SUPERIOR UNIVERSITY LAHORE

GOLD CAMPUS

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PROGRAM: ARTIFICIAL INTELLIGENCE

SEMESTER: 3rd SEMESTER

SECTION: BSAI-3A

SUBJECT: ARTIFICIAL INTELLIGENCE

Submission Title: ASSIGNMENT (DOCUMENT)

Submitted To: SIR ANSAR

Assignment 2 — Model Training & Saving

Tasks Overview

Step	Task	Description
1	**Data Preprocessing & Splitting**	Prepare dataset and split it into training/testing sets
2	**Model Training**	Train a Logistic Regression model
3	**Model Evaluation**	Evaluate model performance using accuracy, confusion matrix, and classification report
4	**Model Saving & Loading**	Save the trained model and reload it using pickle

Technologies Used

- Python
- pandas, numpy
- scikit-learn (Logistic Regression, train_test_split, LabelEncoder)
- pickle (for saving/loading model)
- OOP Concepts (Classes & Objects)

Conceptual Flow
Data Loading → Preprocessing → Splitting → Model Training → Evaluation → Saving/Loading

Each stage is handled by a separate class to implement Object-Oriented Programming (OOP) principles:

Class Design

1.DataSplitter

Handles data preprocessing and splitting into training and testing sets.

Responsibilities:

- Remove irrelevant columns (e.g., Loan_ID)

- Fill missing values (numerical → mean, categorical → mode)
- Encode categorical data using LabelEncoder
- Scale features using StandardScaler
- Split data into training and test sets

Key Methods:

preprocess_data() → Encode & clean dataset
split_data()   → Train/Test split

2.ModelTrainer

Responsible for training the **Logistic Regression** model.

Responsibilities:

- Initialize and fit Logistic Regression
- Train the model using training data

Key Methods:

train_model(X_train, y_train)

3.ModelEvaluator

Evaluates model performance.

Responsibilities:

- Predict test set results
- Calculate accuracy
- Display confusion matrix & classification report

Key Methods:

evaluate()

Performance Metrics Used:

- Accuracy Score
- Confusion Matrix
- Precision, Recall, F1-score

4.ModelSaver

Handles model persistence (saving and loading).

Responsibilities:

- Save trained model using pickle
- Reload model for future use

Key Methods:

save_model()
load_model()

Evaluation Output

Model Accuracy: 0.7886

Confusion Matrix:
[[18 25]
 [1 79]]