# Executive Summary: Direct Marketing Optimization

## 1. Objective & Business Problem

In this project, we aim to optimize direct marketing efforts by identifying high-propensity clients for personalized product offers. The objective is to maximize conversion rates and increase expected revenue by targeting the right clients for Consumer Loans, Credit Cards, and Mutual Funds.

### Key Business Questions:

1. Which clients have the highest likelihood of purchasing each product?
2. Which clients should be targeted for maximum ROI?
3. What is the expected revenue from this optimized marketing strategy?

## 2. Data & Methodology

**Data Sources:** DataScientist_CaseStudy_Dataset.xlsx

**Machine Learning Approach:**

- **Feature Selection:** Recursive Feature Elimination (RFE) with Random Forest.
- **Modeling Techniques:**
  - Random Forest Classifier
- **Performance Evaluation:** AUC-ROC scores used to assess model effectiveness.
- **Model Robustness :** K-Fold Cross validation and standard deviation analysis.
- **Target Selection:** Top 15% of clients with the highest predicted propensity scores.

## 3. Results & Insights

**Model Performance (AUC-ROC Scores):**

| | |
|---|---|
| **Consumer Loan** | 0.65 |
| **Credit Card** | 0.66 |
| **Mutual Fund** | 0.53 |

## High-Propensity Clients per Product:

**Consumer Loan Campaigns:**

- Target long-tenure clients with high balances and transaction volumes.
- Prioritize older clients with consistent credit transactions.

**Credit Card Offers:**

- Focus on clients with high account balances and active credit inflows.
- Prioritize middle-aged, long-tenure clients with high transaction activity.

**Mutual Fund Promotions:**

- Market to clients with steady inflows and larger account balances.

- Educate older clients on wealth growth through investments.

### 4. Targeting Strategy & Expected Revenue

**Final Targeting Strategy:**

- **Each client receives only one best-matching offer.**

**Output -** top_fund_clients.csv , top_card_clients.csv, top_loan_clients.csv

- **Selection Criteria:** Rank all clients by their highest propensity score and select the top 15% (~100 clients).

**Output -** target_clients.csv

**Client Distribution for Targeted Offers:**

- **Consumer Loan:** 12 clients
- **Credit Card:** 84 clients
- **Mutual Fund:** 0 clients

**Revenue Estimation:**

- **Average Revenue per Product (from training data):**
  - **Consumer Loan:** $43.25 per client
  - **Credit Card:** $227.88 per client
  - **Mutual Fund:** $0 per client
- **Total Expected Revenue:**
  - **Consumer Loan Revenue:** 12 × $43.25 = $519
  - **Credit Card Revenue:** 84 × $227.88 = $19,141.92
  - **Mutual Fund Revenue:** 0 × $0 = $0
  - **Total Projected Revenue: $19,660.92**

### 5. Key Takeaways & Recommendations

### Findings:

✅ **Data-Driven Targeting:** High-propensity clients identified with precision.

✅ **Optimized Outreach:** Personalized offers can lead to increase conversion potential.

✅ **Significant Revenue Uplift:** Expected revenue increase through focused targeting.

### Recommendations:

🔹 **Personalized Marketing Campaigns:** Use tailored messaging for each customer segment.

🔹 **Cross-Sell Strategies:**Engage clients with multiple high-propensity scores.

🔹 **Model Refinement:** Continuous updates with new customer data for higher accuracy.

## 6. Conclusion

This data-driven approach ensures efficient marketing spend by prioritizing high-value clients and maximizing expected revenue. Future improvements include refining models with additional behavioral data and running A/B tests to fine-tune marketing effectiveness.