LAB#09

Artificial Intelligence

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Lab Objectives

Implementation of Univariate Linear Regression

Implementation of Multivariate Linear Regression

Implementation of Regularized Linear Regression

Uinvariate Linear Regression

- When we train a regression model on a single feature.

- For example: Prediction of blood glucose level using bmi of a person

- Equation: y=ax+b

Multivariate Linear Regression

- When we train a regression model on multiple features.

- For example: Prediction of blood glucose level using bmi and age of a person

- Equation: $y = a_0 x_0 + a_1 + x_1 + a_n x_n + b$

Regularization

- Regression Models tend to overfit on large coefficient values (a)

- **Regularization:**
  - Technique to prevent overfitting
  - Penalize coefficient values by multiplying alpha
    - Choose value of alpha wisely, too large values may lead to underfitting and too small may lead to overfitting
  - Two Types of Regularized Linear Regression:
    - Ridge
    - Lasso

Lab Task#01 (Univariate Regression)

- Implement Univariate Regression on wines quality dataset using a single feature fixed acidity, Target variable is quality
  - It means you will predict quality using fixed acidity

Lab Task#02 (Multivariate Regression)

- Implement Linear Regression Algorithm on wines quality dataset using all features

Lab Task#03 Lasso Regression

- Using Lasso Regression determine feature importance: Which features are more important in prediction of wine quality