Customer Churn Prediction Using Artificial Neural Networks (ANN)

Objective

To predict whether a customer will exit the bank using an ANN classification model built in Python, based on behavioral and financial data.

Dataset Used

- File Name: Churn_Modelling (AI).csv
- Records: 10,000 customers
- Columns: 14 features including Customer ID, Geography, Age, Balance, EstimatedSalary, etc.
- Target: Exited (1 = customer left the bank, 0 = customer stayed)

Steps Followed

1. Data Cleaning
   - Removed null values (if any)
   - Removed duplicate records

2. Feature Engineering
   - Dropped irrelevant columns like RowNumber, CustomerId, Surname
   - Applied Label Encoding on Gender
   - Applied One-Hot Encoding on Geography

3. Train-Test Split
   - Split data into 80% training and 20% testing
   - Scaled features using StandardScaler

4. ANN Model Architecture
   - 1 Input Layer with 16 neurons (ReLU)
   - 1 Hidden Layer with 8 neurons (ReLU)
   - 1 Output Layer with 1 neuron (Sigmoid for binary classification)

5. Model Training
   - Trained the model using 50 epochs

6. Evaluation

 - Calculated Confusion Matrix and Classification Report
 - Final Test Accuracy achieved: 85%

Results

Metric	Class 0 (Stayed)	Class 1 (Exited)
Precision	0.88	0.62
Recall	0.92	0.50
F1 Score	0.90	0.55

- Overall Accuracy: 0.85

Conclusion

This project demonstrates how ANN can be used for customer churn prediction in the banking sector. With an accuracy of 85%, the model is effective in identifying at-risk customers, which can help businesses take proactive actions to retain them.