Machine Learning Lab, B.Tech 5th Semester

Instructions

1. This is only for practice. Complete it by 12:00 PM today. Your completion will be reviewed by the Teaching Assistants.

Practice Assignment 5

1. Scenario: You are working as a data scientist for a telecom company. The company is interested in predicting whether a customer will churn (leave the company) or not based on several features such as customer age, monthly charges, contract type, and tenure with the company.

   (a) Create a dataset containing the following features: Age, MonthlyCharges, ContractType, Tenure, and a binary target variable Churn (where 1 indicates that the customer has churned, and 0 indicates they have not).

   (b) Implement logistic regression using gradient descent to predict customer churn. Specifically, do the following:

      i. Normalize the continuous features (Age, MonthlyCharges, Tenure).
      ii. Initialize the parameters randomly.
      iii. Use gradient descent to minimize the cost function with respect to the weights.
      iv. Determine the optimal parameters
      v. Evaluate the model's performance using accuracy and confusion matrix.

      Note: You can use cross-validation methodology to evaluate your model.

2. Extend the above scenario for three classes: a. No Churn: The customer will stay with the company; b.Voluntary Churn: The customer will actively choose to leave the company (e.g., due to dissatisfaction with service); c.Involuntary Churn: The customer will be removed by the company (e.g., due to non-payment or violation of terms). Then, carry out the same tasks as outlined in points 1(a) and 1(b).

Note: You are not allowed to use inbuilt function of any machine learning model.