AL2002 – Artificial Intelligence Lab

Lab Task # 09

Note:

- Plagiarism will not be **tolerated!!**
- Use comments wherever applicable.
- Please ensure to submit both a **PDF document** and a **Python file** containing your code on the classroom platform.

Problem: 1 - Predicting Who Survived the Titanic Using Multilayer Perceptron (MLP)

Goal

The goal of this lab task is to build a multilayer perceptron (MLP) classifier that can predict whether a passenger survived the sinking of the Titanic or not.

Dataset

The dataset contains information about the passengers of the Titanic, including features such as passenger ID, ticket class, name, age, gender, number of siblings and spouses, number of parents and children, ticket number, fare, cabin number, and port of embarkation. The target variable is whether the passenger survived the sinking of the Titanic (1 = Yes, 0 = No).

- Import the necessary Python libraries, such as pandas, numpy, and sklearn.
- Load the Titanic dataset into a pandas DataFrame using pandas.read_csv().
- Preprocess the data by converting categorical features into numerical ones, filling in missing values, and scaling the numerical features using sklearn.preprocessing.
- Split the dataset into training and test sets using sklearn.model_selection.train_test_split().
- Build an MLP classifier using sklearn.neural_network.MLPClassifier() and train it on the training data.
- Evaluate the performance of the MLP classifier on the test data using metrics such as accuracy, precision, recall, and F1-score.

- Fine-tune the MLP classifier by adjusting its hyperparameters, such as the number of hidden layers, and the number of neurons per layer.
- Evaluate the performance of the fine-tuned MLP classifier on the test data and compare it to the initial model.
- Discuss the results and insights gained from the experiment and identify potential areas for further improvement.