



**SHORT ANSWER QUESTIONS**

1. What is the goal of predictive analysis in machine learning?
2. Define the difference between supervised and unsupervised learning in predictive analysis.
3. Explain the key steps involved in building a predictive model.
4. Explain the concept of feature selection in predictive analysis.
5. What is the purpose of cross-validation in evaluating predictive models?
6. Describe the concept of overfitting and its impact on predictive analysis.
7. What is the role of evaluation metrics in assessing the performance of predictive models?
8. Define precision and recall in the context of binary classification?
9. Explain the concept of hyperparameter tuning in predictive analysis.
10. Explain the concept of feature engineering and its importance in predictive analysis.
11. How do you evaluate the performance of predictive models?
12. How can imbalanced datasets affect predictive analysis, and what techniques can be used to address this issue?
13. Describe different feature selection techniques/algorithms used in machine learning.

## LONG ANSWER QUESTIONS

1. Explain the concept of label encoding and its purpose in machine learning. Provide an example to illustrate how label encoding is applied to encode categorical data.
2. Explain the concept of predictive analysis in machine learning. Discuss its significance, applications, and the overall process involved in building predictive models.
3. Discuss the steps involved in performing predictive analysis. From data preprocessing to model selection and evaluation, describe each step in detail, highlighting the key considerations and challenges.
4. Explain the concept of feature selection in predictive analysis. Discuss various techniques and algorithms used for feature selection, such as filter methods, wrapper methods, and embedded methods. Provide examples of when and how each technique is applied.
5. Describe different machine learning algorithms used for predictive analysis. Compare and contrast their strengths, weaknesses, and suitability for different types of prediction tasks, such as regression, classification, and time series forecasting.
6. Discuss the evaluation metrics used to assess the performance of predictive models. Explain commonly used metrics such as accuracy, precision, recall, F1 score, mean squared error (MSE), and mean absolute error (MAE). Highlight situations when each metric is appropriate and their interpretation.
7. Explain the concept of cross-validation and its role in predictive analysis. Discuss different types of cross-validation techniques, such as k-fold cross-validation and stratified cross-validation. Discuss the benefits of cross-validation in estimating the model's performance and handling data variability.
8. Discuss the concept of model regularization in predictive analysis. Explain techniques such as L1 and L2 regularization, their impact on model complexity and overfitting, and how they are incorporated into different algorithms such as linear regression, logistic regression, and support vector machines.
9. Explain the concept of ensemble learning in predictive analysis. Discuss popular ensemble methods such as bagging, boosting, and stacking. Describe how these methods combine multiple models to improve prediction accuracy and handle complex patterns in the data.
10. Discuss the challenges and considerations in predictive analysis, including data quality, feature engineering, model selection, and interpretability. Explain how these factors impact the reliability and usefulness of predictive models.
11. Discuss the ethical considerations and potential biases in predictive analysis. Address issues such as algorithmic fairness, privacy concerns, and the responsible use of predictive models in sensitive domains. Explain the steps taken to mitigate biases and ensure fairness in predictive analysis.