

# Customer Churn Prediction Using Artificial Neural Network (ANN)

## Project Overview

This project predicts whether a bank customer will leave the bank using an Artificial Neural Network (ANN). The model is trained using customer demographic and financial data.

## Dataset

Source: Kaggle - Credit Card Customer Churn Dataset

Target Variable: Exited (1 = Churn, 0 = Not Churn)

## Technologies Used

Python, NumPy, Pandas, Scikit-learn, TensorFlow, Keras, Matplotlib

## Data Preprocessing

- Removed unnecessary columns
- One-hot encoding applied
- Feature scaling using StandardScaler
- Train-test split (80-20)

## ANN Architecture

Input Layer: 11 neurons

Hidden Layer 1: 16 neurons (ReLU)

Hidden Layer 2: 8 neurons (ReLU)

Output Layer: 1 neuron (Sigmoid)

## Model Training

Optimizer: Adam

Loss Function: Binary Crossentropy

Epochs: 100

Batch Size: 32

## Evaluation Metrics

- Accuracy
- Confusion Matrix
- ROC-AUC Curve

## Results

Accuracy achieved: ~86–88%

ROC-AUC Score: ~0.87

The model performs well and generalizes effectively.

## Conclusion

The ANN model successfully predicts customer churn and can be used by banks to identify high-risk customers.

## Future Enhancements

- Add Dropout layers
- Hyperparameter tuning
- Try XGBoost or Random Forest
- Deploy using Streamlit