Naive Bayes Viva Questions and Answers

1. What is the Naive Bayes algorithm?

Naive Bayes is a classification algorithm based on Bayes' Theorem. It predicts the class of a given data point assuming that features are independent of each other. Common uses include text classification, spam filtering, and sentiment analysis.

2. What is Bayes' Theorem?

Bayes' Theorem calculates the probability of an event based on prior knowledge of related events:

$P(A|B) = P(B|A) * P(A) / P(B)$, where $P(A|B)$ is the posterior probability.

3. Why is it called 'Naive'?

The algorithm assumes that all features are independent, which is often not true in real-world data.

4. What types of data can Naive Bayes handle?

It works best with categorical data and can handle numerical data after preprocessing.

5. What are the types of Naive Bayes classifiers?

1. Gaussian Naive Bayes: For continuous data.

2. Multinomial Naive Bayes: For text data.

3. Bernoulli Naive Bayes: For binary features.

6. How is Naive Bayes used in text classification?

The algorithm calculates the probability of a document belonging to each class using word frequencies, predicting the

class with the highest probability.

7. What are the advantages of Naive Bayes?

Simple, efficient, works well with large datasets, and performs well with less training data.

8. What are the limitations of Naive Bayes?

It assumes feature independence and struggles with continuous data unless specific assumptions hold.

9. How does the prior probability affect predictions?

Prior probability reflects initial belief about a class. A higher prior biases the model toward that class unless the evidence suggests otherwise.

10. How do you evaluate the performance of Naive Bayes?

Metrics include confusion matrix, accuracy, precision, recall, F1-score, and ROC-AUC.

11. Can Naive Bayes handle missing data?

Yes, missing values can be imputed using mean, median, or mode for numerical data or the most frequent category for categorical data.

12. Give a practical example of Naive Bayes.

Example: Spam classification using word frequencies in emails to calculate probabilities and predict spam or not spam.

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13. How does Naive Bayes handle unseen words in test data?

Unseen words can cause probabilities to become zero. Laplace Smoothing adds a small value to word counts to prevent this issue.

14. What is Laplace Smoothing, and why is it used?

Laplace Smoothing prevents zero probabilities for unseen features by adding a small constant to all counts.

15. Why does Naive Bayes perform well with text data?

Text data has sparse features, making the independence assumption work reasonably well.