Fundraisings Campaign

Assignment #4:
Predictive Modeling

Marketing Analysts

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Paralyzed Veterans
of America

Business Situation & Objectives

The Situation

- Paralyzed Veterans of America (PVA) seeks to enhance the response rates of their fundraising campaigns by targeting lapsed donors—those who have not donated in the past 12 months. This initiative aims to increase donations and support for veterans with spinal cord injuries and diseases.

Primary Business Objectives

- **Develop a Decision Tree Model:** Identify the characteristics of donors most likely to respond to future campaigns using predictive analytics to better target active and non-active donors.
- **Profile Lapsed Donors:** Use the model results to create detailed profiles of lapsed donors to improve campaign targeting.
- **Perform Financial Analysis:** Conduct an analysis to guide data-driven decisions, ensuring that targeting strategies are cost-effective and maximize the return on investment for future campaigns.

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Analysis Approach

The Predictive Analytics Technique Utilized in the Analysis
- The decision tree modeling technique was employed to segment lapsed donors based on their likelihood of responding to fundraising campaigns. This method helps in understanding patterns and making data-driven predictions.

The Predictor Variables Considered in the Model Development Process
- **DemAgeGrp:** Age groups of the donor (missing, <40, 40+)
- **DemGender:** Gender of the donor
- **DemMedHomeVal:** Median Home Value in the region
- **DemPctVeterans:** % of veterans in the region that donor lives in
- **FundCnt:** # of fundraising solicitations ever received from PVA
- **GiftAvgAll:** Average $ amount of each gift across all months
- **GiftCnt36:** Gift Count 36 Months
- **StatusStarDonor:** Star donor - anyone who gave to 3 consecutive PVA campaigns in lifetime (1 = Star, 0 = non-Star)

The Assessment Metrica Used to Select the Best Decision Tree Model
- **Misclassification Rate:** Measures the proportion of incorrect predictions to evaluate model accuracy.
- **Lift:** Assesses the model's effectiveness in identifying high-response segments, enhancing targeting strategies.
- **Cumulative Lift Analysis:** Demonstrates the model's ability to differentiate likely responders from non-responders over cumulative percentages of the dataset, optimizing future fundraising efforts.

The Assessment Metric Result
- **Misclassification Rate:** 0.1739 = 17.39%
- **Validation Miscalification Rate:** 0.1801 = 18.01%
- The selected decision tree model exhibited a high cumulative lift, indicating robust performance in distinguishing likely responders from non-responders. This effectiveness is visualized in the cumulative lift chart, where higher lift values represent improved targeting capabilities.

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DESCRIPTION OF PVA DONORS IN SELECTED DECISION TREE MODEL LEAF NODES

Terminal Leaf Node...	Terminal Leaf Description	Estimated Campaign Response Rate
...with the Highest % of Event Level type 1 (Responded to campaign)	Terminal Leaf Node 6: Lapsed PVA Donors who have received 6 to 18 gifts in the last 36 months and have given between 2 to 3 fundraising solicitations from PVA responded to the campaign. Total count of the leaf node is 70 (Indicates the amount of people).	70.00%
...with the 2nd Highest % of Event Level type 1 (Responded to campaign)	Terminal Leaf Node 1: Lapsed PVA Donors who have been given 3 or more gifts in the last 36 months.	27.55%
...with the 2nd Lowest % of Event Level type 1 (Responded to campaign)	Terminal Leaf Node 5: Lapsed PVA Donors who have received 18 or more gifts in the last 36 months and have been given 2 to 3 fundraising solicitations from PVA responded to the campaign. Total count of the leaf node is 962 (Indicates the amount of people).	8.11%
...with the Lowest % of Event Level type 1 (Responded to campaign)	Terminal Leaf Node 4: Lapsed PVA Donors who have been given 0 to 2 gifts in the last 36 months.	1.95%
...with the Highest count (# of observations)	Terminal Leaf Node 1: Lapsed PVA Donors who have been given 3 or more gifts in the last 36 months.	2,192.00

Model Cumulative Lift Results

Cumulative Lift Chart
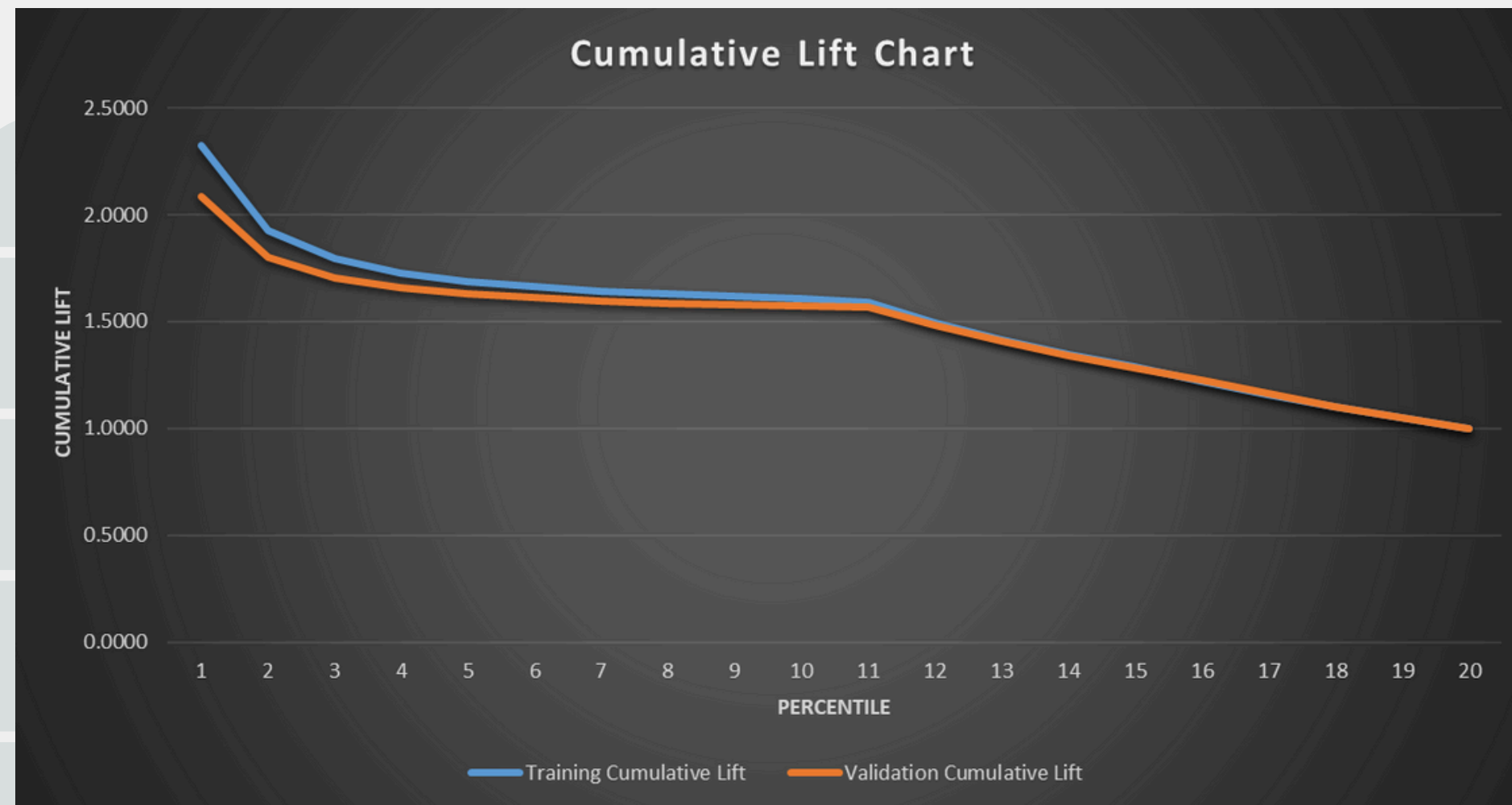
Purpose of a Lift Chart
- A lift chart is used to measure the effectiveness of a predictive model in identifying positive responses. It compares the model's performance against a random selection baseline to show how much better the model is at identifying likely responders.

Key Takeaways from the Cumulative Lift Chart Results
- **High Initial Lift:** The model shows a significant lift in the initial percentiles, indicating its strong ability to identify high-response segments.
- **Consistency:** The lift values decrease steadily, reflecting that the model maintains its predictive power across different segments.
- **Validation:** The proximity of the training and validation lines indicates the model's robustness and generalizability. The validation cumulative lift consistently outperforms the training cumulative lift, reinforcing the model's effectiveness in real-world applications.

Financial **Analysis**

Financial Analysis Assumptions

- Expected Overall Response Rate (if no model implemented): **18.00%**

- Marketing Cost Per Individual: **$1.28** (includes development and delivery of one direct mail package and up to two email follow-up reminders)

- Average Donation Amount: **$6.20** (reflecting the current environment where PVA expects lower average donation amounts)

- Total PVA Lapsed Donor Population: **195,603.00**
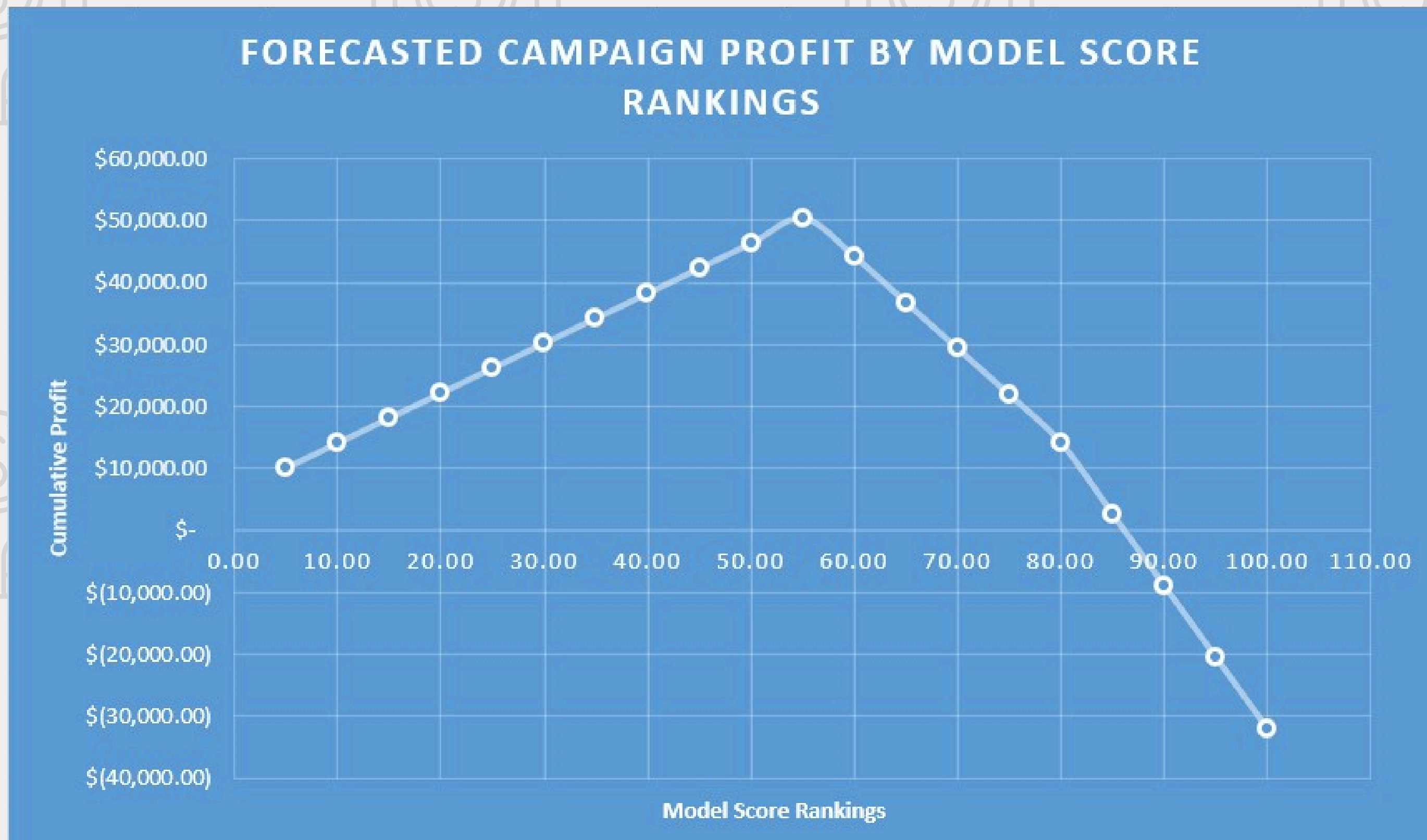
Financial Recommendations

Recommendation
- **Target Top 55.00% of Donors:** Based on the model's cumulative lift, targeting the top **55.00%** of the lapsed donor population is recommended to maximize the cumulative profit.

Expected ROI Calculation
- **Number of Targeted Donors:** 107,582.00 (55.00% of 195,603.00)
- **Expected Responders:**
  - Using the cumulative lift chart, if the cumulative lift for the top 55.00% is 1.57;
  - The expected response rate is 1.57 * 18.00% = 28.21%.
  - Expected Responders: 107,582.00 * 28.21% = 30,346.80
- **Expected Revenue:**
  - 30,346.80 * $6.20 = $188,151.96
- **Cost of Solicitations:**
  - 107,582.00 * $1.28 = $137,706.56
- **ROI Calculation:**
  - ROI = (Expected Revenue - Cost of Solicitations) / Cost of Solicitations
  - ROI = ($188,151.96 - $137,706.56) / $137,706.56 = 0.3663 or 36.62%

Financial Chart

FORECASTED CAMPAIGN PROFIT BY MODEL SCORE RANKINGS

THANK YOU
from us all

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Dear Professor McGuirk,

Thank you for being the best Prof

one can ask for! Wish you the best.

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