Executive Summary

Project Objective

To maximize revenue from direct marketing campaigns by strategically targeting clients with the optimal product offer (Consumer Loan, Credit Card, or Mutual Fund), while adhering to the constraint of contacting only 15% of the client base (~100 individuals).

Methodology & Process Flow

1. Data Preparation & Feature Engineering

- **Data Integration**: Combined four datasets (socio-demographic information, product holdings, transaction behavior, and sales/revenue data)
- **Feature Creation**: Engineered comprehensive features to capture client behavior patterns:
  - Product ownership indicators and combinations
  - Transaction behavior metrics (monthly counts, ratios, cash vs. cashless usage)
  - Client relationship metrics (tenure, product acquisition rate)
  - Asset-to-liability ratios and investment balance metrics
- **Test Dataset Generation**: Created a test set of 200 clients who each purchased exactly one product aligning with the business constraint that each customer can only be recommended one product offer.

2. Model Development

Three XGBoost classification models were trained using 5-fold cross-validation with grid search hyperparameter tuning:

Product	CV AUC	Validation AUC	Top Predictive Features
Mutual Funds	0.574	0.581	Has MF account or not, MF account balance, CA usage intensity
Credit Cards	0.576	0.485	Cashless transactions on debit card, MF account balance, CL account balance
Consumer Loans	0.672	0.657	Has CA or not, Transactions on debit card, Has OVD or not

3. Revenue Prediction & Propensity Scoring

- Generated purchase probability for each client-product combination
- Calculated expected revenue using average product revenue values per customer excluding test set:
  - Mutual Funds: 2.05
  - Credit Cards: 2.27
  - Consumer Loans: 3.33

4. Campaign Optimization & Client Targeting

- Selected the optimal product for each client based on highest expected revenue
- Ranked clients by expected revenue and selected top 100 for targeting
- The final selection strategy included a mix of:
  - Consumer Loans: 57 clients
  - Credit Cards: 33 clients
  - Mutual Funds: 10 clients

Key Results

Revenue Impact and Campaign Composition

Metric	Value	Calculation Method
Expected Campaign Revenue	724	Sum of expected revenue for selected clients based on their propensity and product-specific average revenue
Theoretical Maximum Revenue	1833	Sum of highest possible revenue across all products for top 100 clients if optimal conversion was achieved
Model Efficiency	40%	Ratio of Expected Campaign Revenue to Theoretical Maximum Revenue

High-Propensity Client Profiles

Mutual Funds Prospects
- Top examples: Client 1406 (0.790 propensity), Client 230 (0.741 propensity)

Credit Card Prospects
- Top examples: Client 478 (0.978 propensity), Client 230 (0.973 propensity)

Consumer Loan Prospects
- Top examples: Client 1431 (0.971 propensity), Client 447 (0.947 propensity)

Deliverables

- The Targeted Client List specifying selected clients for each offer can be found in the saved `targeted_clients.csv` file, which contains client IDs, recommended product offers, expected revenue, and propensity scores.
- Complete model predictions for all test clients are available in the underlying code outputs, which can be exported if needed for further analysis.