

# DATA EXPLORATION & INSIGHTS

# Data-Driven Insights for Campaign Optimization

## (Customer Segmentation)

Based on customer demographics and financial behavior, three key segments were defined:

|                       | <b>Segment A</b><br><i>Rising Achievers</i> | <b>Segment B</b><br><i>Established Professionals</i> | <b>Segment C</b><br><i>Experienced Traditionalists</i> |
|-----------------------|---|--|--|
| <b>Age Group</b>      | Age 26–35                                   | Age 36–50  | Age 51–60  |
| <b>Type of job</b>    | admin, technician, blue-collar, services    |  | admin, blue-collar, retired, technician, management    |
| <b>Marital status</b> | single, married                             | married  |  |
| <b>Education</b>      | university, high school, basic.9y           |  | university, high school, basic.4y                      |

# Data-Driven Insights for Campaign Optimization

## (The Optimal Customer Interaction through Phone Call)

Customer interaction analysis revealed clear engagement patterns, allowing us to categorize customers into high, moderate, and low engagement types for tailored strategy design:

|                            | Recommendation  |
|----------------------------|---|
| Contact Month              | <ul style="list-style-type: none"><li>- Distribute campaign efforts more evenly throughout the year</li><li>- Avoid overload between May to August</li></ul>  |
| Contact Day                | <ul style="list-style-type: none"><li>- Optimize outreach on Tue–Thu (with focus on Thursday)</li><li>- Avoid low-efficiency days: Monday &amp; weekends</li></ul>  |
| Number of Contact Attempts | <ul style="list-style-type: none"><li>- Optimizing content, timing, and approach in the first 1–3 contact attempts</li><li>- Consider a stop rule after 4 contacts unless there's positive engagement</li></ul> |
| Days since Last Campaign   | <ul style="list-style-type: none"><li>- Focus contact within 2-15 days post-campaign</li><li>- Can use gentle reminders</li></ul>   |

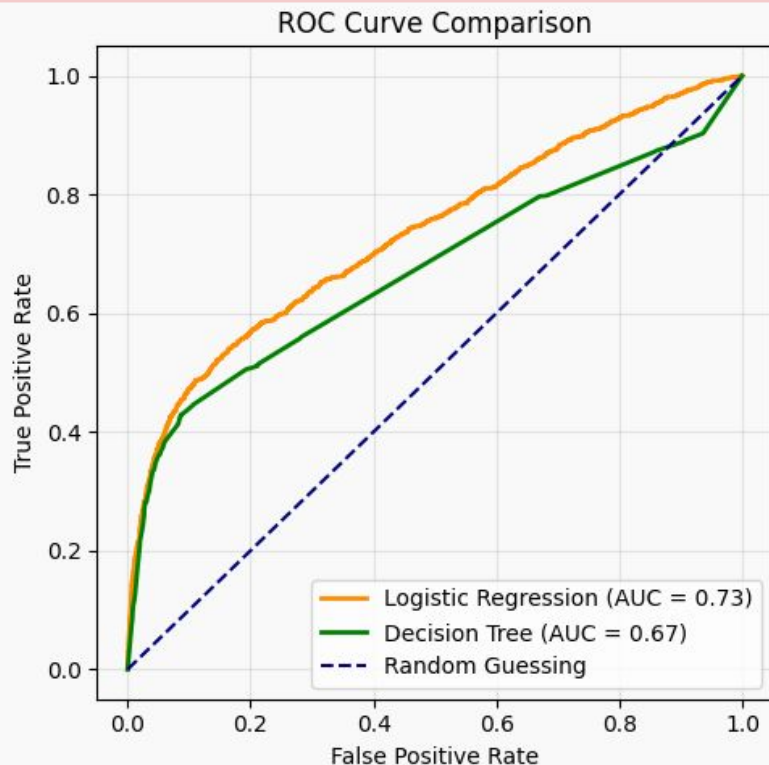
# Data-Driven Insights for Campaign Optimization

(The Optimal Customer Interaction through Phone Call)

|   | Recommendation   |
|---|--|
| <b>Call Duration</b>                                  | <ul style="list-style-type: none"><li>- Optimal effectiveness at 6–20 mins</li><li>- Can extend call (20+ mins) to build trust and clarity</li><li>- Avoid exceeding 45 minutes</li></ul>  |
| <b>Number of Contact Attempts (Previous Campaign)</b> | <ul style="list-style-type: none"><li>- Customers with 1–3 prior contacts: prioritize and personalized messaging that reinforces previously discussed benefits</li><li>- New leads: pre-screen carefully, invest in strong first-touch marketing (introductory content and trust-building)</li></ul> |
| <b>Previous Campaign Outcome</b>                      | <ul style="list-style-type: none"><li>- Previously converted: prioritize, reconnect early</li><li>- New leads: pre-screen carefully, invest in strong first-touch marketing</li></ul>  |

# MODELING & EVALUATION

# Model Evaluation



| Metric    | Logistic Regression | Decision Tree |
|-----------|---------------------|---------------|
| Accuracy  | 81.5%               | 85.96% ✓      |
| Precision | 0.305               | 0.381 ✓       |
| Recall    | 0.522 ✓             | 0.426         |
| F1-score  | 0.385               | 0.402 ✓       |
| AUC       | 0.734 ✓             | 0.672         |

→ Logistic Regression shows better separation ability.

# Model Recommendation

## ★ Logistic Regression:

- Stronger in Recall & AUC → Better at covering buyers
- Key features focus on customer interaction status (contact history, previous campaign outcomes)

## ★ Decision Tree:

- Stronger in Accuracy & Precision → Better at identifying high-potential customers
- Key features combine customer interaction status and customer demographics (age, education, job type) → Offers more intuitive prediction logic

→ **Recommended Model: Decision Tree — preferred for targeting potential buyers**

**effectively**

# KEY FINDINGS & RECOMMENDATIONS



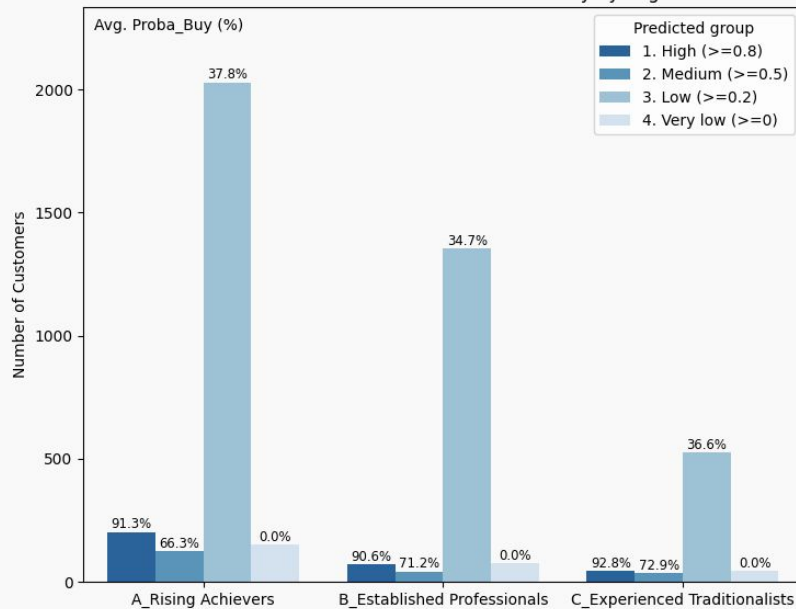
# Applying the Predictive Model to Test Data

★ **Assumption:** This analysis is based on a **bank marketing** campaign targeting **term deposit** subscriptions. The campaign is designed for **long-term objectives** and aims to **optimize resource allocation**.

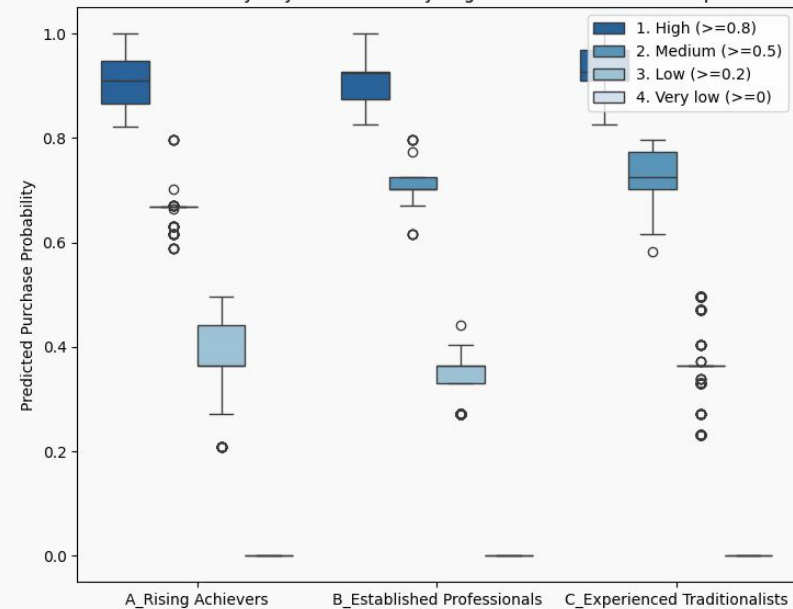
★ **Description:**

- The test dataset was categorized into the 3 customer segments and apply the predictive model to estimate purchase probabilities:
  - + Segment A\_Rising Achievers: 2509 customers
  - + Segment B\_Established Professionals: 1543 customers
  - + Segment C\_Experienced Traditionalists: 652 customers
  - + Unassigned: 6767 customers

Distribution of Predicted Purchase Probability by Segment



Probability Buy Distribution by Segment and Predicted Group



- + **High group (90–93%):** Very high predicted rate. The model distinguishes clearly, strong concentration in prediction accuracy. → Should be prioritized as the primary target for campaign efforts
- + **Medium group (66–72%):** Variable purchase rate by segment. The model's classification is moderately dispersed. → Should have tailored and personalized messaging, promising group if resources allow
- + **Low group (34–38%):** Low predicted rate. The model doesn't clearly distinguish, predictions are still a bit noisy. → Should be nurtured slowly or excluded
- + **Very low (0%):** No purchase likelihood. The model distinguishes clearly → Should not pursuing

# Key Findings & Actionable Recommendations

(Tailored Messaging & Channel Guide)

|                              | <b>Segment A</b><br><i>Rising Achievers</i>  | <b>Segment B</b><br><i>Established Professionals</i>  | <b>Segment C</b><br><i>Experienced Traditionalists</i>  |
|------------------------------|--|---|---|
| <b>Customer Demographics</b> | Age: 26–35<br>Job: admin, technician, blue-collar, services<br>Status: single, married<br>Education: university, high school, basic.9y         | Age: 36–50<br>Job: admin, technician, blue-collar, services<br>Status: married<br>Education: university, high school, basic.9y      | Age: 51–60<br>Job: admin, blue-collar, retired, technician, management<br>Status: married<br>Education: university, high school, basic.4y |
| <b>Key Messaging</b>         | <ul style="list-style-type: none"><li>- Financial freedom</li><li>- Competitive interest rates</li><li>- Flexible short-term options</li></ul> | <ul style="list-style-type: none"><li>- Highlight long-term goals</li><li>- Financial security</li><li>- Risk-free growth</li></ul> | <ul style="list-style-type: none"><li>- Safety</li><li>- Stable interest rates</li><li>- Direct customer support</li></ul>                |
| <b>Suggested Channels</b>    | <ul style="list-style-type: none"><li>- Digital campaigns</li><li>- In-app notifications</li><li>- Social media ads</li></ul>                  | <ul style="list-style-type: none"><li>- Email marketing</li><li>- Direct consultation</li><li>- Loyalty/member programs</li></ul>   | <ul style="list-style-type: none"><li>- Phone consultations</li><li>- In-branch brochures</li><li>- Exclusive customer seminars</li></ul> |

# Key Findings & Actionable Recommendations

(Interaction Strategy by Customer Probability Segment)

| High (0.8 - 1)<br>Direct offers<br>to trigger purchase   | Medium (0.5 - 0.8)<br>Personalized content,<br>nurturing engagement | Low (0.2 - 0.5)<br>Light nurturing,<br>exclude if necessary          | Very low (0 - 0.2)<br>Maintain brand<br>awareness only                 |
|--|---|--|--|
| <b>Phone call</b> <i>(can be based on the optimal customer interaction analysis discussed above)</i> |   |  |  |
| Strongly recommended<br>— effective for quick<br>conversion  | Recommended<br>selectively — use for<br>personalized guidance       | Not prioritized — phone<br>calls are not<br>cost-effective here      | Not recommended —<br>little to no return from<br>calling efforts       |
| <b>Email / Messaging</b>   |   |  |  |
| Direct offers, strong<br>call-to-action messages   | Personalized messaging<br>based on profile and<br>behavior          | Occasional<br>brand-focused emails —<br>maintain light<br>connection | Inspirational,<br>community-oriented<br>content — avoid sales<br>pitch |

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|---|--|--|---|
| <b>Advertising / Retargeting</b>                              |  |  |   |
| Targeted ads with clear<br>CTA to drive conversions           | Behavioral retargeting<br>with tailored messaging                          | Optional light<br>retargeting — nurture<br>gently                  | Not recommended —<br>low ROI for ad spend                     |
| <b>Chatbot / Automated Assistance</b>                         |  |  |   |
| Conversion-focused —<br>order placement, offer<br>activation  | Quick answers,<br>informative guidance,<br>support logic                   | Light touchpoint —<br>minimal resources<br>needed                  | Not necessary — avoid<br>deploying chatbot<br>resources here  |