancer cases.
This explanation aligns with the principles outlined in the ISTQB CT-AI Syllabus, particularly sections on performance metrics for

ML models and handling imbalanced datasets (Chapter 5: ML Functional Performance Metrics).

NEW QUESTION # 119
Which of the following is a dataset issue that can be resolved using pre-processing?

- A. Invalid data
- B. Numbers stored as strings
- C. Insufficient data
- D. Wanted outliers

Answer: B

Explanation:
Pre-processing is an essential step in data preparation that ensures data is clean, formatted correctly, and structured for effective machine learning (ML) model training. One common issue that can be resolved during pre-processing isnumbers stored as strings.
Explanation of Answer Choices:
* Option A: Insufficient data
* Incorrect. Pre-processing cannot resolve insufficient data. If data is lacking, techniques like data augmentation or external data collection are needed.
* Option B: Invalid data
* Incorrect. While pre-processing can identify and handle some forms of invalid data (e.g., missing values, duplicate entries), it does not resolve all invalid data issues. Some cases may require domain expertise to determine validity.
* Option C: Wanted outliers
* Incorrect. Pre-processing usually focuses on handling unwanted outliers. Wanted outliers may need to be preserved, which is more of a data selection decision rather than pre-processing.
* Option D: Numbers stored as strings
* Correct. One of the key functions of data pre-processing isdata transformation, which includes converting incorrectly formatted data types, such as numbers stored as strings, into their correct numerical format.
ISTQB CT-AI Syllabus References:
* Data Pre-Processing Steps:"Transformation: The format of the given data is changed (e.g., breaking an address held as a string into its constituent parts, dropping a field holding a random identifier, converting categorical data into numerical data, changing image formats)".

NEW QUESTION # 120
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