SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

COIMBATORE – 35

DEPARTMENT OF COMPUTER SIENCE AND ENGINEERING

Puzzles
UNIT II

1. Matching Puzzle

Match the linear models, regression methods, and classification techniques with their descriptions or characteristics.

Terms	Descriptions
Linear Regression	Method of selecting a subset of predictors to avoid overfitting.
Ridge Regression	Predicts a continuous outcome by fitting a line to the data.
Logistic Regression	Minimizes the residual sum of squares between observed and predicted outcomes.
Subset Selection	Shrinkage method that reduces the magnitude of coefficients by adding a penalty.
Discriminant Analysis	Model used for binary classification with probabilities bounded between 0 and 1.
Least Square	Classification method that assumes different classes generate data based on different Gaussian distributions.

Answer:

Linear Regression → Predicts a continuous outcome by fitting a line to the data.
Ridge Regression → Shrinkage method that reduces the magnitude of coefficients by adding a penalty.
Logistic Regression → Model used for binary classification with probabilities bounded between 0 and 1.
Subset Selection → Method of selecting a subset of predictors to avoid overfitting.
Discriminant Analysis → Classification method that assumes different classes generate data based on different Gaussian distributions.
Least Squares → Minimizes the residual sum of squares between observed and predicted outcomes.

2. Fill-in-the-Blanks Puzzle

1. The _____ method finds the coefficients that minimize the sum of squared errors between the predicted and observed values.
2. _____ Regression applies a penalty to the coefficients to prevent overfitting by shrinking them toward zero.
3. _____ Regression is used for binary classification problems and outputs probabilities for two classes.
4. A _____ is a boundary that separates data into two different classes in a classification problem.

Answer:

1. Least Squares
2. Ridge
3. Logistic
4. Hyperplane

3. Multiple Choice Puzzle

Create a multiple-choice puzzle focusing on key concepts from linear models, regression techniques, and classification methods.

Example Questions:

What is the goal of Least Squares in Linear Regression?

A) Maximize the likelihood
B) Minimize the sum of squared residuals (Correct)
C) Maximize the margin between classes
D) Minimize the bias in the model

Which of the following is a shrinkage method that penalizes the size of the coefficients?

A) Least Squares
B) Ridge Regression (Correct)
C) Subset Selection
D) Principal Component Analysis

Which method is used for classification by modeling the posterior probability of the classes given the data?

A) Logistic Regression (Correct)

B) Linear Regression
C) Ridge Regression
D) Lasso

4. True or False Puzzle

1. True or False: Logistic regression can only be used for multi-class classification problems.
2. True or False: Ridge regression adds a penalty to the size of coefficients to reduce overfitting.
3. True or False: Subset selection improves model performance by choosing a smaller subset of the most relevant features.
4. True or False: Linear regression is suitable for predicting both continuous and categorical outcomes.

Answer:
False
True
True
False

5. Sequence Puzzle

Arrange the Sequence for Fitting a Linear Regression Model:

Assess model performance using metrics like R-squared or Mean Squared Error
Estimate the coefficients using the chosen technique.
Choose the estimation technique (e.g., Least Squares).
Perform validation using a test dataset.
Define the linear model equation.

Answer:

Step 1: Define the linear model equation.
Step 2: Choose the estimation technique (e.g., Least Squares).
Step 3: Estimate the coefficients using the chosen technique.
Step 4: Assess model performance using metrics like R-squared or Mean Squared Error (MSE).
Step 5: Perform validation using a test dataset.

7. Jumbled Words Puzzle

1. EGDIRS SSRIONERGE
2. REAHPLYPN EANTRIOSP

3. OSGISITLC RGNEEISOSN
4. SCRIMNANIDTA AALYSNIS

Answer:

1. (Answer: Ridge Regression)
2. (Answer: Separating Hyperplane)
3. (Answer: Logistic Regression)
4. (Answer: Discriminant Analysis)