

PREDICTIVE AND DESCRIPTIVE ANALYTICS

APPLICATION IN MARKETING FOR FUNDRAISING



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Direct Social Communications
your partner in fundraising



KEY PARTS

1. Introduction

- Business Objective
- Dataset Overview

2. Understanding Donors

- Donor Profiling (Top 20%)
- Buyer Persona

3. Method & Modeling

- Methodology & Data Preparation
- Model Development
- Model Results & Performance

4. Campaign Application

- Score on Donors
- Recommendations
- Conclusion

A message can change everything !



CONTEXT AND BUSINESS QUESTION

- DSC has supported fundraising since 1985.
 - They help NGOs run re-activation campaigns through direct mail.
 - We focus on donors who previously gave €30+.
 - Current results:
 - CPC = €0.80
 - Response rate = 1.8%
 - One Client cost us **44.44 €**
1. Can we build a model that improves the average response rate?
 2. Which model performs best?
 3. Can we identify and target the top donors?
 4. Can the results convince the Head of Data Analytics?

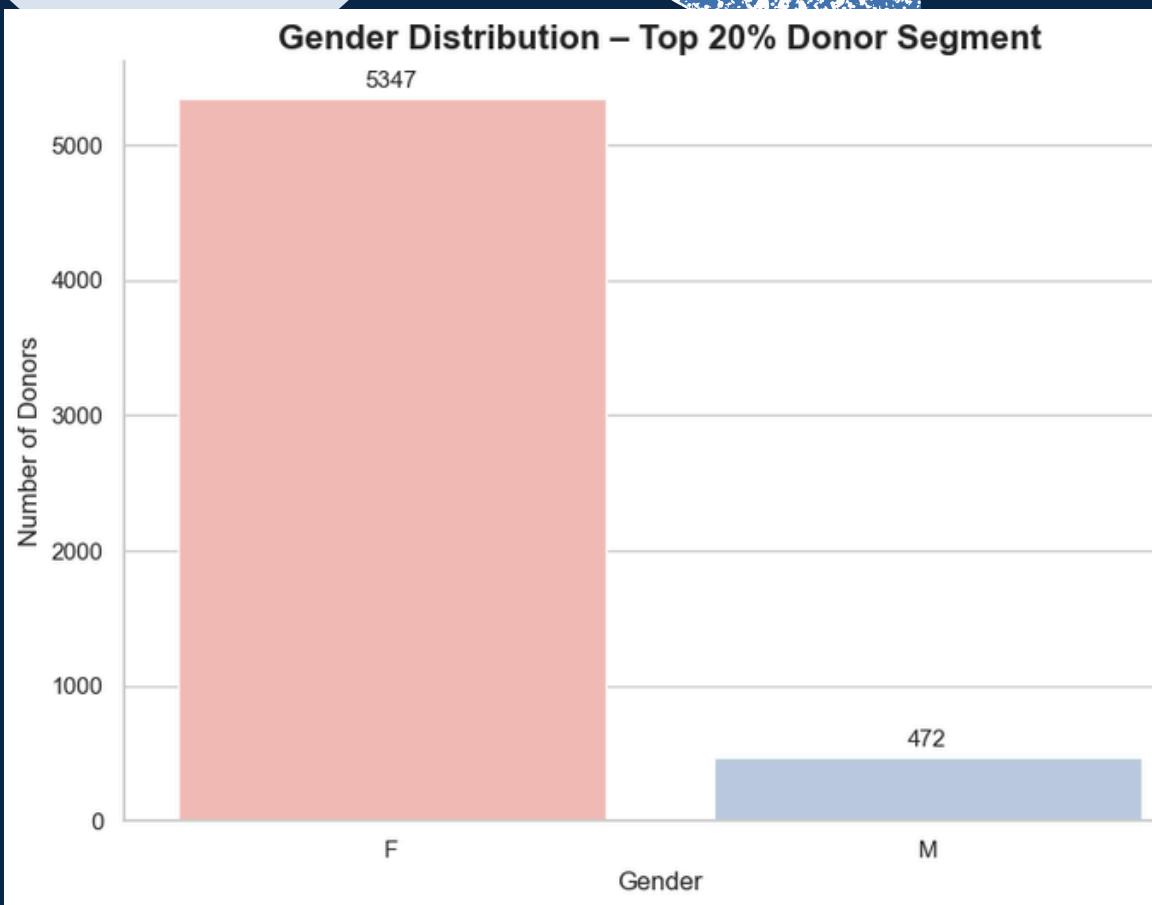
DATASETS

We work with a relational database containing almost 20 years of donor history:

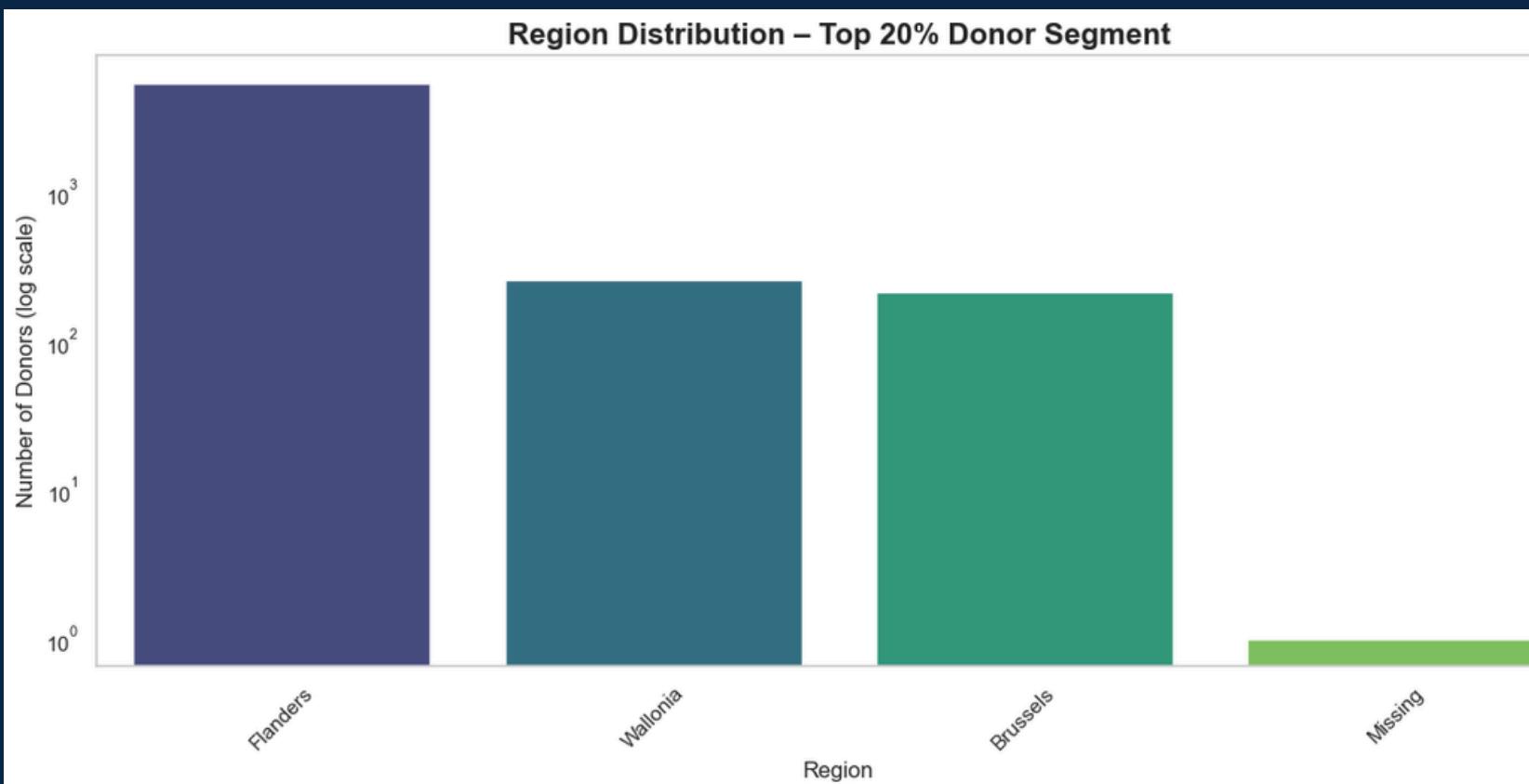
1. Donors: Demographics (age, region, gender).
2. Gifts: Transaction history of all donations.
3. Campaign 6169: Used for model training.
4. Campaign 7244: Used for model validation.
5. Campaign Metadata: Additional information about previous marketing actions.

PROFILING INSIGHTS

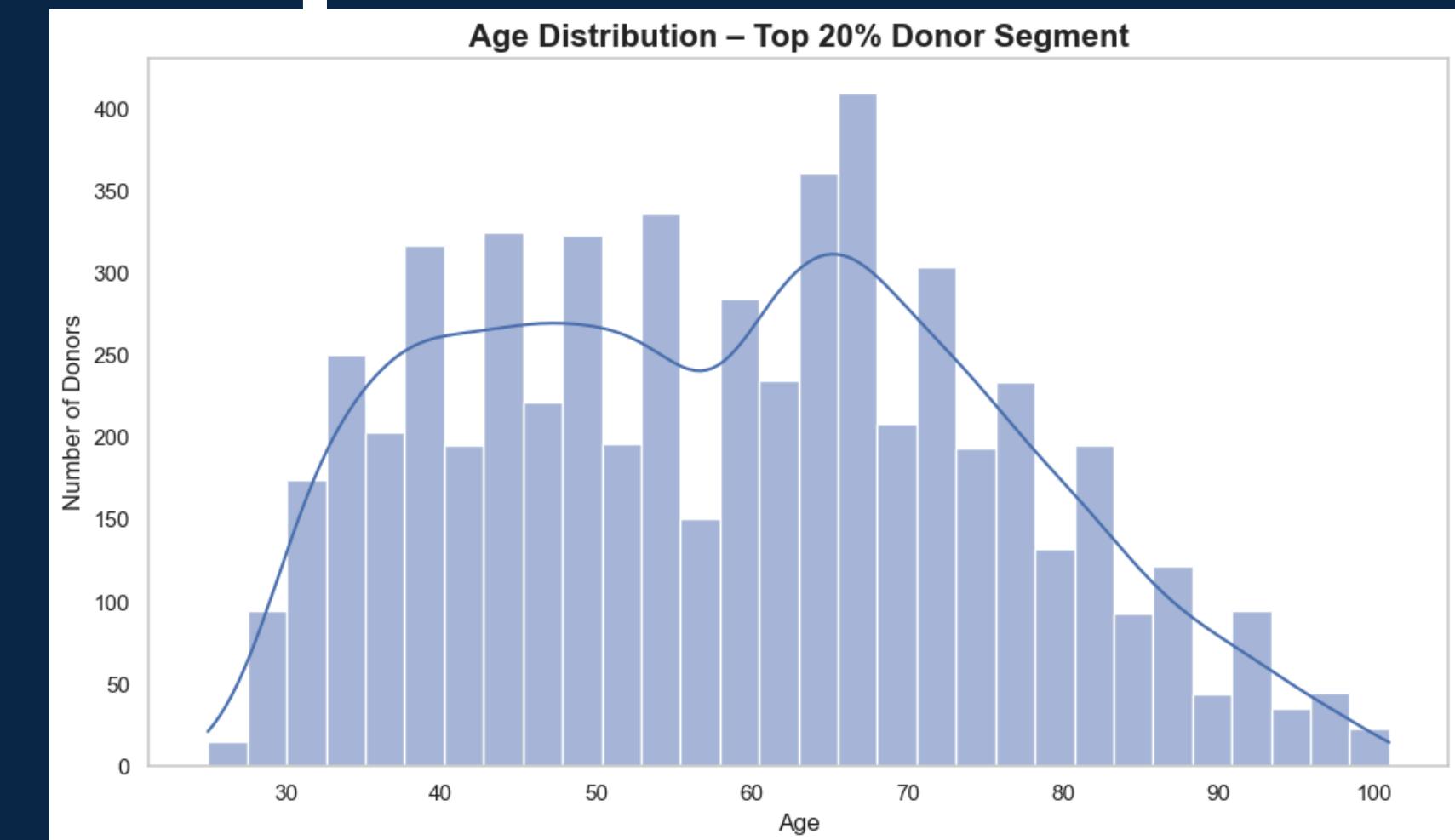
- TOP 20% DONOR SEGMENT



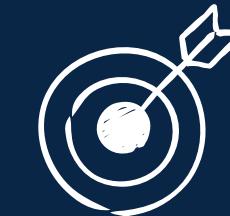
- Females donate more than males



- Age Distribution
- Insight: Top donors are mainly 45–65 years old.



- Region Distribution
- Insight: Flanders dominates the donor base.



BUYER PERSONA

High-Value Donor (Top 20%)



Demographics

- Female
- Age: 45–75
- Region: Flanders
- Stable income

Motivations

- Social impact
- Trust and transparency
- Connection with cause

Behavior

- Donates regularly
- Gives higher amounts
- Long-term donor

Channels

- Direct mail
- Email
- SMS reminders

MODELS

- AUC SCORE of 0.7301
- Accuracy of 0.7254
- The Catboost Model is the winner of our competition

🚀 Training CatBoost Model (Depth=4, L2=3)...

🏆 MODEL RESULTS

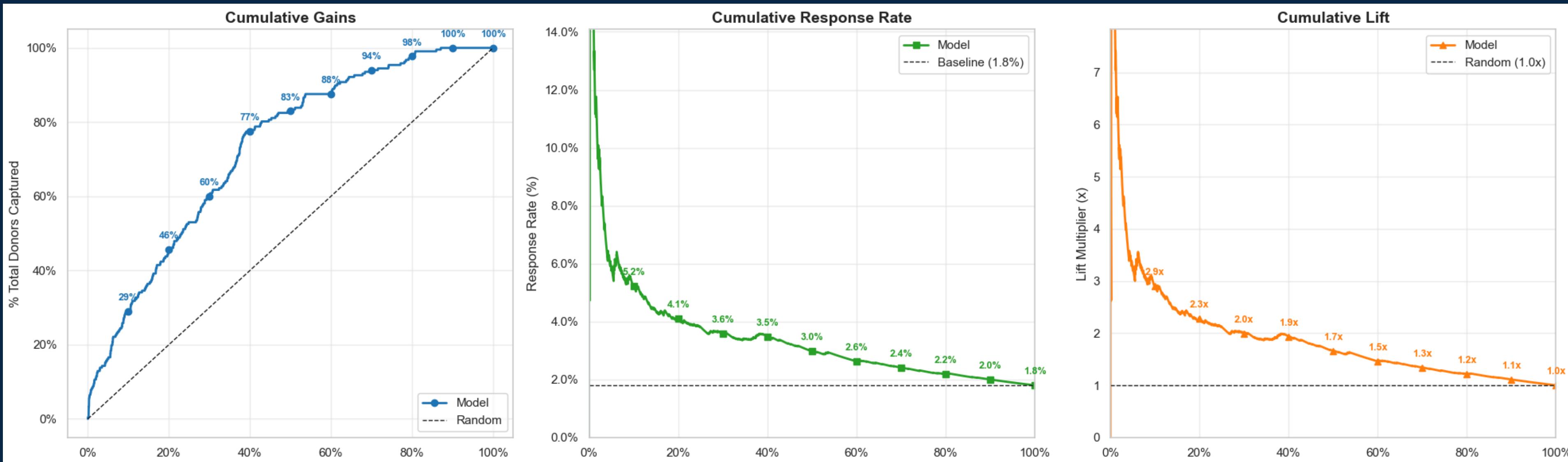
AUC Score: 0.7301

Accuracy: 0.7254

- Now the objective is to find the optimal % of the population to target.
- The objective is to maximize our profit

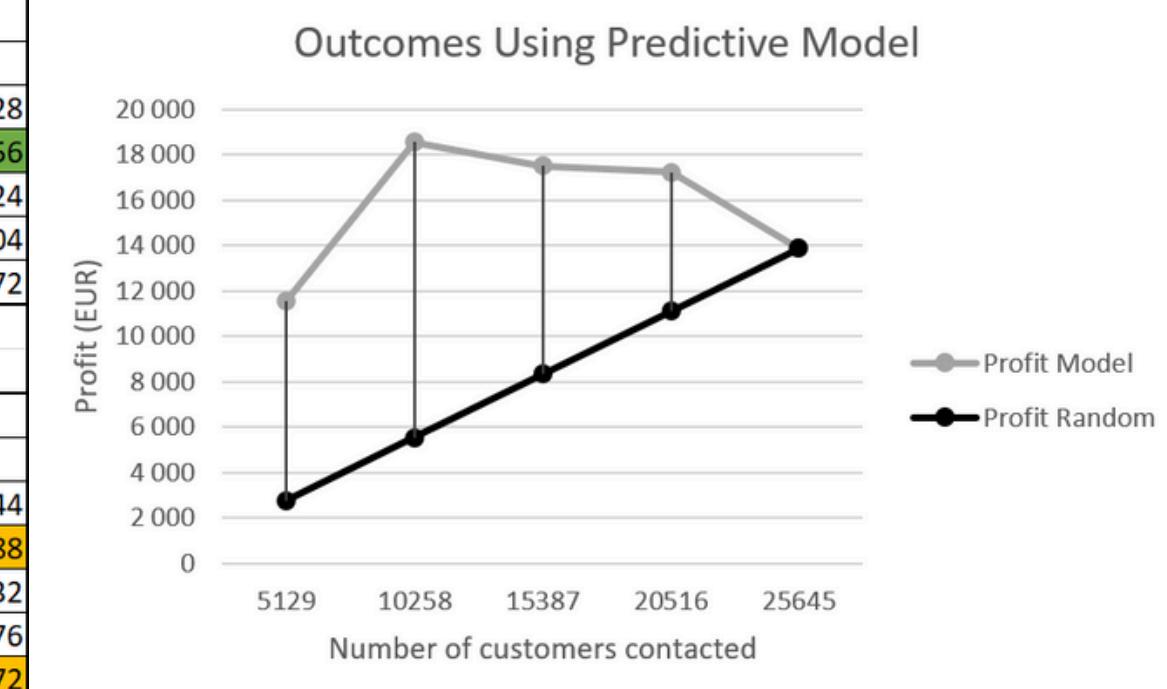


GAINS, RESPONSE & LIFT



CATBOOST VS RANDOM

| MODEL | | | With model | | | | |
|------------------------------|---------------------|-----------------|------------------|--------------------|-------------------|----------------|---------------|
| Fraction of people contacted | Cumulative response | Cumulative gain | num contacted | Cost of contacting | num new customers | Revenue Model | Profit Model |
| 0.2 | 4.10% | 46% | 5129 | 4103.2 | 210.289 | 15670.7363 | 11567.53628 |
| 0.4 | 3.50% | 77% | 10258 | 8206.4 | 359.03 | 26754.9156 | 18548.5156 |
| 0.6 | 2.60% | 88% | 15387 | 12309.6 | 400.062 | 29812.6202 | 17503.02024 |
| 0.8 | 2.20% | 98% | 20516 | 16412.8 | 451.352 | 33634.751 | 17221.95104 |
| 1.0 | 1.80% | 100% | 25645 | 20516 | 461.61 | 34399.1772 | 13883.1772 |
| | | | | | | | |
| | | | Random selection | | | | |
| Fraction of people contacted | | | num contacted | Cost of contacting | num churners | Revenue Random | Profit Random |
| 0.2 | 1.80% | | 5129 | 4103.2 | 92.322 | 6879.83544 | 2776.63544 |
| 0.4 | 1.80% | | 10258 | 8206.4 | 184.644 | 13759.6709 | 5553.27088 |
| 0.6 | 1.80% | | 15387 | 12309.6 | 276.966 | 20639.5063 | 8329.90632 |
| 0.8 | 1.80% | | 20516 | 16412.8 | 369.288 | 27519.3418 | 11106.54176 |
| 1.0 | 1.80% | | 25645 | 20516 | 461.61 | 34399.1772 | 13883.1772 |



Baseline: Average response 1.8%.

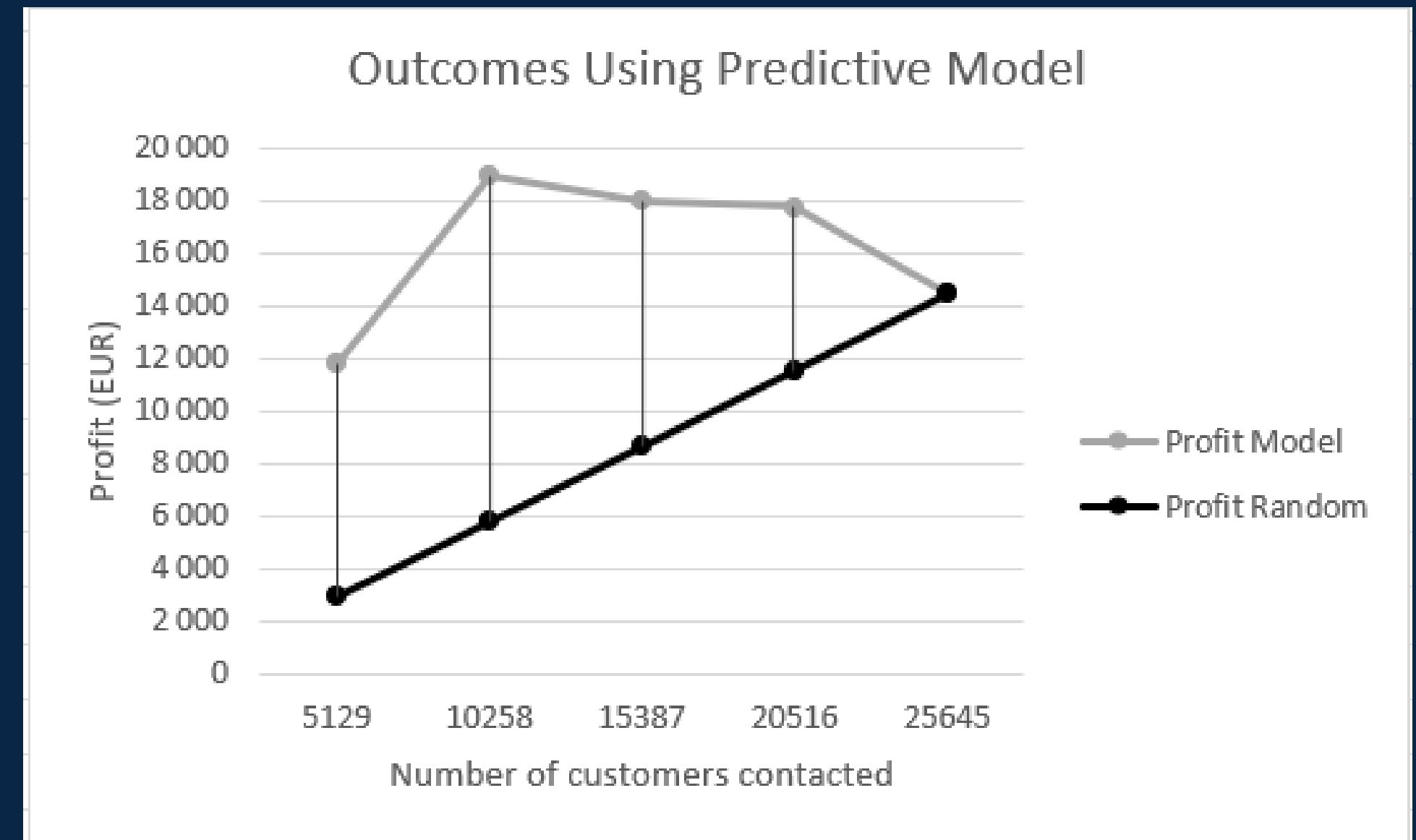
Model Performance: Average response rate increases to 3.5%.

+94% of increase ARR by targeting the top 40%

One client cost us 23 € (VS 44 € before)

RESULTS

- By utilizing predictive analytics to target the Top 40%, we reduce mailing costs by 60% and immediately unlock €12,309 in strategic savings.
- This efficiency delivers a profit of €18,548€ (VS 13893 for Baseline)+5K
- Incremental Money = 17 000 €





RESULTS

Imagine the immediate, tangible impact our model delivers on the ground: 67,000 distributed meals. 300 children educated for an entire year (17k). This is the exact financial power that we are unlocking here.

How do we translate this vision from theory into this real-world success? The answer is clear: we must bet on predictive analysis. And to achieve this level of precision and humanitarian yield, CatBoost is our greatest asset.





CONCLUSION

Through extensive study and rigorous predictive analysis, we can affirm a powerful duality: Our model demonstrably maximizes profit while minimizing operational costs.

This is more than just financial efficiency; it represents a direct ethical leverage.

Every dollar saved and every dollar gained translates directly into the capacity for the association to significantly amplify its humanitarian contribution and reach more people in need.

In resume, Go for it

THANKS :)

Elie, Qiushuang, Lenny



Direct Social Communications

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