Naive Bayes Viva Questions and Answers

1. What is Support Vector Machine (SVM)?

SVM is a supervised machine learning algorithm used for classification and regression tasks. It works by finding the hyperplane that best separates data points of different classes in a feature space.

2. What is a hyperplane?

A hyperplane is a decision boundary in the feature space that separates data points into different classes. For 2D data, it is a line; for 3D, it is a plane; and for higher dimensions, it is called a hyperplane.

3. What are support vectors?

Support vectors are the data points that lie closest to the hyperplane and influence its position and orientation. These points are critical for defining the margin.

4. What is the margin in SVM?

The margin is the distance between the hyperplane and the nearest data points (support vectors) of any class. SVM aims to maximize this margin to ensure better generalization.

5. What is the objective of SVM?

The objective of SVM is to find the hyperplane that maximizes the margin while correctly classifying the data points.

6. What is the kernel trick?

The kernel trick is a technique that allows SVM to operate in a high-dimensional space without explicitly transforming the data. Common kernels include linear, polynomial, radial basis function (RBF), and sigmoid.

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7. What is the difference between linear and non-linear SVM?

Linear SVM uses a linear hyperplane to separate data, while non-linear SVM uses kernel functions to handle more complex, non-linearly separable data.

8. What are some common kernel functions in SVM?

1. Linear Kernel: Suitable for linearly separable data.

2. Polynomial Kernel: Captures interactions between features.

3. RBF Kernel: Handles non-linear relationships.

4. Sigmoid Kernel: Similar to a neural network activation function.

9. What are the parameters of an SVM?

Key parameters include:

1. C: Controls the trade-off between maximizing the margin and minimizing classification error.

2. Gamma: Defines the influence of a single training example in RBF and polynomial kernels.

10. How does SVM handle multi-class classification?

SVM handles multi-class classification using strategies like:

1. One-vs-One: Creates SVM models for every pair of classes.

2. One-vs-All: Creates one SVM model per class against all other classes.

11. What are the advantages of SVM?

1. Effective in high-dimensional spaces.

2. Works well with clear margin of separation.

3. Memory efficient.

12. What are the limitations of SVM?

1. Computationally intensive for large datasets.

2. Less effective when classes overlap significantly.

3. Requires careful tuning of parameters like C and gamma.

13. How do you evaluate the performance of SVM?

You can evaluate SVM using metrics like accuracy, precision, recall, F1-score, and ROC-AUC. Cross-validation is also commonly used.

14. Give a practical example of SVM.

Example: Classifying emails as spam or not spam. SVM finds the hyperplane that separates spam emails from non-spam based on features like word frequency and metadata.

15. What is soft margin in SVM?

Soft margin allows some misclassifications to make the model more robust and handle noise. It introduces a penalty for misclassified points controlled by the parameter C.

16. How does SVM differ from logistic regression?

While both are used for classification, SVM focuses on maximizing the margin, while logistic regression predicts

probabilities using a sigmoid function.