**Proof of Concept:**

**Customer Churn Prediction Using Neural Networks**

My project explains about churning a customer from bank using neural networks using a custom-built Artificial Neural Network (ANN) developed from scratch using NumPy. By using preprocessing techniques like normalization and one-hot coding. The model effectively learned from the 8000 observations and when I gave 2000 observations for testing it give me accuracy of predicting correcting is 80.8%. The aim was to identify customers likely to leave the bank, enabling some extra services or giving them some offers to make them stay. The pipeline from data cleaning to model evaluation was implemented without external ML libraries, proving that we can build a simple-neural network without any advanced libraries can still work well for real-world application problems

Key Points:

* Processed 10,000-row dataset by cleaning, encoding, and normalizing 11 input features.
* Built a 3-layer neural network (11→10→6→1) with ReLU and Tanh activations.(used many for testing-sigmoid, Linear, leaky\_ReLu)
* Trained for 10,000 epochs using Stochastic Gradient Descent (SGD) with η = 0.005.
* Achieved 80.8% test accuracy — effective learning confirmed by a smooth training curve.
* Fully implemented using only NumPy — no TensorFlow or PyTorch used.
* Future scope includes dropout layers, deeper networks, and model comparisons (e.g., Random Forest).