**Question Bank**

**Machine Learning (303105353)**

**Unit: 1 and 2**

1. Explain the key differences between supervised, unsupervised, semi-supervised, and reinforcement learning. Provide examples for each.
2. What is PAC learning, and how does it help in evaluating the efficiency of a learning algorithm?
3. What are version spaces, and how do they help in hypothesis evaluation during machine learning?
4. What are some common techniques for handling missing values in a dataset? How does the choice of technique impact the model?
5. Explain the Z-Score method for detecting outliers. How do outliers affect the performance of machine learning models?
6. How does cross-validation help in assessing the generalizability of a machine learning model?
7. What is the difference between hyperparameter optimization and model training? Mention popular techniques used for optimization.
8. Why is visualization important in machine learning? List some visualization tools and techniques commonly used to present results effectively.
9. What is the difference between linear and non-linear models? Provide examples of each in the context of machine learning.
10. What is linear regression, and how is it used to predict outcomes? Explain its assumptions and limitations.
11. How does multilinear regression extend the concept of linear regression? Provide an example application.
12. Explain the working of the Naïve Bayes classifier. Why is the "naïve" assumption important, and when might it fail?
13. How does a decision tree algorithm classify data? What are the main components of a decision tree?
14. Describe the ID3 algorithm for constructing decision trees. What role does entropy play in this algorithm?
15. What is the CART (Classification and Regression Trees) algorithm, and how does it differ from ID3?
16. What are error bounds in the context of machine learning models, and why are they important?
17. Compare the performance of decision trees and Naïve Bayes classifiers for a classification task. What factors influence their effectiveness?

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