

## DSTI\_Nguyen\_Report\_page\_73

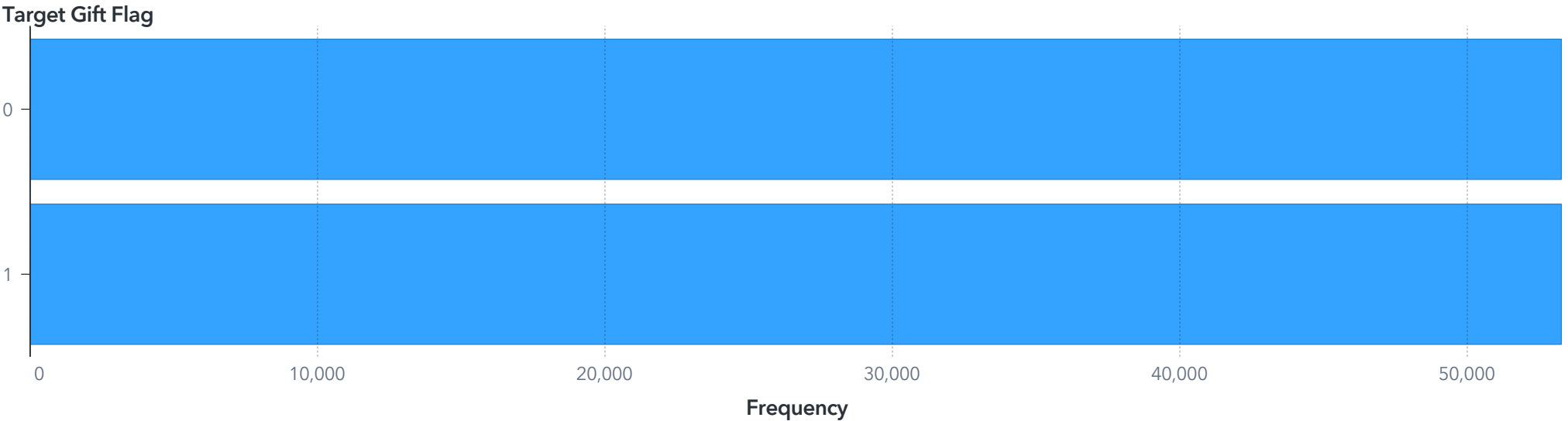
Creation Date: Saturday, July 6, 2024 10:32:19 AM

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Phuc Nguyen PHAM - Exercice 2



Frequency of Target Gift Flag

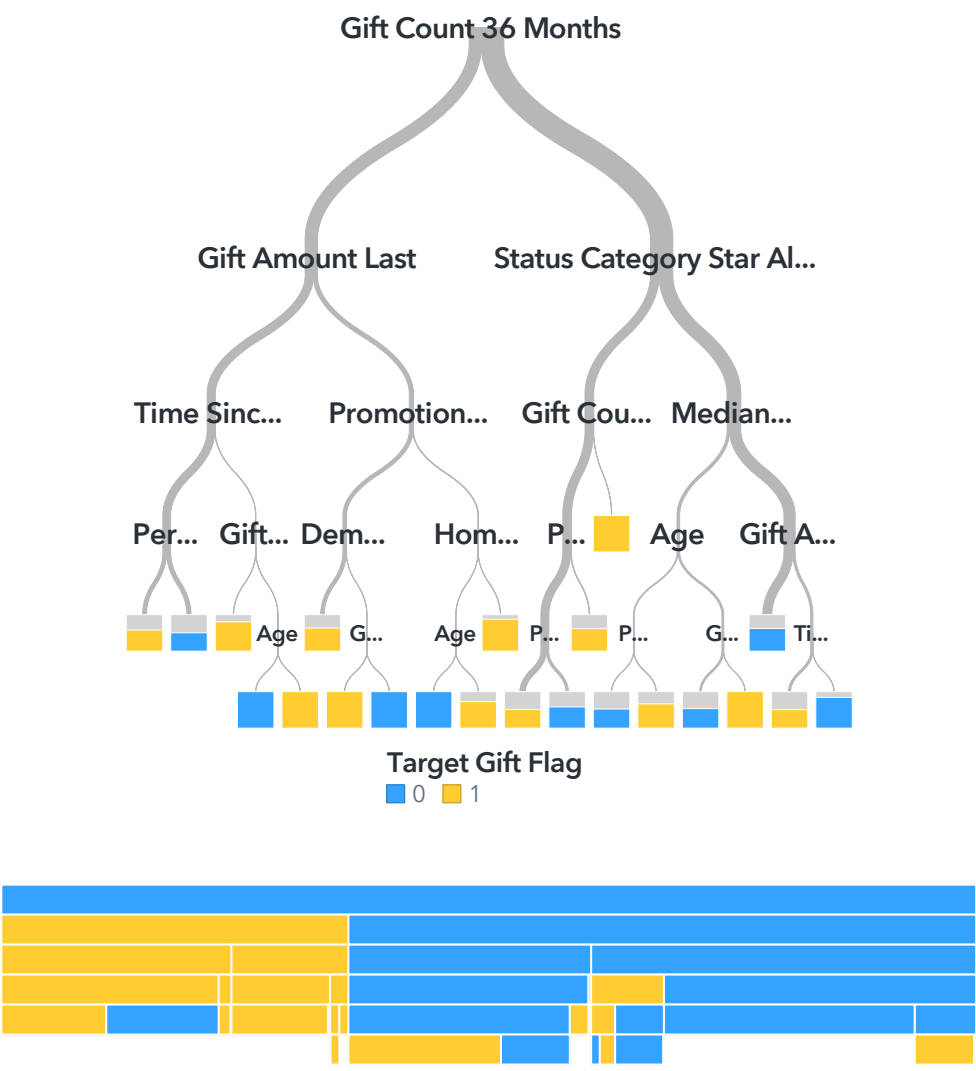


Control Number	Age	Frequency	Median Income Region	Demographic Cluster	Gender	Home Owner	Status Category 96NK	Frequency Percent ▲
10002	67	1	\$0	23	F	U	A	0.00%
10003	.	1	\$38,750	00	M	U	S	0.00%
10004	.	1	\$38,942	00	M	U	E	0.00%
10005	53	1	\$71,509	35	M	U	F	0.00%
10006	47	1	\$92,514	00	M	H	S	0.00%
10007	58	1	\$72,868	35	M	H	A	0.00%
10008	.	1	\$0	08	U	U	A	0.00%
10009	.	1	\$0	35	F	U	A	0.00%
10010	.	1	\$0	13	U	U	A	0.00%
10011	.	1	\$0	15	U	U	S	0.00%

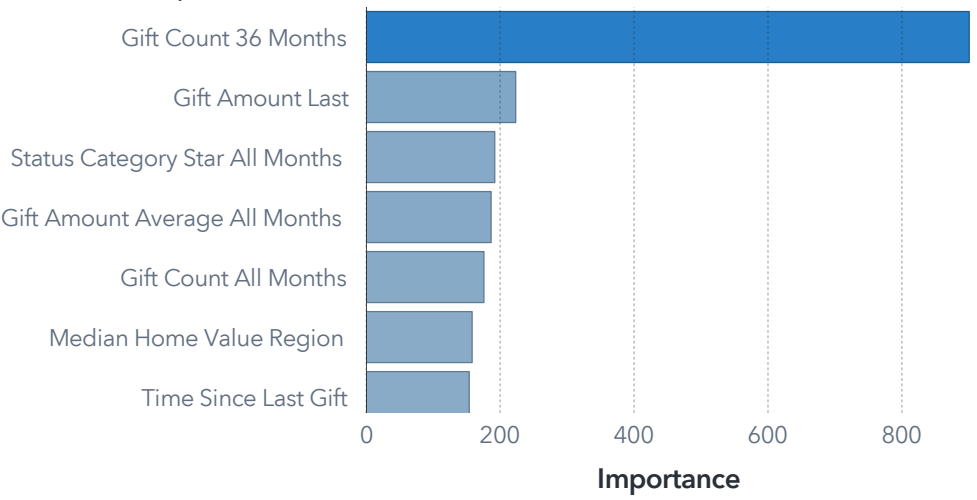


Decision Tree   **Target Gift Flag**   (event=1)   KS (Youden)   **0.1639**   Observations Used   **106,546**

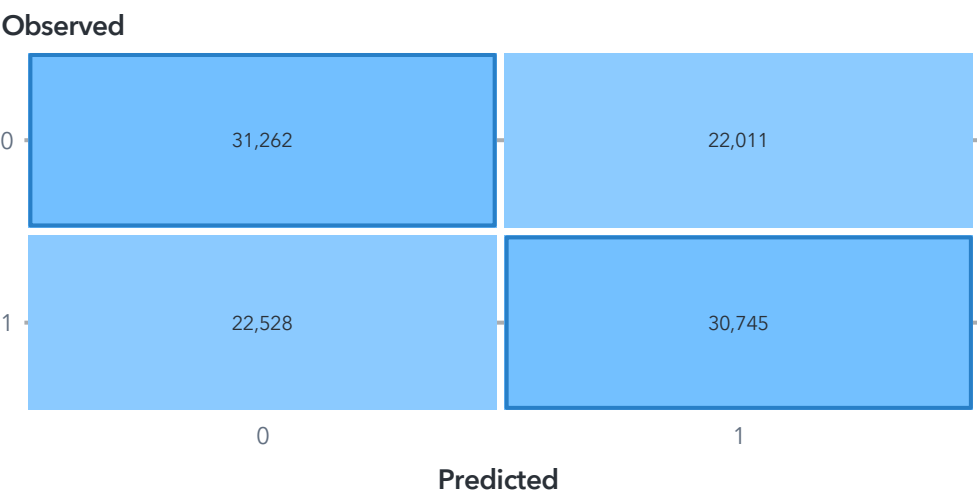
Tree



Variable Importance



Confusion Matrix



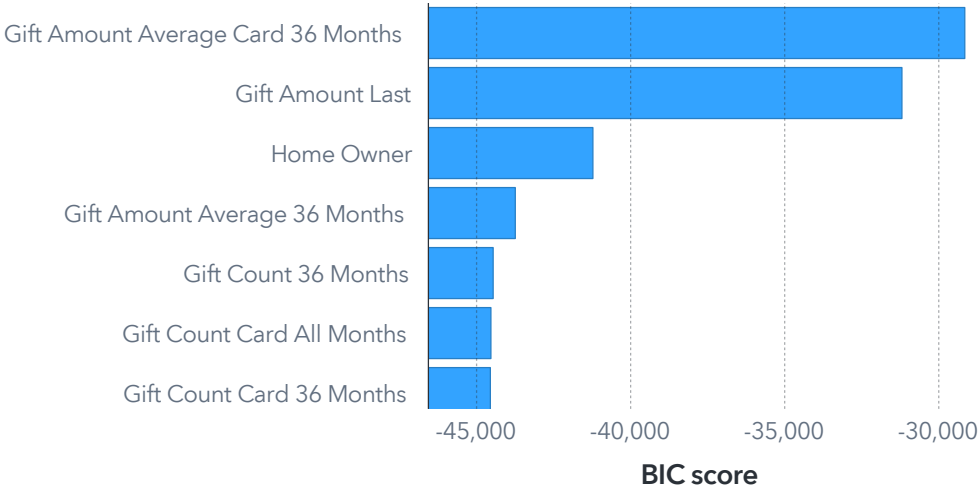


Bayesian Network **Target Gift Flag** (event=1) KS (Youden) **0.4490** Observations Used **64,988** Unused **41,558**

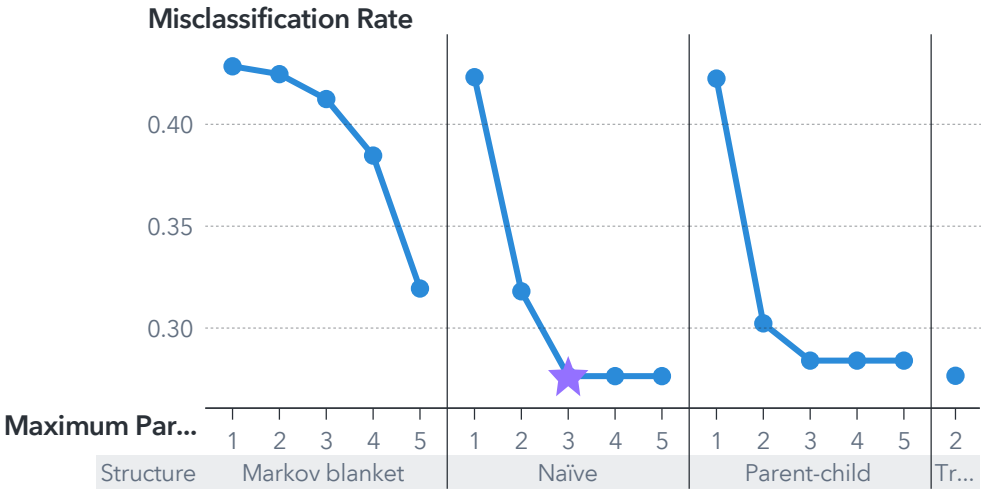
Network



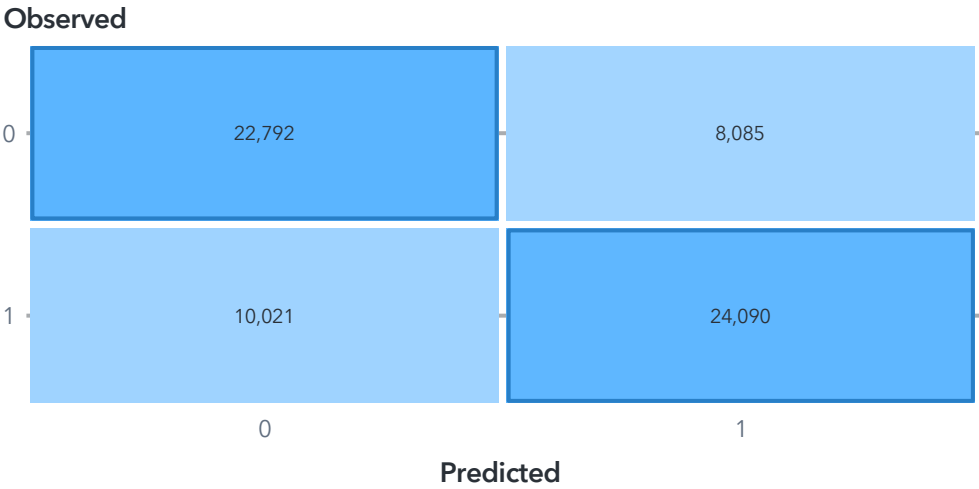
Variables in Network



Model Selection



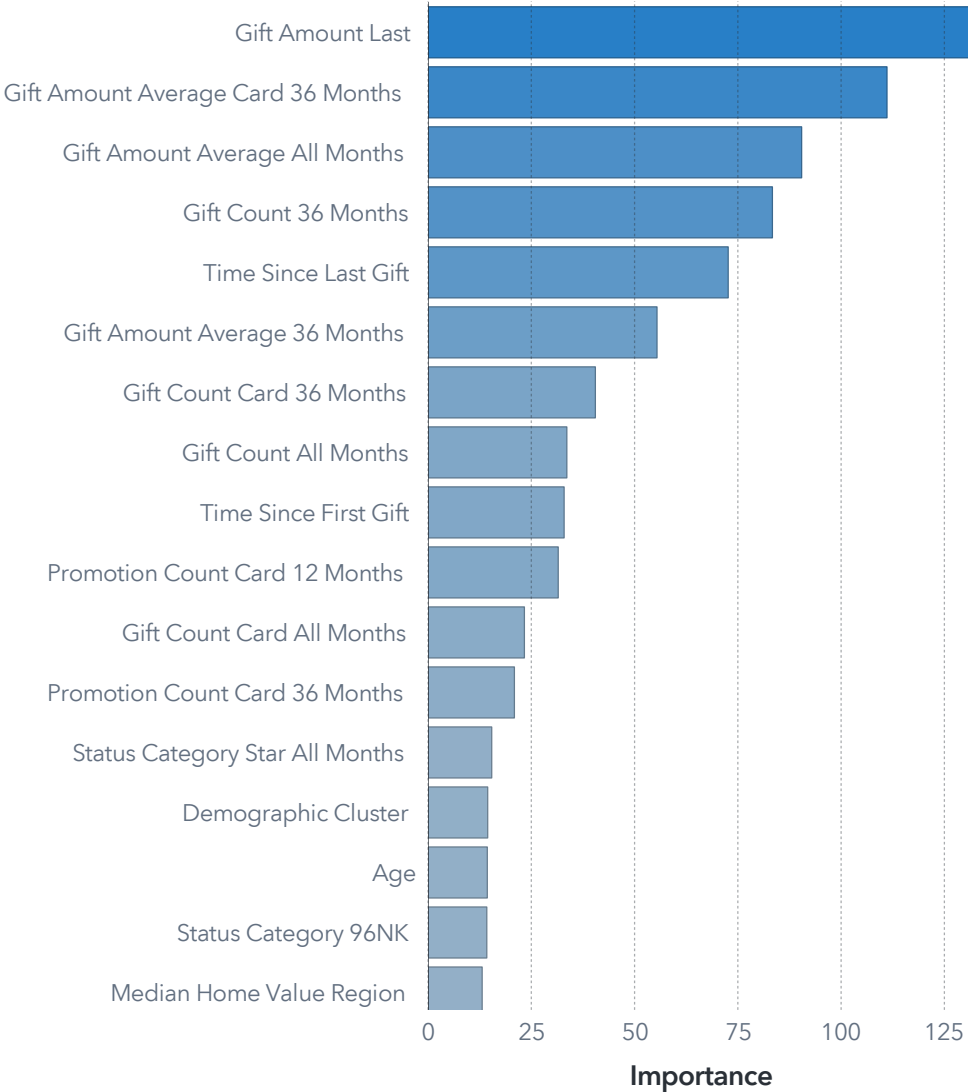
Confusion Matrix



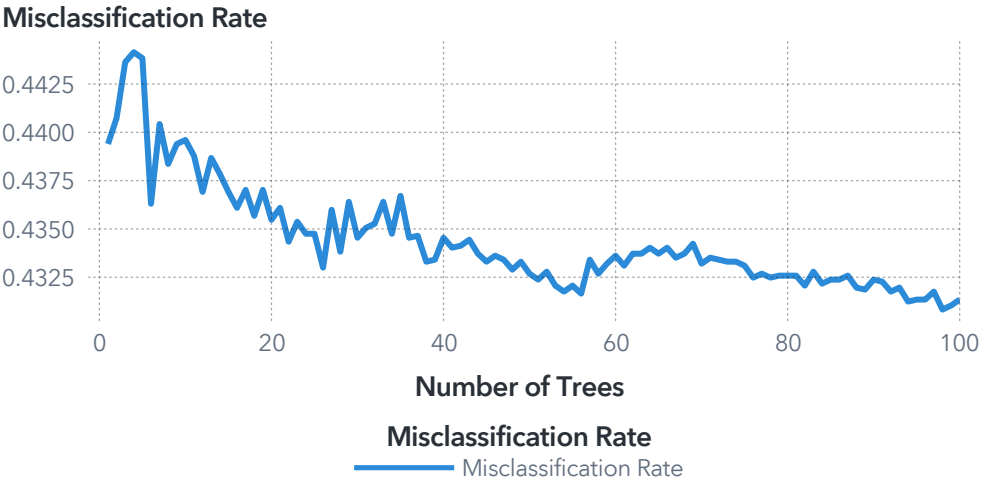


Forest **Target Gift Flag** (event=1) KS (Youden) **0.1563** Observations Used **106,546**

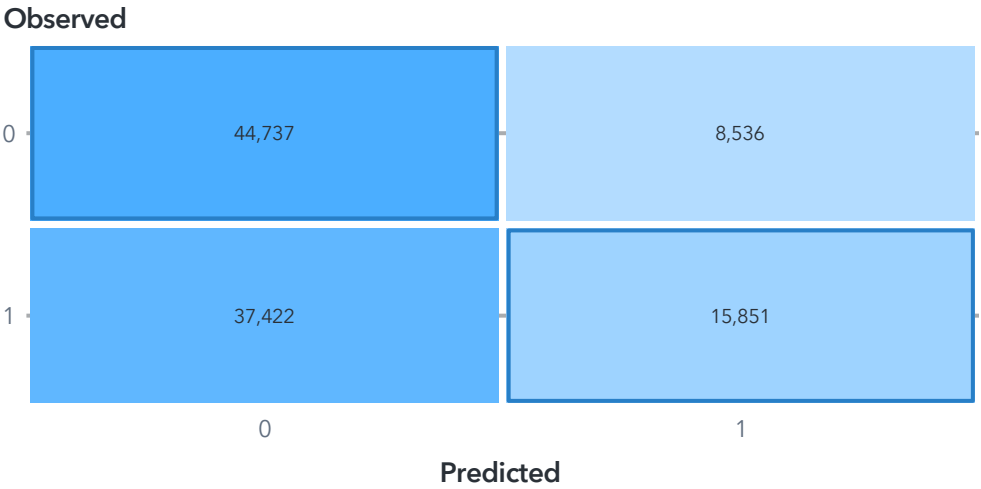
Variable Importance



Error Plot



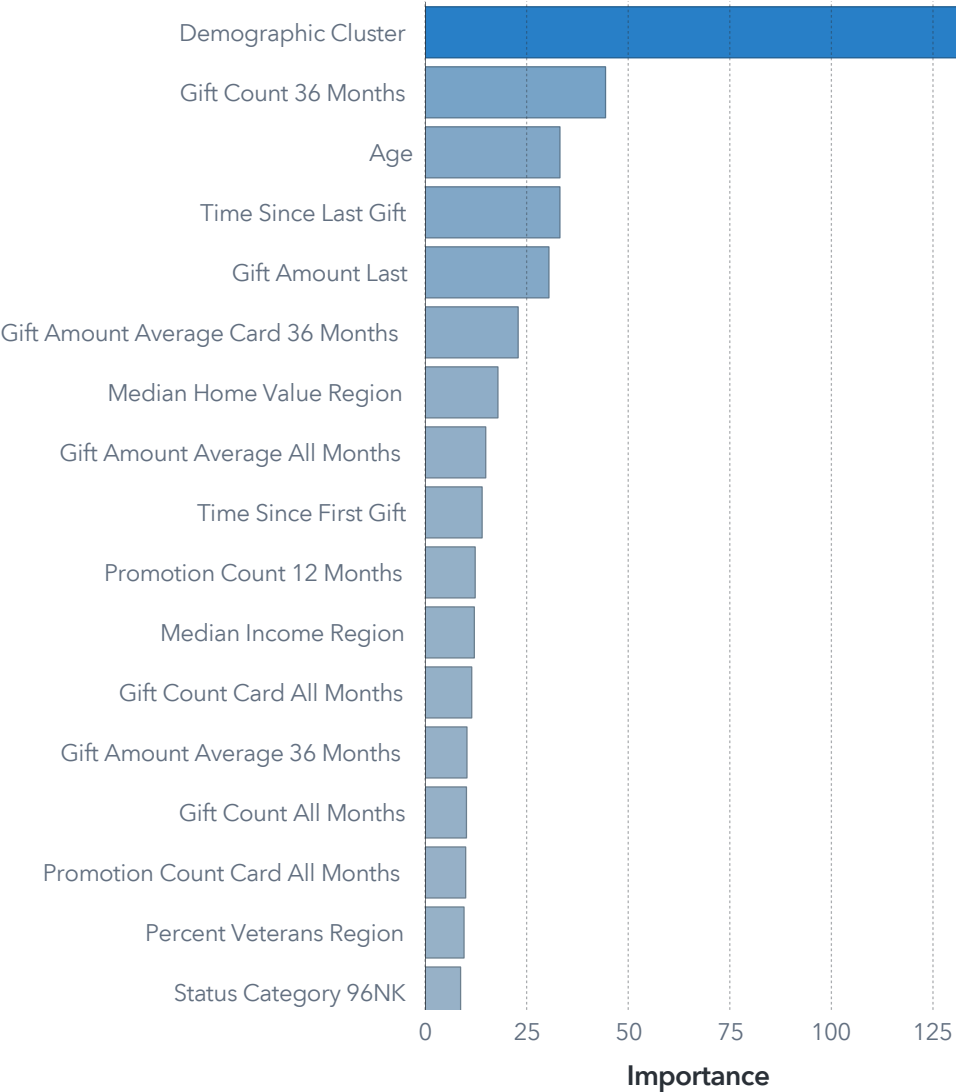
Confusion Matrix





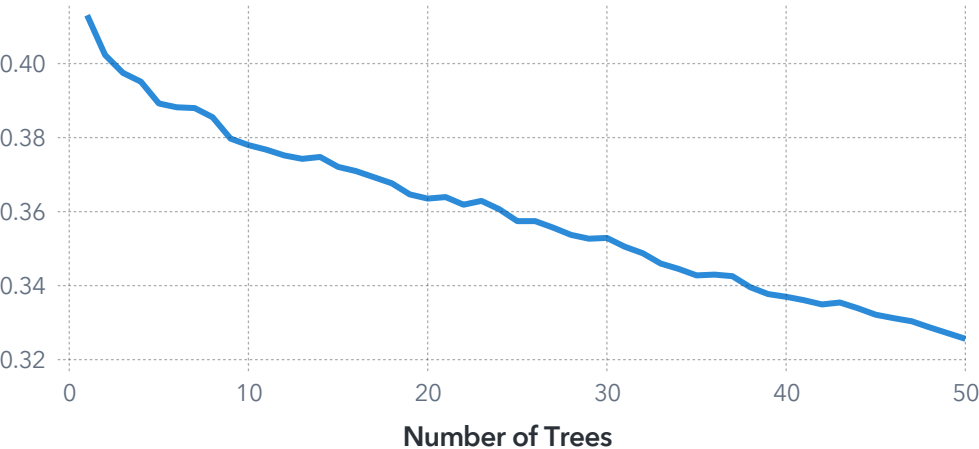
Gradient Boosting   **Target Gift Flag**   (event=1)   KS (Youden)   **0.3488**   Observations Used   **106,546**

Variable Importance



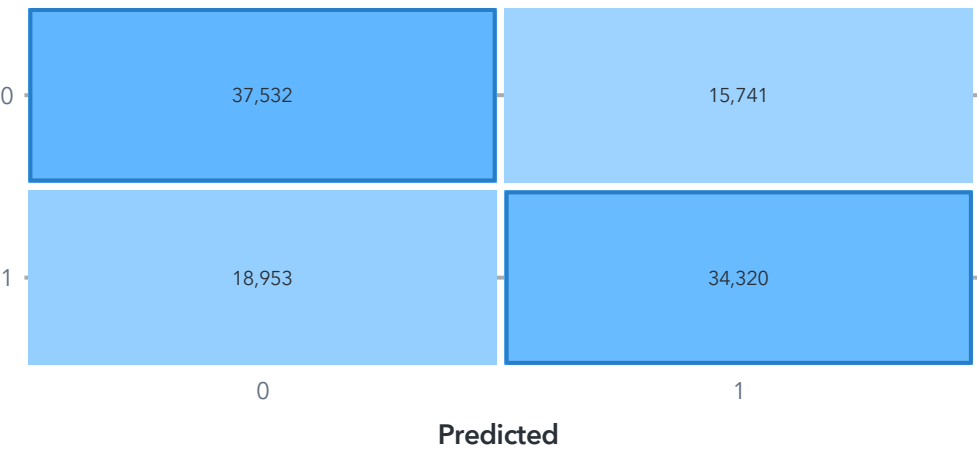
Iteration Plot

Misclassification Rate



Confusion Matrix

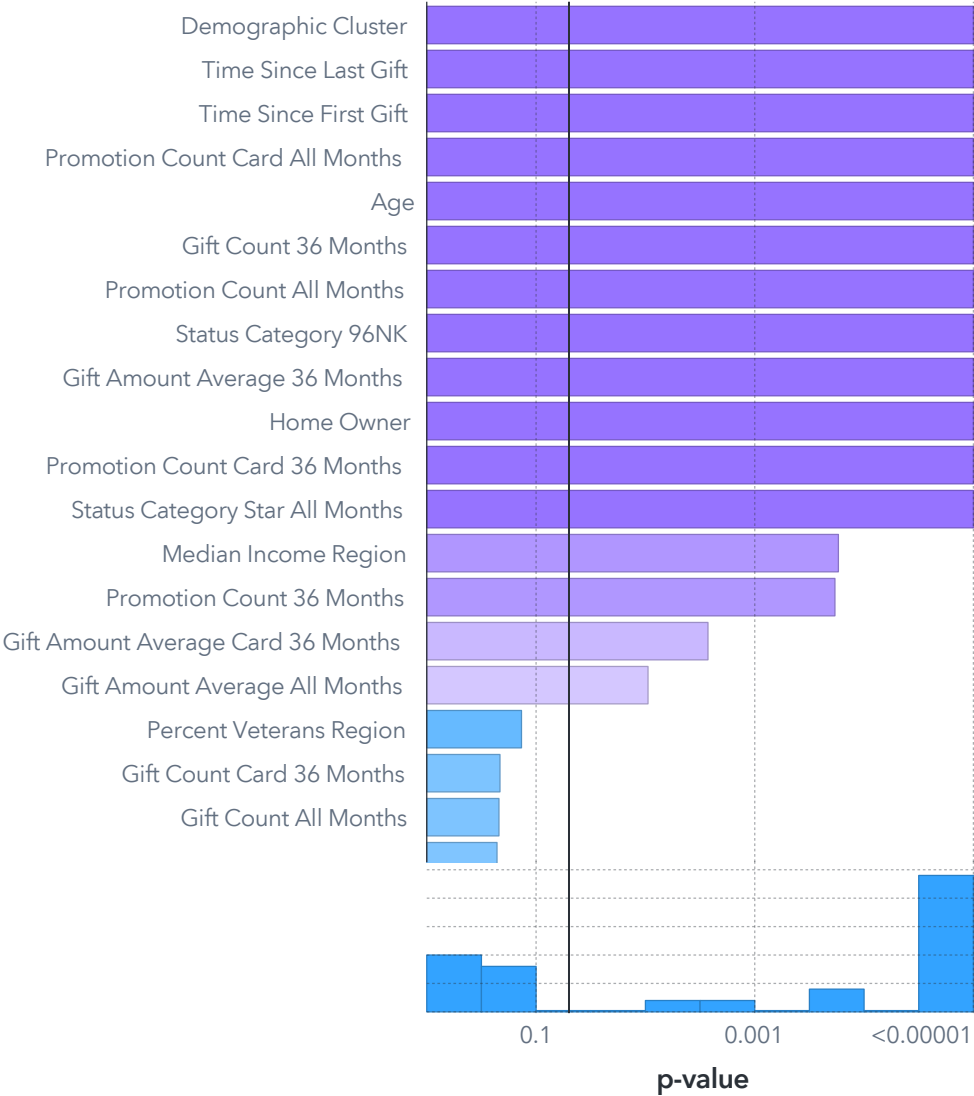
Observed



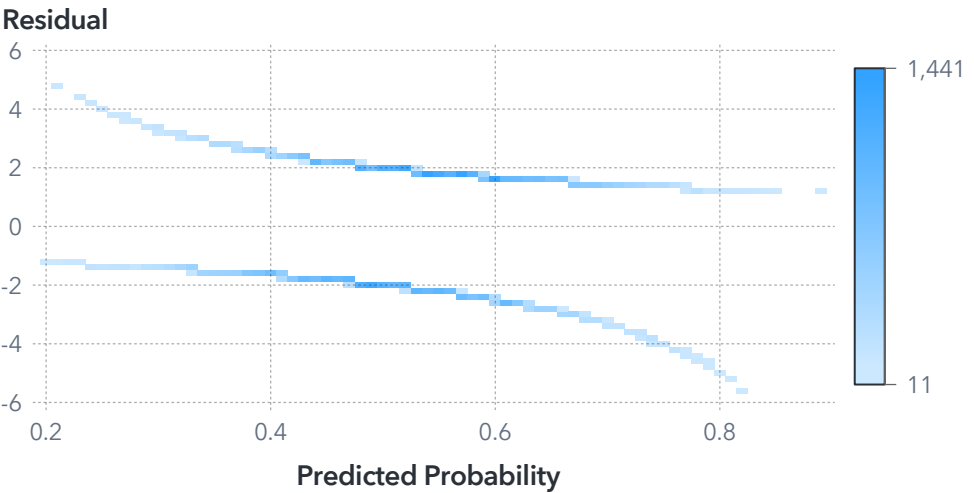


Logistic Regression **Target Gift Flag** (event=1) KS (Youden) **0.1863** Observations Used **64,988** Unused **41,558**

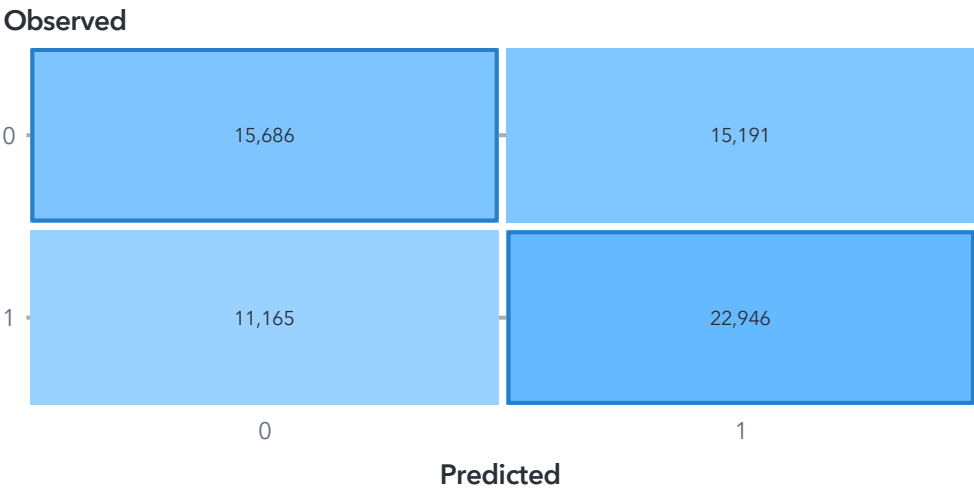
Fit Summary



Residual Plot



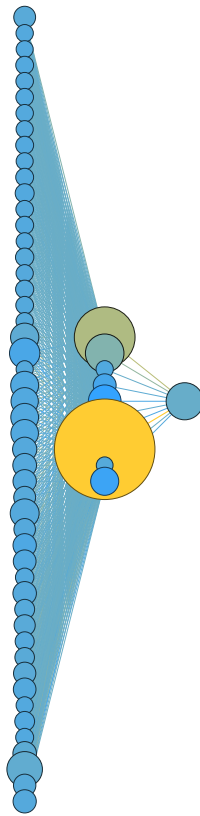
Confusion Matrix





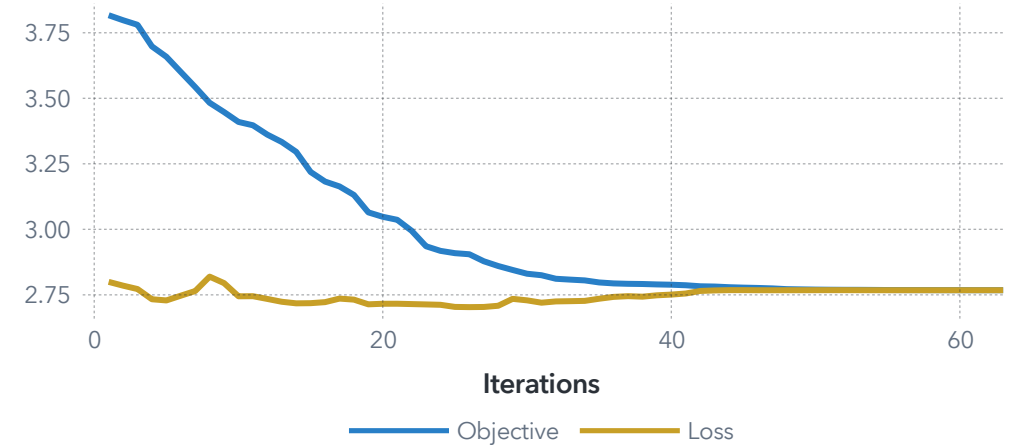
Neural Network **Target Gift Flag** (event=1) KS (Youden) **0.0000** Observations Used **64,988** Unused **41,558**

Network



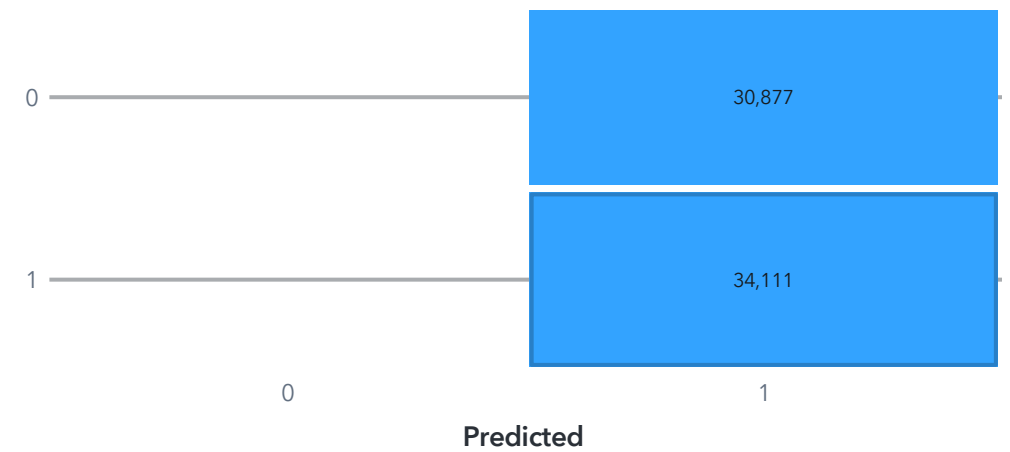
Iteration Plot

Objective / Loss

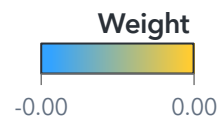


Confusion Matrix

Observed



Neuron Absolute Average



Neuron A...



Link Absolute



Link

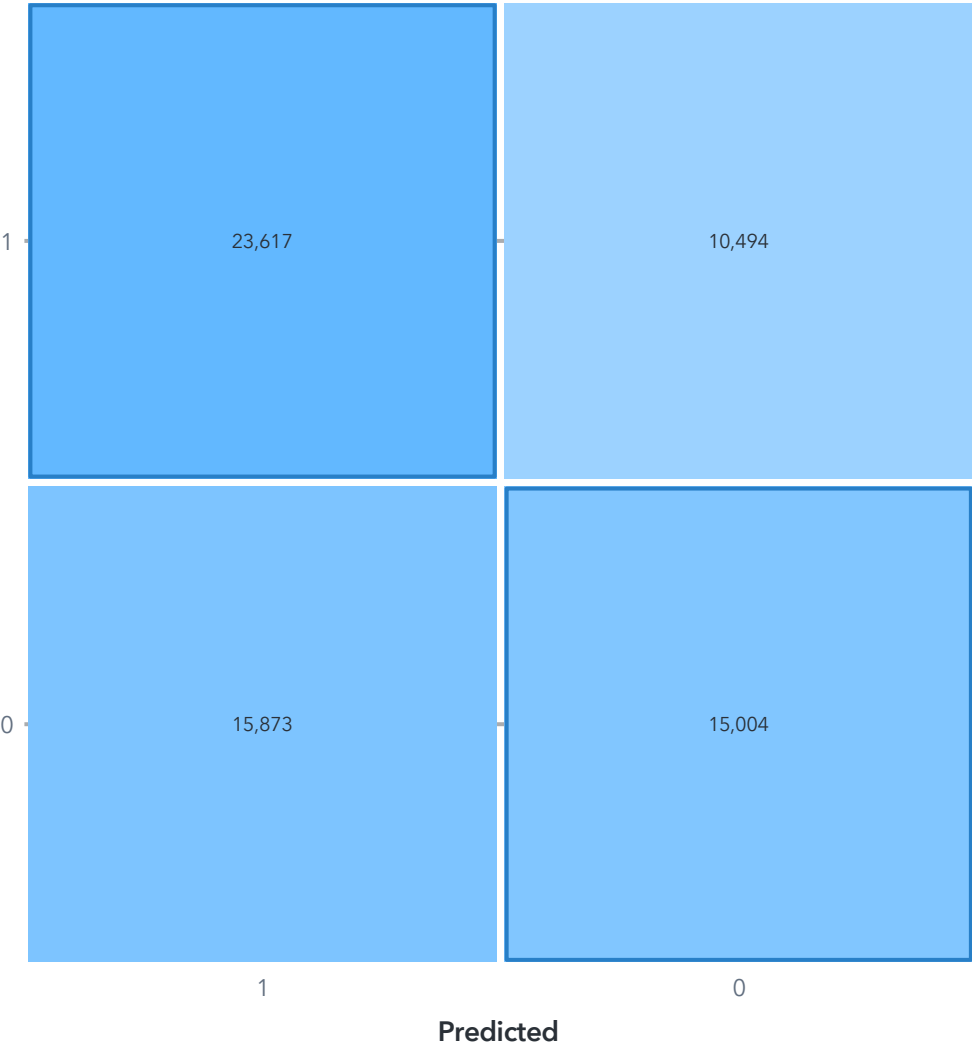




Support Vector Machine   **Target Gift Flag**   (event=1)   KS (Youden)   **0.1783**   Observations Used   **64,988**   Unused   **41,558**

Relative Importance Plot

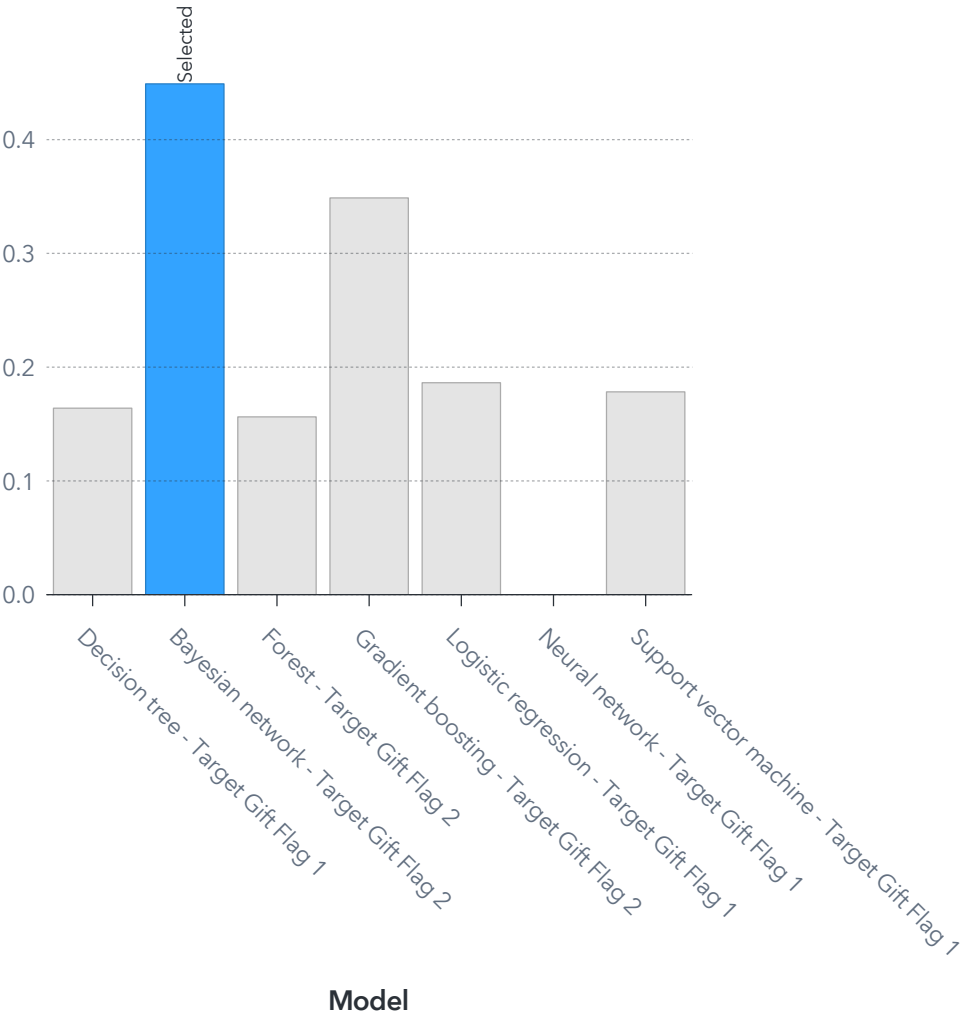
Confusion Matrix  
Observed





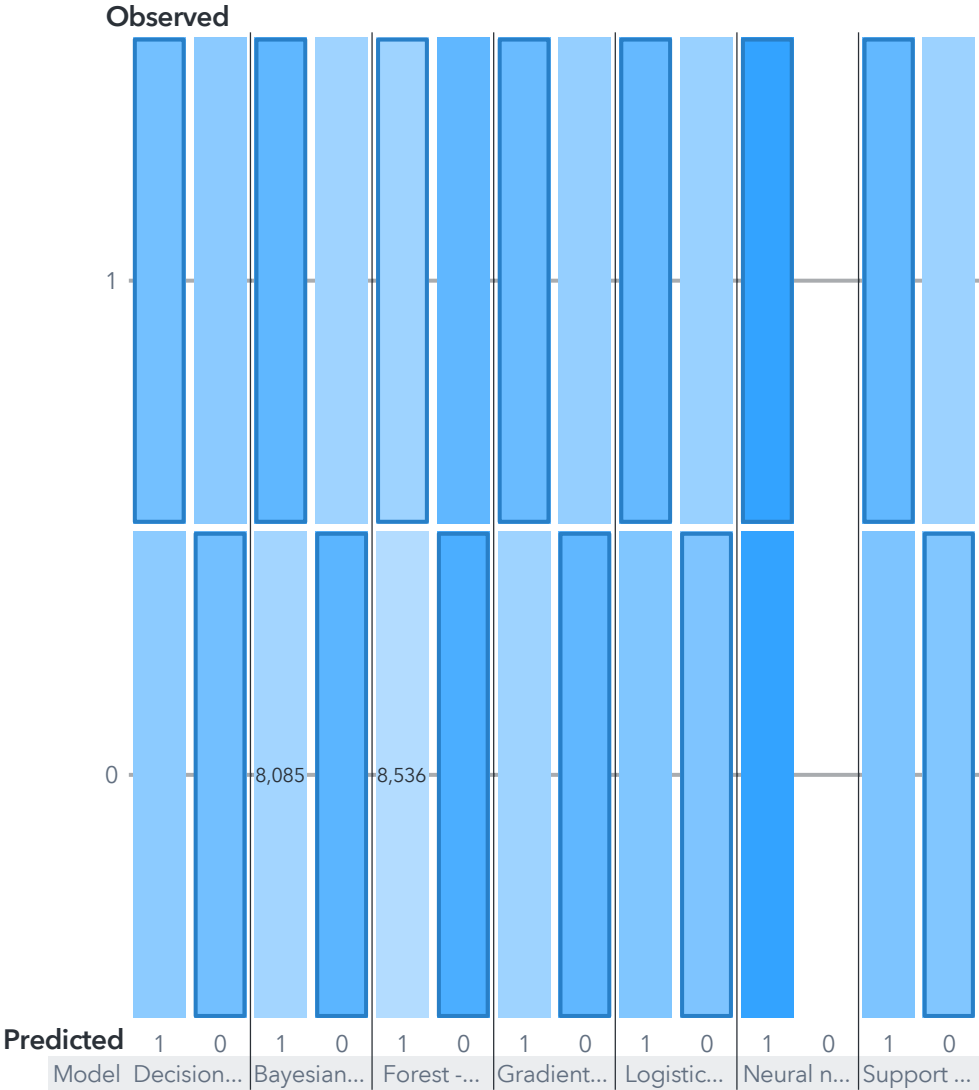
Model Comparison   **Target Gift Flag**   (event=1)

Fit Statistic  
KS (Youden)



⚠ A2.1

Confusion Matrix



## Appendix

### A1.1 List table - Control Number 1

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Warnings: Not all of the data appears because the client query row limit exceeds the server threshold.

### A2.1 Fit Statistic

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Warnings: Neural network - Target Gift Flag 1: One or more of the neuron layers has too many neurons to display and has been truncated.  
Number of observations for all models do not match.

Bar - Target Gift Flag 1 Supplement 1

Target Gift Flag ▲	Frequency ▼▼
0	53,273
1	53,273

Node ID	Depth	Parent ID	N Children	Type	Observations	% Observations	Percent of Parent	Gain	Predicted Value	0	1	✕✕
0	0	-1	2	Class	106,546	100.00%	.	0.0122	0	53,273 (50.00%)	53,273 (50.00%)	
1	1	0	2	Class	37,939	35.61%	35.61%	0.0089	1	15,653 (41.26%)	22,286 (58.74%)	
2	1	0	2	Class	68,607	64.39%	64.39%	0.0041	0	37,620 (54.83%)	30,987 (45.17%)	
3	2	1	2	Class	25,157	23.61%	66.31%	0.0095	1	11,352 (45.12%)	13,805 (54.88%)	
4	2	1	2	Class	12,782	12.00%	33.69%	0.0096	1	4,301 (33.65%)	8,481 (66.35%)	
5	2	2	2	Class	26,532	24.90%	38.67%	0.0109	0	13,299 (50.12%)	13,233 (49.88%)	
6	2	2	2	Class	42,075	39.49%	61.33%	0.0055	0	24,321 (57.80%)	17,754 (42.20%)	
7	3	3	2	Class	23,771	22.31%	94.49%	0.0049	1	11,044 (46.46%)	12,727 (53.54%)	
8	3	3	2	Class	1,386	1.30%	5.51%	0.0371	1	308 (22.22%)	1,078 (77.78%)	
9	3	4	2	Class	10,780	10.12%	84.34%	0.0071	1	3,872 (35.92%)	6,908 (64.08%)	
10	3	4	2	Class	2,002	1.88%	15.66%	0.0365	1	429 (21.43%)	1,573 (78.57%)	
11	3	5	2	Class	26,246	24.63%	98.92%	0.0038	0	13,299 (50.67%)	12,947 (49.33%)	
12	3	5	0	Leaf	286	0.27%	1.08%	0.0000	1		286 (100.00%)	
13	3	6	2	Class	7,953	7.46%	18.90%	0.0103	1	3,883 (48.82%)	4,070 (51.18%)	
14	3	6	2	Class	34,122	32.03%	81.10%	0.0067	0	20,438 (59.90%)	13,684 (40.10%)	
15	4	7	0	Leaf	11,473	10.77%	48.26%	0.0000	1	4,840 (42.19%)	6,633 (57.81%)	
16	4	7	0	Leaf	12,298	11.54%	51.74%	0.0000	0	6,204 (50.45%)	6,094 (49.55%)	
17	4	8	0	Leaf	1,298	1.22%	93.65%	0.0000	1	253 (19.49%)	1,045 (80.51%)	
18	4	8	2	Class	88	0.08%	6.35%	0.9544	0	55 (62.50%)	33 (37.50%)	
19	4	9	0	Leaf	10,582	9.93%	98.16%	0.0000	1	3,861 (36.49%)	6,721 (63.51%)	
20	4	9	2	Class	198	0.19%	1.84%	0.3095	1	11 (5.56%)	187 (94.44%)	
21	4	10	2	Class	1,012	0.95%	50.55%	0.0779	1	308 (30.43%)	704 (69.57%)	
22	4	10	0	Leaf	990	0.93%	49.45%	0.0000	1	121 (12.22%)	869 (87.78%)	
23	4	11	2	Class	24,200	22.71%	92.20%	0.0055	0	12,518 (51.73%)	11,682 (48.27%)	
24	4	11	0	Leaf	2,046	1.92%	7.80%	0.0000	1	781 (38.17%)	1,265 (61.83%)	
25	4	13	2	Class	2,618	2.46%	32.92%	0.0242	1	1,056 (40.34%)	1,562 (59.66%)	
26	4	13	2	Class	5,335	5.01%	67.08%	0.0113	0	2,827 (52.99%)	2,508 (47.01%)	
27	4	14	0	Leaf	27,423	25.74%	80.37%	0.0000	0	17,072 (62.25%)	10,351 (37.75%)	
28	4	14	2	Class	6,699	6.29%	19.63%	0.0118	0	3,366 (50.25%)	3,333 (49.75%)	
29	5	18	0	Leaf	55	0.05%	62.50%	0.0000	0	55 (100.00%)		
30	5	18	0	Leaf	33	0.03%	37.50%	0.0000	1		33 (100.00%)	
31	5	20	0	Leaf	187	0.18%	94.44%	0.0000	1		187 (100.00%)	
32	5	20	0	Leaf	11	0.01%	5.56%	0.0000	0	11 (100.00%)		
33	5	21	0	Leaf	44	0.04%	4.35%	0.0000	0	44 (100.00%)		
34	5	21	0	Leaf	968	0.91%	95.65%	0.0000	1	264 (27.27%)	704 (72.73%)	
35	5	23	0	Leaf	16,676	15.65%	68.91%	0.0000	1	8,140 (48.81%)	8,536 (51.19%)	
36	5	23	0	Leaf	7,524	7.06%	31.09%	0.0000	0	4,378 (58.19%)	3,146 (41.81%)	
37	5	25	0	Leaf	946	0.89%	36.13%	0.0000	0	495 (52.33%)	451 (47.67%)	
38	5	25	0	Leaf	1,672	1.57%	63.87%	0.0000	1	561 (33.55%)	1,111 (66.45%)	
39	5	26	0	Leaf	5,280	4.96%	98.97%	0.0000	0	2,827 (53.54%)	2,453 (46.46%)	
40	5	26	0	Leaf	55	0.05%	1.03%	0.0000	1		55 (100.00%)	
41	5	28	0	Leaf	6,490	6.09%	96.88%	0.0000	1	3,190 (49.15%)	3,300 (50.85%)	
42	5	28	0	Leaf	209	0.20%	3.12%	0.0000	0	176 (84.21%)	33 (15.79%)	

Node ID	Parent ID	Type	Age	Demographic Cluster	Gender	Home Owner	Gift Amount Average 36 Months	Gift Amount Average All Months	Gift Amount Average Card 36 Months	Gift Amount Last	Gift Count 36 Months	Gift Count All Months	Gift Count Card 36 Months	Gift Count Card All Months	Median Home Value Region	Median Income Region	Percent Veterans Region	Promotion Count 12 Months	Promotion Count 36 Months	Promotion Count All Months	Promotion Count Card 12 Months	Promotion Count Card 36 Months	Promotion Count Card All Months	Status Category 96NK	⌵
0		-1 Class																							
1		0 Class									≥ 4														
2		0 Class									0 to 4														
3		1 Class								≥ 8	≥ 4														
4		1 Class								0 to 8	≥ 4														
5		2 Class									0 to 4														
6		2 Class									0 to 4														
7		3 Class								≥ 8	≥ 4														
8		3 Class								≥ 8	≥ 4														
9		4 Class								0 to 8	≥ 4							≥ 11							
10		4 Class								0 to 8	≥ 4							2 to 11							
11		5 Class									0 to 4			≥ 3											
12		5 Leaf									0 to 4			1 to 3											
13		6 Class									0 to 4														
14		6 Class									0 to 4				≥ 176,500 0 to 176,500										
15		7 Leaf								≥ 8	≥ 4														
16		7 Leaf								≥ 8	≥ 4						≥ 32 0 to 32								
17		8 Leaf								≥ 8	≥ 4			≥ 9											
18		8 Class								≥ 8	≥ 4			1 to 9											
19		9 Leaf		00, 01, 02, 03, 04, 05, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, or 53						0 to 8	≥ 4							≥ 11							
20		9 Class		06, 07, 29, 32, or 52						0 to 8	≥ 4							≥ 11							
21		10 Class				H				0 to 8	≥ 4							2 to 11							
22		10 Leaf				U				0 to 8	≥ 4							2 to 11							
23		11 Class									0 to 4			≥ 3				≥ 9							
24		11 Leaf									0 to 4			≥ 3				2 to 9							
25		13 Class	≥ 58								0 to 4				≥ 176,500										
26		13 Class	0 to 58 or Missing								0 to 4				≥ 176,500										
27		14 Leaf									0 to 4				0 to 176,500										
28		14 Class									0 to 4				0 to 176,500										
29		18 Leaf	≥ 26							≥ 8	≥ 4			1 to 9											
30		18 Leaf	0 to 26 or Missing							≥ 8	≥ 4			1 to 9											
31		20 Leaf		06, 07, 29, 32, or 52						0 to 8	≥ 4				≥ 2			≥ 11							
32		20 Leaf		06, 07, 29, 32, or 52						0 to 8	≥ 4				0 to 2			≥ 11							
33		21 Leaf	≥ 85 or Missing			H				0 to 8	≥ 4							2 to 11							
34		21 Leaf	0 to 85			H				0 to 8	≥ 4							2 to 11							
35		23 Leaf									0 to 4			≥ 3				≥ 9				≥ 11			
36		23 Leaf									0 to 4			≥ 3				≥ 9				2 to 11			
37		25 Leaf	≥ 58								0 to 4				≥ 176,500		≥ 34								
38		25 Leaf	≥ 58								0 to 4				≥ 176,500		0 to 34								
39		26 Leaf	0 to 58 or Missing								0 to 4				≥ 176,500										
40		26 Leaf	0 to 58 or Missing					≥ 6.14			0 to 4				≥ 176,500										
41		28 Leaf						1.5 to 10.2			0 to 4				0 to 176,500										
42		28 Leaf						1.5 to 10.2			0 to 4				0 to 176,500										

Variable	Importance	Standard Deviation
Gift Count 36 Months	900.4774	0.0000
Gift Amount Last	223.2353	0.0000
Status Category Star All Months	191.9228	0.0000
Gift Amount Average All Months	186.4697	62.0261
Gift Count All Months	175.7666	57.3951
Median Home Value Region	158.1476	0.0000
Time Since Last Gift	153.8744	0.0000
Age	142.0095	6.4343
Promotion Count 12 Months	140.2256	0.7859
Percent Veterans Region	123.6029	19.2168
Promotion Count Card 36 Months	91.1273	0.0000
Time Since First Gift	49.7720	0.0000
Demographic Cluster	37.1903	0.0000
Home Owner	33.1989	0.0000
Gift Count Card All Months	20.7778	0.0000
Gender	0.0000	0.0000
Gift Amount Average 36 Months	0.0000	0.0000
Gift Amount Average Card 36 Months	0.0000	0.0000
Gift Count Card 36 Months	0.0000	0.0000
Median Income Region	0.0000	0.0000
Promotion Count 36 Months	0.0000	0.0000
Promotion Count All Months	0.0000	0.0000
Promotion Count Card 12 Months	0.0000	0.0000
Promotion Count Card All Months	0.0000	0.0000
Status Category 96NK	0.0000	0.0000

Decision tree - Target Gift Flag 1 Supplement 4

Predicted	Observed	Frequency	Percentage
0	0	31,262	58.68%
1	0	22,011	41.32%
0	1	22,528	42.29%
1	1	30,745	57.71%



Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	5328	4183	1.5704	2.0003	1.5704	2.0003
10.00	5328	3389	1.2722	2.0003	1.4213	2.0003
15.00	5328	3384	1.2704	2.0003	1.3710	2.0003
20.00	5328	3167	1.1891	2.0003	1.3255	2.0003
25.00	5328	3080	1.1564	2.0003	1.2917	2.0003
30.00	5328	2923	1.0973	2.0003	1.2593	2.0003
35.00	5328	2727	1.0239	2.0003	1.2257	2.0003
40.00	5328	2727	1.0239	2.0003	1.2005	2.0003
45.00	5328	2722	1.0217	2.0003	1.1806	2.0003
50.00	5328	2702	1.0145	1.9976	1.1640	2.0000
55.00	5328	2640	0.9912	0.0000	1.1483	1.8182
60.00	5328	2640	0.9912	0.0000	1.1352	1.6667
65.00	5328	2521	0.9466	0.0000	1.1207	1.5385
70.00	5328	2321	0.8715	0.0000	1.1029	1.4286
75.00	5328	2182	0.8193	0.0000	1.0840	1.3333
80.00	5328	2011	0.7550	0.0000	1.0634	1.2500
85.00	5328	2011	0.7550	0.0000	1.0453	1.1765
90.00	5328	2011	0.7550	0.0000	1.0292	1.1111
95.00	5328	2011	0.7550	0.0000	1.0147	1.0526
100.00	5314	1918	0.7202	0.0000	1.0000	1.0000

Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	1.0000	0.998
0.02	1.0000	0.998
0.03	1.0000	0.998
0.04	1.0000	0.998
0.05	1.0000	0.998
0.06	1.0000	0.998
0.07	1.0000	0.998
0.08	1.0000	0.998
0.09	1.0000	0.998
0.10	1.0000	0.998
0.11	1.0000	0.998
0.12	1.0000	0.998
0.13	1.0000	0.998
0.14	1.0000	0.998
0.15	1.0000	0.998
0.16	0.9994	0.995
0.17	0.9994	0.995
0.18	0.9994	0.995
0.19	0.9994	0.995
0.20	0.9994	0.995
0.21	0.9994	0.995
0.22	0.9994	0.995
0.23	0.9994	0.995
0.24	0.9994	0.995
0.25	0.9994	0.995
0.26	0.9994	0.995
0.27	0.9994	0.995
0.28	0.9994	0.995
0.29	0.9994	0.995
0.30	0.9994	0.995
0.31	0.9994	0.995
0.32	0.9994	0.995
0.33	0.9994	0.995
0.34	0.9994	0.995
0.35	0.9994	0.995
0.36	0.9994	0.995
0.37	0.9994	0.995
0.38	0.8051	0.674
0.39	0.8051	0.674
0.40	0.8051	0.674
0.41	0.8051	0.674
0.42	0.7460	0.592
0.43	0.7460	0.592
0.44	0.7460	0.592
0.45	0.7460	0.592
0.46	0.7460	0.592
0.47	0.7000	0.539
0.48	0.6915	0.530
0.49	0.6915	0.530
0.50	0.5771	0.413
0.51	0.5152	0.353
0.52	0.3549	0.200
0.53	0.3549	0.200
0.54	0.3549	0.200
0.55	0.3549	0.200
0.56	0.3549	0.200
0.57	0.3549	0.200
0.58	0.2304	0.110
0.59	0.2304	0.110
0.60	0.2304	0.110
0.61	0.2304	0.110
0.62	0.2067	0.095
0.63	0.2067	0.095
0.64	0.0805	0.023
0.65	0.0805	0.023
0.66	0.0805	0.023
0.67	0.0597	0.012
0.68	0.0597	0.012
0.69	0.0597	0.012
0.70	0.0597	0.012
0.71	0.0597	0.012
0.72	0.0597	0.012
0.73	0.0465	0.007
0.74	0.0465	0.007
0.75	0.0465	0.007
0.76	0.0465	0.007
0.77	0.0465	0.007
0.78	0.0465	0.007
0.79	0.0465	0.007
0.80	0.0465	0.007
0.81	0.0268	0.002
0.82	0.0268	0.002
0.83	0.0268	0.002
0.84	0.0268	0.002
0.85	0.0268	0.002
0.86	0.0268	0.002
0.87	0.0268	0.002
0.88	0.0105	0.000
0.89	0.0105	0.000
0.90	0.0105	0.000
0.91	0.0105	0.000
0.92	0.0105	0.000
0.93	0.0105	0.000
0.94	0.0105	0.000
0.95	0.0105	0.000
0.96	0.0105	0.000
0.97	0.0105	0.000
0.98	0.0105	0.000
0.99	0.0105	0.000

Decision tree - Target Gift Flag 1 Supplement 7

Response	Event	Value	Frequency
Correct	1	True Positive	30,745
Incorrect	1	False Negative	22,528
Correct	0	True Negative	31,262
Incorrect	0	False Positive	22,011

Decision tree - Target Gift Flag 1 Supplement 8

[illegible]

Description	Value	✕✕
Significance level	0.2	
Prescreen predictors	True	
Variable selection	None	
Best structure	Naïve	
Attempted structures	Naïve, Tree-augmented naïve, Parent-child, Markov blanket	
Parenting method	Set of parents	
Maximum number of parents	3	
Missing interval variable handling	Ignore	
Missing nominal variable handling	Ignore	
Number of bins	10	
Independence test statistic	G-square	

Description	Value
Number of observations read	106,546
Number of observations used	64,988
Number of observations used for training	64,988
Number of observations used for assessment	64,988

Description	Value	✕✕
Number of Nodes	25	
Number of Links	56	
Average Degree	4.4800	
Maximum Number of Parents in Network	3	
Number of Parameters	15,323	
BIC Score	-1,781,794.8995	
Misclassification Rate	0.2786	

Best Model	Misclassification Rate	Significance Level	Prescreening	Variable Selection	Structure	Parenting Method	Maximum Parents
	0.4285	0.2	True	Markov blanket	Markov blanket	Set of parents	1
	0.4246	0.2	True	Markov blanket	Markov blanket	Set of parents	2
	0.4124	0.2	True	Markov blanket	Markov blanket	Set of parents	3
	0.3847	0.2	True	Markov blanket	Markov blanket	Set of parents	4
	0.3194	0.2	True	Markov blanket	Markov blanket	Set of parents	5
	0.4232	0.2	True	None	Naïve	Set of parents	1
	0.3180	0.2	True	None	Naïve	Set of parents	2
Yes	0.2764	0.2	True	None	Naïve	Set of parents	3
	0.2764	0.2	True	None	Naïve	Set of parents	4
	0.2764	0.2	True	None	Naïve	Set of parents	5
	0.4225	0.2	True	None	Parent-child	Set of parents	1
	0.3023	0.2	True	None	Parent-child	Set of parents	2
	0.2840	0.2	True	None	Parent-child	Set of parents	3
	0.2840	0.2	True	None	Parent-child	Set of parents	4
	0.2840	0.2	True	None	Parent-child	Set of parents	5
	0.2766	0.2	True	None	Tree-augmented naïve	Set of parents	2



Variable	Selected	Chi-Square	Pr > Chi-Square	G-Square	Pr > G-Square	Degrees of Freedom	Mutual Information	Conditional Variable
Demographic Cluster	Yes	902.8230	<0.00001	908.6805	<0.00001	53	0.1178	
Gender	Yes	5.0118	0.08160	5.0125	0.08157	2	0.0088	
Home Owner	Yes	6.1709	0.01299	6.1696	0.01300	1	0.0097	
Status Category 96NK	Yes	745.7295	<0.00001	749.2943	<0.00001	5	0.1071	
Age	Yes	455.4063	<0.00001	458.3707	<0.00001	9	0.0838	
Median Home Value Region	Yes	275.3622	<0.00001	276.5182	<0.00001	9	0.0652	
Median Income Region	Yes	74.8152	<0.00001	79.2669	<0.00001	9	0.0349	
Percent Veterans Region	Yes	100.5270	<0.00001	100.5908	<0.00001	9	0.0393	
Gift Amount Average 36 Months	Yes	342.1219	<0.00001	346.7090	<0.00001	8	0.0729	
Gift Amount Average All Months	Yes	561.2817	<0.00001	573.9797	<0.00001	9	0.0938	
Gift Amount Average Card 36 Months	Yes	187.8009	<0.00001	196.5831	<0.00001	7	0.0550	
Gift Amount Last	Yes	236.6673	<0.00001	245.9788	<0.00001	7	0.0615	
Gift Count 36 Months	Yes	1,102.0218	<0.00001	1,118.2738	<0.00001	9	0.1306	
Gift Count All Months	Yes	698.1493	<0.00001	712.8187	<0.00001	9	0.1044	
Gift Count Card 36 Months	Yes	909.2622	<0.00001	923.4422	<0.00001	8	0.1188	
Gift Count Card All Months	Yes	969.1326	<0.00001	972.9861	<0.00001	9	0.1219	
Time Since First Gift	Yes	564.1674	<0.00001	577.3062	<0.00001	9	0.0940	
Time Since Last Gift	Yes	792.3655	<0.00001	808.1295	<0.00001	9	0.1112	
Promotion Count 12 Months	Yes	372.5701	<0.00001	378.0439	<0.00001	9	0.0762	
Promotion Count 36 Months	Yes	438.4295	<0.00001	441.0569	<0.00001	9	0.0822	
Promotion Count All Months	Yes	597.7934	<0.00001	599.0957	<0.00001	9	0.0958	
Promotion Count Card 12 Months	Yes	344.2409	<0.00001	354.7309	<0.00001	9	0.0738	
Promotion Count Card 36 Months	Yes	542.9119	<0.00001	560.7879	<0.00001	9	0.0927	
Promotion Count Card All Months	Yes	647.7209	<0.00001	659.7589	<0.00001	9	0.1005	
Status Category Star All Months	No	0.0000	0.99999	0.0000	0.99999	1	0.0000	

Variable	Level Index	Level Value	Frequency
Target Gift Flag	0	1	34,111
Target Gift Flag	1	0	30,877
Demographic Cluster	0	00	1,265
Demographic Cluster	1	01	616
Demographic Cluster	2	02	1,342
Demographic Cluster	3	03	1,023
Demographic Cluster	4	04	319
Demographic Cluster	5	05	726
Demographic Cluster	6	06	308
Demographic Cluster	7	07	484
Demographic Cluster	8	08	1,309
Demographic Cluster	9	09	429
Demographic Cluster	10	10	1,078
Demographic Cluster	11	11	1,705
Demographic Cluster	12	12	2,398
Demographic Cluster	13	13	2,266
Demographic Cluster	14	14	1,782
Demographic Cluster	15	15	792
Demographic Cluster	16	16	1,551
Demographic Cluster	17	17	1,155
Demographic Cluster	18	18	2,442
Demographic Cluster	19	19	319
Demographic Cluster	20	20	1,111
Demographic Cluster	21	21	1,023
Demographic Cluster	22	22	847
Demographic Cluster	23	23	990
Demographic Cluster	24	24	2,959
Demographic Cluster	25	25	792
Demographic Cluster	26	26	737
Demographic Cluster	27	27	2,442
Demographic Cluster	28	28	1,419
Demographic Cluster	29	29	561
Demographic Cluster	30	30	1,870
Demographic Cluster	31	31	737
Demographic Cluster	32	32	517
Demographic Cluster	33	33	374
Demographic Cluster	34	34	880
Demographic Cluster	35	35	2,750
Demographic Cluster	36	36	2,629
Demographic Cluster	37	37	605
Demographic Cluster	38	38	726
Demographic Cluster	39	39	1,584
Demographic Cluster	40	40	2,915
Demographic Cluster	41	41	1,353
Demographic Cluster	42	42	913
Demographic Cluster	43	43	1,298
Demographic Cluster	44	44	1,265
Demographic Cluster	45	45	1,265
Demographic Cluster	46	46	1,199
Demographic Cluster	47	47	418
Demographic Cluster	48	48	605
Demographic Cluster	49	49	2,035
Demographic Cluster	50	50	418
Demographic Cluster	51	51	1,254
Demographic Cluster	52	52	220
Demographic Cluster	53	53	968
Gender	0	F	35,178
Gender	1	M	27,577
Gender	2	U	2,233
Home Owner	0	H	43,538
Home Owner	1	U	21,450
Status Category 96NK	0	A	37,389
Status Category 96NK	1	E	605
Status Category 96NK	2	F	3,828
Status Category 96NK	3	L	209
Status Category 96NK	4	N	4,004
Status Category 96NK	5	S	18,953
Age	0	<8.7	319
Age	1	<17.4	506
Age	2	<26.1	704
Age	3	<34.8	3,102
Age	4	<43.5	7,744
Age	5	<52.2	10,604
Age	6	<60.9	9,196
Age	7	<69.6	11,242
Age	8	<78.3	13,145
Age	9	>=78.3	8,426
Median Home Value Region	0	<59800	20,713
Median Home Value Region	1	<119600	26,323
Median Home Value Region	2	<179400	8,096
Median Home Value Region	3	<239200	3,894
Median Home Value Region	4	<299000	2,046
Median Home Value Region	5	<358800	1,595
Median Home Value Region	6	<418600	913
Median Home Value Region	7	<478400	451
Median Home Value Region	8	<538200	385
Median Home Value Region	9	>=538200	572
Median Income Region	0	<20000.1	9,042
Median Income Region	1	<40000.2	12,353
Median Income Region	2	<60000.3	26,741
Median Income Region	3	<80000.4	11,748
Median Income Region	4	<100001	3,256
Median Income Region	5	<120001	1,177
Median Income Region	6	<140001	396
Median Income Region	7	<160001	143
Median Income Region	8	<180001	121
Median Income Region	9	>=180001	11
Percent Veterans Region	0	<7.8	1,936
Percent Veterans Region	1	<15.6	2,156
Percent Veterans Region	2	<23.4	8,250
Percent Veterans Region	3	<31.2	20,801
Percent Veterans Region	4	<39	17,380
Percent Veterans Region	5	<46.8	9,856
Percent Veterans Region	6	<54.6	3,256
Percent Veterans Region	7	<62.4	990
Percent Veterans Region	8	<70.2	253
Percent Veterans Region	9	>=70.2	110
Gift Amount Average 36 Months	0	<17.645	49,060
Gift Amount Average 36 Months	1	<33.74	14,157
Gift Amount Average 36 Months	2	<49.835	1,001
Gift Amount Average 36 Months	3	<65.93	506
Gift Amount Average 36 Months	4	<82.025	99
Gift Amount Average 36 Months	5	<98.12	44
Gift Amount Average 36 Months	6	<114.215	77
Gift Amount Average 36 Months	7	<130.31	11
Gift Amount Average 36 Months	8	<146.405	0
Gift Amount Average 36 Months	9	>=146.405	33
Gift Amount Average All Months	0	<12.461	41,800
Gift Amount Average All Months	1	<23.422	19,151
Gift Amount Average All Months	2	<34.383	3,157
Gift Amount Average All Months	3	<45.344	462
Gift Amount Average All Months	4	<56.305	242
Gift Amount Average All Months	5	<67.266	44
Gift Amount Average All Months	6	<78.227	22
Gift Amount Average All Months	7	<89.188	33
Gift Amount Average All Months	8	<100.149	55
Gift Amount Average All Months	9	>=100.149	22
Gift Amount Average Card 36 Months	0	<21.197	56,595
Gift Amount Average Card 36 Months	1	<41.064	7,304
Gift Amount Average Card 36 Months	2	<60.931	803
Gift Amount Average Card 36 Months	3	<80.798	110
Gift Amount Average Card 36 Months	4	<100.665	143
Gift Amount Average Card 36 Months	5	<120.532	0
Gift Amount Average Card 36 Months	6	<140.399	11
Gift Amount Average Card 36 Months	7	<160.266	11
Gift Amount Average Card 36 Months	8	<180.133	0
Gift Amount Average Card 36 Months	9	>=180.133	11
Gift Amount Last	0	<25	55,814
Gift Amount Last	1	<50	7,887
Gift Amount Last	2	<75	946
Gift Amount Last	3	<100	88
Gift Amount Last	4	<125	220
Gift Amount Last	5	<150	11
Gift Amount Last	6	<175	11
Gift Amount Last	7	<200	0
Gift Amount Last	8	<225	0
Gift Amount Last	9	>=225	11
Gift Count 36 Months	0	<2.4	23,782
Gift Count 36 Months	1	<3.8	13,068
Gift Count 36 Months	2	<5.2	17,248
Gift Count 36 Months	3	<6.6	4,642
Gift Count 36 Months	4	<8	2,662
Gift Count 36 Months	5	<9.4	2,475
Gift Count 36 Months	6	<10.8	484
Gift Count 36 Months	7	<12.2	528
Gift Count 36 Months	8	<13.6	88
Gift Count 36 Months	9	>=13.6	11
Gift Count All Months	0	<10	32,901
Gift Count All Months	1	<19	20,504
Gift Count All Months	2	<28	7,546
Gift Count All Months	3	<37	2,772
Gift Count All Months	4	<46	836
Gift Count All Months	5	<55	264
Gift Count All Months	6	<64	110
Gift Count All Months	7	<73	22
Gift Count All Months	8	<82	11
Gift Count All Months	9	>=82	22
Gift Count Card 36 Months	0	<1.8	25,553
Gift Count Card 36 Months	1	<2.6	17,435
Gift Count Card 36 Months	2	<3.4	10,879
Gift Count Card 36 Months	3	<4.2	5,368
Gift Count Card 36 Months	4	<5	0
Gift Count Card 36 Months	5	<5.8	2,959
Gift Count Card 36 Months	6	<6.6	1,617
Gift Count Card 36 Months	7	<7.4	803
Gift Count Card 36 Months	8	<8.2	319
Gift Count Card 36 Months	9	>=8.2	55
Gift Count Card All Months	0	<3.8	23,617
Gift Count Card All Months	1	<6.6	15,730
Gift Count Card All Months	2	<9.4	11,242
Gift Count Card All Months	3	<12.2	6,996
Gift Count Card All Months	4	<15	2,948
Gift Count Card All Months	5	<17.8	2,409
Gift Count Card All Months	6	<20.6	1,221
Gift Count Card All Months	7	<23.4	517
Gift Count Card All Months	8	<26.2	242
Gift Count Card All Months	9	>=26.2	66
Time Since First Gift	0	<39.5	16,379
Time Since First Gift	1	<64	12,254
Time Since First Gift	2	<88.5	12,023
Time Since First Gift	3	<113	9,284
Time Since First Gift	4	<137.5	14,883
Time Since First Gift	5	<162	99
Time Since First Gift	6	<186.5	33
Time Since First Gift	7	<211	11
Time Since First Gift	8	<235.5	11
Time Since First Gift	9	>=235.5	11
Time Since Last Gift	0	<6.3	2,134
Time Since Last Gift	1	<8.6	682
Time Since Last Gift	2	<10.9	429
Time Since Last Gift	3	<13.2	363
Time Since Last Gift	4	<15.5	7,304
Time Since Last Gift	5	<17.8	18,799
Time Since Last Gift	6	<20.1	20,471
Time Since Last Gift	7	<22.4	7,161
Time Since Last Gift	8	<24.7	5,181
Time Since Last Gift	9	>=24.7	2,464
Promotion Count 12 Months	0	<8.4	4,532
Promotion Count 12 Months	1	<12.8	26,675
Promotion Count 12 Months	2	<17.2	28,435
Promotion Count 12 Months	3	<21.6	1,155
Promotion Count 12 Months	4	<26	1,507
Promotion Count 12 Months	5	<30.4	1,529
Promotion Count 12 Months	6	<34.8	660
Promotion Count 12 Months	7	<39.2	341
Promotion Count 12 Months	8	<43.6	88
Promotion Count 12 Months	9	>=43.6	66
Promotion Count 36 Months	0	<14	330
Promotion Count 36 Months	1	<20	5,808
Promotion Count 36 Months	2	<26	8,250
Promotion Count 36 Months	3	<32	17,998
Promotion Count 36 Months	4	<38	25,784
Promotion Count 36 Months	5	<44	1,881
Promotion Count 36 Months	6	<50	1,606
Promotion Count 36 Months	7	<56	990
Promotion Count 36 Months	8	<62	231
Promotion Count 36 Months	9	>=62	110
Promotion Count All Months	0	<21	6,578
Promotion Count All Months	1	<35	12,650
Promotion Count All Months	2	<49	11,165
Promotion Count All Months	3	<63	13,970
Promotion Count All Months	4	<77	13,464
Promotion Count All Months	5	<91	4,895
Promotion Count All Months	6	<105	1,067
Promotion Count All Months	7	<119	682
Promotion Count All Months	8	<133	407
Promotion Count All Months	9	>=133	110
Promotion Count Card 12 Months	0	<2.2	605
Promotion Count Card 12 Months	1	<3.4	2,354
Promotion Count Card 12 Months	2	<4.6	9,603
Promotion Count Card 12 Months	3	<5.8	11,022
Promotion Count Card 12 Months	4	<7	37,774
Promotion Count Card 12 Months	5	<8.2	2,123
Promotion Count Card 12 Months	6	<9.4	429
Promotion Count Card 12 Months	7	<10.6	341
Promotion Count Card 12 Months	8	<11.8	627
Promotion Count Card 12 Months	9	>=11.8	110
Promotion Count Card 36 Months	0	<5.1	264
Promotion Count Card 36 Months	1	<7.2	4,796
Promotion Count Card 36 Months	2	<9.3	2,640
Promotion Count Card 36 Months	3	<11.4	7,073
Promotion Count Card 36 Months	4	<13.5	10,615
Promotion Count Card 36 Months	5	<15.6	17,237
Promotion Count Card 36 Months	6	<17.7	20,185
Promotion Count Card 36 Months	7	<19.8	1,199
Promotion Count Card 36 Months	8	<21.9	605
Promotion Count Card 36 Months	9	>=21.9	374
Promotion Count Card All Months	0	<8.3	6,809
Promotion Count Card All Months	1	<13.6	11,385
Promotion Count Card All Months	2	<18.9	11,055
Promotion Count Card All Months	3	<24.2	14,443
Promotion Count Card All Months	4	<29.5	11,209
Promotion Count Card All Months	5	<34.8	8,877
Promotion Count Card All Months	6	<40.1	913
Promotion Count Card All Months	7	<45.4	220
Promotion Count Card All Months	8	<50.7	33
Promotion Count Card All Months	9	>=50.7	44
Status Category Star All Months	0	<0.1	26,444
Status Category Star All Months	1	<0.2	0
Status Category Star All Months	2	<0.3	0
Status Category Star All Months	3	<0.4	0
Status Category Star All Months	4	<0.5	0
Status Category Star All Months	5	<0.6	0
Status Category Star All Months	6	<0.7	0
Status Category Star All Months	7	<0.8	0
Status Category Star All Months	8	<0.9	0
Status Category Star All Months	9	>=0.9	38,544

Variable	Order	BIC score
Gift Amount Average Card 36 Months	1	-29,154.8344
Gift Amount Last	2	-31,195.2536
Home Owner	3	-41,224.8022
Status Category Star All Months	4	-43,586.0806
Gift Amount Average 36 Months	5	-43,743.8588
Gift Count 36 Months	6	-44,462.0218
Gift Count Card All Months	7	-44,534.6656
Gift Count Card 36 Months	8	-44,553.2683
Time Since Last Gift	9	-44,617.0940
Status Category 96NK	10	-44,624.3476
Gift Count All Months	11	-44,664.7493
Promotion Count Card All Months	12	-44,691.2792
Promotion Count All Months	13	-44,721.6108
Time Since First Gift	14	-44,732.5056
Gift Amount Average All Months	15	-44,734.1688
Promotion Count Card 36 Months	16	-44,740.7647
Age	17	-44,791.9733
Promotion Count 36 Months	18	-44,800.6302
Demographic Cluster	19	-44,810.6215
Promotion Count 12 Months	20	-44,832.1368
Promotion Count Card 12 Months	21	-44,843.7932
Median Home Value Region	22	-44,882.8996
Percent Veterans Region	23	-44,970.8633
Gender	24	-44,979.8656
Median Income Region	25	-44,981.5252

Bayesian network - Target Gift Flag 2 Supplement 8

Predicted	Observed	Frequency	Percentage
0	0	22,792	73.82%
1	0	8,085	26.18%
0	1	10,021	29.38%
1	1	24,090	70.62%

Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	3250	3250	1.9055	1.9055	1.9055	1.9055
10.00	3250	3173	1.8604	1.9055	1.8830	1.9055
15.00	3250	2821	1.6540	1.9055	1.8067	1.9055
20.00	3250	2755	1.6153	1.9055	1.7588	1.9055
25.00	3250	2557	1.4992	1.9055	1.7069	1.9055
30.00	3250	2282	1.3380	1.9055	1.6454	1.9055
35.00	3250	2095	1.2283	1.9055	1.5858	1.9055
40.00	3250	1879	1.1017	1.9055	1.5253	1.9055
45.00	3250	1816	1.0648	1.9055	1.4741	1.9055
50.00	3250	1611	0.9446	1.9055	1.4212	1.9055
55.00	3250	1589	0.9317	0.9446	1.3767	1.8182
60.00	3250	1639	0.9610	0.0000	1.3420	1.6667
65.00	3250	1485	0.8707	0.0000	1.3058	1.5385
70.00	3250	1280	0.7505	0.0000	1.2661	1.4286
75.00	3250	1149	0.6737	0.0000	1.2266	1.3333
80.00	3250	1113	0.6526	0.0000	1.1907	1.2500
85.00	3250	891	0.5224	0.0000	1.1514	1.1765
90.00	3250	451	0.2644	0.0000	1.1022	1.1111
95.00	3250	275	0.1612	0.0000	1.0526	1.0526
100.00	3238	0	0.0000	0.0000	1.0000	1.0000



Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	1.0000	0.947
0.02	1.0000	0.928
0.03	1.0000	0.904
0.04	1.0000	0.888
0.05	0.9994	0.876
0.06	0.9981	0.862
0.07	0.9968	0.847
0.08	0.9961	0.836
0.09	0.9948	0.824
0.10	0.9936	0.808
0.11	0.9919	0.799
0.12	0.9890	0.784
0.13	0.9874	0.767
0.14	0.9861	0.755
0.15	0.9845	0.738
0.16	0.9819	0.724
0.17	0.9777	0.705
0.18	0.9739	0.691
0.19	0.9684	0.678
0.20	0.9632	0.663
0.21	0.9571	0.651
0.22	0.9536	0.634
0.23	0.9458	0.621
0.24	0.9410	0.608
0.25	0.9339	0.598
0.26	0.9258	0.586
0.27	0.9207	0.568
0.28	0.9152	0.555
0.29	0.9087	0.539
0.30	0.9023	0.524
0.31	0.8958	0.511
0.32	0.8887	0.498
0.33	0.8807	0.486
0.34	0.8729	0.468
0.35	0.8633	0.451
0.36	0.8539	0.439
0.37	0.8449	0.421
0.38	0.8371	0.413
0.39	0.8281	0.400
0.40	0.8168	0.384
0.41	0.8052	0.373
0.42	0.7955	0.359
0.43	0.7839	0.346
0.44	0.7707	0.331
0.45	0.7572	0.321
0.46	0.7520	0.310
0.47	0.7414	0.295
0.48	0.7304	0.286
0.49	0.7178	0.273
0.50	0.7062	0.262
0.51	0.6962	0.253
0.52	0.6833	0.239
0.53	0.6737	0.228
0.54	0.6620	0.214
0.55	0.6498	0.204
0.56	0.6417	0.193
0.57	0.6301	0.183
0.58	0.6150	0.172
0.59	0.6008	0.162
0.60	0.5879	0.153
0.61	0.5792	0.143
0.62	0.5698	0.137
0.63	0.5585	0.127
0.64	0.5460	0.117
0.65	0.5302	0.109
0.66	0.5169	0.100
0.67	0.5037	0.093
0.68	0.4908	0.084
0.69	0.4769	0.080
0.70	0.4660	0.074
0.71	0.4521	0.070
0.72	0.4418	0.064
0.73	0.4321	0.057
0.74	0.4176	0.051
0.75	0.4037	0.046
0.76	0.3921	0.043
0.77	0.3773	0.040
0.78	0.3667	0.037
0.79	0.3557	0.033
0.80	0.3441	0.030
0.81	0.3309	0.027
0.82	0.3180	0.024
0.83	0.3054	0.022
0.84	0.2941	0.021
0.85	0.2806	0.018
0.86	0.2699	0.016
0.87	0.2586	0.012
0.88	0.2470	0.010
0.89	0.2354	0.007
0.90	0.2257	0.006
0.91	0.2157	0.004
0.92	0.2032	0.004
0.93	0.1906	0.003
0.94	0.1770	0.002
0.95	0.1661	0.001
0.96	0.1506	0.000
0.97	0.1332	0.000
0.98	0.1148	0.000
0.99	0.0855	0.000


Response	Event	Value	Frequency
Correct	1	True Positive	24,090
Incorrect	1	False Negative	10,021
Correct	0	True Negative	22,792
Incorrect	0	False Positive	8,085

Bayesian network - Target Gift Flag 2 Supplement 12

[illegible]



Variable	Importance	Standard Deviation
Gift Amount Last	131.7121	188.3725
Gift Amount Average Card 36 Months	111.1019	163.9344
Gift Amount Average All Months	90.4437	140.1503
Gift Count 36 Months	83.3635	145.4316
Time Since Last Gift	72.6636	52.4012
Gift Amount Average 36 Months	55.4282	84.3654
Gift Count Card 36 Months	40.5110	88.8869
Gift Count All Months	33.5966	90.4642
Time Since First Gift	32.9412	31.2926
Promotion Count Card 12 Months	31.5153	30.2241
Gift Count Card All Months	23.3243	74.2670
Promotion Count Card 36 Months	20.9057	38.2212
Status Category Star All Months	15.4161	88.8755
Demographic Cluster	14.4423	8.2503
Age	14.3438	11.6957
Status Category 96NK	14.2259	46.8085
Median Home Value Region	13.1008	15.3414
Promotion Count All Months	12.5167	19.7107
Promotion Count 12 Months	10.4032	19.5700
Promotion Count 36 Months	9.9912	23.1234
Promotion Count Card All Months	8.0739	20.8065
Percent Veterans Region	3.5580	6.9445
Median Income Region	1.0785	5.6172
Gender	1.0530	3.0304
Home Owner	0.4351	4.4750

Number of Trees	Misclassification Rate	Misclassification Rate (Out-of-bag) 
1	0.4394	0.4389
2	0.4407	0.4409
3	0.4436	0.4384
4	0.4441	0.4410
5	0.4438	0.4381
6	0.4363	0.4373
7	0.4404	0.4370
8	0.4384	0.4369
9	0.4394	0.4379
10	0.4396	0.4389
11	0.4388	0.4380
12	0.4369	0.4364
13	0.4387	0.4370
14	0.4378	0.4365
15	0.4369	0.4366
16	0.4361	0.4376
17	0.4370	0.4368
18	0.4357	0.4361
19	0.4370	0.4360
20	0.4355	0.4353
21	0.4361	0.4356
22	0.4343	0.4354
23	0.4354	0.4355
24	0.4348	0.4351
25	0.4348	0.4341
26	0.4330	0.4337
27	0.4360	0.4347
28	0.4338	0.4354
29	0.4364	0.4359
30	0.4345	0.4362
31	0.4351	0.4361
32	0.4353	0.4360
33	0.4364	0.4362
34	0.4348	0.4356
35	0.4367	0.4359
36	0.4345	0.4359
37	0.4346	0.4355
38	0.4333	0.4354
39	0.4334	0.4349
40	0.4345	0.4348
41	0.4340	0.4347
42	0.4341	0.4347
43	0.4344	0.4344
44	0.4337	0.4346
45	0.4333	0.4342
46	0.4336	0.4342
47	0.4334	0.4346
48	0.4329	0.4338
49	0.4333	0.4339
50	0.4327	0.4336
51	0.4324	0.4335
52	0.4328	0.4336
53	0.4321	0.4333
54	0.4318	0.4329
55	0.4321	0.4331
56	0.4317	0.4335
57	0.4334	0.4336
58	0.4327	0.4336
59	0.4332	0.4337
60	0.4336	0.4342
61	0.4331	0.4342
62	0.4337	0.4345
63	0.4337	0.4341
64	0.4340	0.4343
65	0.4337	0.4342
66	0.4340	0.4343
67	0.4335	0.4344
68	0.4337	0.4341
69	0.4342	0.4346
70	0.4332	0.4346
71	0.4335	0.4345
72	0.4334	0.4344
73	0.4333	0.4343
74	0.4333	0.4345
75	0.4331	0.4342
76	0.4325	0.4344
77	0.4327	0.4343
78	0.4325	0.4339
79	0.4326	0.4339
80	0.4326	0.4338
81	0.4326	0.4342
82	0.4321	0.4340
83	0.4328	0.4341
84	0.4322	0.4339
85	0.4324	0.4340
86	0.4324	0.4339
87	0.4326	0.4333
88	0.4320	0.4335
89	0.4319	0.4337
90	0.4324	0.4341
91	0.4323	0.4342
92	0.4318	0.4339
93	0.4320	0.4341
94	0.4312	0.4340
95	0.4313	0.4338
96	0.4313	0.4340
97	0.4318	0.4342
98	0.4308	0.4340
99	0.4310	0.4339
100	0.4313	0.4342

Forest - Target Gift Flag 2 Supplement 3

Predicted	Observed	Frequency	Percentage
0	0	44,737	83.98%
1	0	8,536	16.02%
0	1	37,422	70.25%
1	1	15,851	29.75%

Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	5328	3828	1.4372	2.0003	1.4372	2.0003
10.00	5328	3560	1.3367	2.0003	1.3870	2.0003
15.00	5328	3531	1.3257	2.0003	1.3665	2.0003
20.00	5328	3061	1.1491	2.0003	1.3122	2.0003
25.00	5328	2945	1.1056	2.0003	1.2709	2.0003
30.00	5328	2941	1.1039	2.0003	1.2431	2.0003
35.00	5328	2608	0.9791	2.0003	1.2053	2.0003
40.00	5328	2979	1.1184	2.0003	1.1945	2.0003
45.00	5328	2629	0.9871	2.0003	1.1714	2.0003
50.00	5328	2692	1.0106	1.9976	1.1554	2.0000
55.00	5328	2493	0.9358	0.0000	1.1354	1.8182
60.00	5328	2442	0.9169	0.0000	1.1172	1.6667
65.00	5328	2449	0.9193	0.0000	1.1020	1.5385
70.00	5328	2382	0.8942	0.0000	1.0871	1.4286
75.00	5328	2408	0.9040	0.0000	1.0749	1.3333
80.00	5328	2337	0.8775	0.0000	1.0626	1.2500
85.00	5328	2182	0.8194	0.0000	1.0483	1.1765
90.00	5328	2005	0.7528	0.0000	1.0318	1.1111
95.00	5328	1963	0.7368	0.0000	1.0163	1.0526
100.00	5314	1838	0.6899	0.0000	1.0000	1.0000

Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	0.9699	0.941
0.02	0.9500	0.911
0.03	0.9201	0.856
0.04	0.8926	0.812
0.05	0.8664	0.768
0.06	0.8472	0.747
0.07	0.8412	0.738
0.08	0.8303	0.727
0.09	0.8177	0.707
0.10	0.7840	0.668
0.11	0.7520	0.628
0.12	0.7272	0.595
0.13	0.7012	0.568
0.14	0.6612	0.518
0.15	0.6333	0.487
0.16	0.6188	0.469
0.17	0.6007	0.450
0.18	0.5841	0.429
0.19	0.5670	0.412
0.20	0.5519	0.397
0.21	0.5391	0.387
0.22	0.5158	0.360
0.23	0.5026	0.346
0.24	0.4883	0.333
0.25	0.4772	0.322
0.26	0.4631	0.307
0.27	0.4479	0.297
0.28	0.4408	0.293
0.29	0.4357	0.289
0.30	0.4305	0.284
0.31	0.4254	0.280
0.32	0.4177	0.276
0.33	0.4080	0.263
0.34	0.4041	0.256
0.35	0.3962	0.249
0.36	0.3884	0.242
0.37	0.3847	0.237
0.38	0.3770	0.230
0.39	0.3640	0.220
0.40	0.3521	0.212
0.41	0.3473	0.209
0.42	0.3434	0.205
0.43	0.3390	0.201
0.44	0.3339	0.196
0.45	0.3234	0.188
0.46	0.3128	0.177
0.47	0.3077	0.173
0.48	0.3039	0.169
0.49	0.3004	0.164
0.50	0.2975	0.160
0.51	0.2934	0.157
0.52	0.2901	0.156
0.53	0.2864	0.154
0.54	0.2835	0.152
0.55	0.2796	0.149
0.56	0.2740	0.146
0.57	0.2686	0.142
0.58	0.2639	0.139
0.59	0.2571	0.133
0.60	0.2538	0.129
0.61	0.2507	0.127
0.62	0.2422	0.120
0.63	0.2335	0.113
0.64	0.2306	0.111
0.65	0.2261	0.107
0.66	0.2185	0.102
0.67	0.2139	0.099
0.68	0.2094	0.097
0.69	0.2052	0.095
0.70	0.2024	0.094
0.71	0.1978	0.091
0.72	0.1945	0.089
0.73	0.1912	0.087
0.74	0.1877	0.084
0.75	0.1815	0.082
0.76	0.1782	0.080
0.77	0.1739	0.079
0.78	0.1714	0.078
0.79	0.1693	0.077
0.80	0.1666	0.076
0.81	0.1639	0.074
0.82	0.1584	0.074
0.83	0.1551	0.072
0.84	0.1516	0.071
0.85	0.1497	0.068
0.86	0.1468	0.066
0.87	0.1437	0.064
0.88	0.1410	0.063
0.89	0.1375	0.061
0.90	0.1340	0.059
0.91	0.1307	0.057
0.92	0.1264	0.054
0.93	0.1214	0.052
0.94	0.1152	0.049
0.95	0.1090	0.046
0.96	0.1049	0.044
0.97	0.0993	0.040
0.98	0.0925	0.036
0.99	0.0797	0.032

Forest - Target Gift Flag 2 Supplement 6

Response	Event	Value	Frequency
Correct	1	True Positive	15,851
Incorrect	1	False Negative	37,422
Correct	0	True Negative	44,737
Incorrect	0	False Positive	8,536

Forest - Target Gift Flag 2 Supplement 7

[illegible]

Variable	Importance	Standard Deviation
Demographic Cluster	133.8945	30.2677
Gift Count 36 Months	44.4183	104.3678
Age	33.2006	9.6134
Time Since Last Gift	33.1937	14.8236
Gift Amount Last	30.4881	77.5074
Gift Amount Average Card 36 Months	22.9122	21.4845
Median Home Value Region	17.9380	9.2680
Gift Amount Average All Months	14.9390	22.8831
Time Since First Gift	14.0449	7.6415
Promotion Count 12 Months	12.3387	9.2872
Median Income Region	12.1325	6.1449
Gift Count Card All Months	11.4898	29.0370
Gift Amount Average 36 Months	10.3202	6.9900
Gift Count All Months	10.1918	11.6752
Promotion Count Card All Months	10.0021	6.0775
Percent Veterans Region	9.5978	6.3910
Status Category 96NK	8.7516	9.4123
Promotion Count 36 Months	8.3417	11.1391
Promotion Count All Months	7.0677	10.1911
Gift Count Card 36 Months	5.5439	9.7492
Promotion Count Card 36 Months	5.4170	4.3339
Promotion Count Card 12 Months	4.8258	12.0257
Status Category Star All Months	4.4458	17.5209
Gender	2.5091	4.4300
Home Owner	0.3952	0.0000



Number of Trees	Misclassification Rate
1	0.4131
2	0.4023
3	0.3975
4	0.3951
5	0.3892
6	0.3882
7	0.3880
8	0.3855
9	0.3797
10	0.3780
11	0.3767
12	0.3752
13	0.3743
14	0.3748
15	0.3721
16	0.3709
17	0.3693
18	0.3676
19	0.3647
20	0.3635
21	0.3639
22	0.3619
23	0.3629
24	0.3606
25	0.3574
26	0.3574
27	0.3557
28	0.3537
29	0.3527
30	0.3529
31	0.3505
32	0.3488
33	0.3460
34	0.3445
35	0.3428
36	0.3430
37	0.3426
38	0.3396
39	0.3377
40	0.3370
41	0.3361
42	0.3349
43	0.3354
44	0.3339
45	0.3321
46	0.3312
47	0.3304
48	0.3287
49	0.3272
50	0.3256

Gradient boosting - Target Gift Flag 2 Supplement 3

Predicted	Observed	Frequency	Percentage
0	0	37,532	70.45%
1	0	15,741	29.55%
0	1	18,953	35.58%
1	1	34,320	64.42%


Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	5328	4943	1.8557	2.0003	1.8557	2.0003
10.00	5328	4360	1.6369	2.0003	1.7463	2.0003
15.00	5328	4140	1.5543	2.0003	1.6823	2.0003
20.00	5328	3827	1.4368	2.0003	1.6209	2.0003
25.00	5328	3705	1.3909	2.0003	1.5749	2.0003
30.00	5328	3381	1.2693	2.0003	1.5240	2.0003
35.00	5328	3117	1.1702	2.0003	1.4734	2.0003
40.00	5328	3084	1.1578	2.0003	1.4340	2.0003
45.00	5328	2666	1.0009	2.0003	1.3859	2.0003
50.00	5328	2567	0.9637	1.9976	1.3436	2.0000
55.00	5328	2578	0.9678	0.0000	1.3095	1.8182
60.00	5328	2354	0.8837	0.0000	1.2740	1.6667
65.00	5328	2263	0.8496	0.0000	1.2414	1.5385
70.00	5328	2006	0.7531	0.0000	1.2065	1.4286
75.00	5328	1907	0.7159	0.0000	1.1738	1.3333
80.00	5328	1854	0.6960	0.0000	1.1439	1.2500
85.00	5328	1584	0.5947	0.0000	1.1116	1.1765
90.00	5328	1254	0.4708	0.0000	1.0760	1.1111
95.00	5328	1034	0.3882	0.0000	1.0398	1.0526
100.00	5314	649	0.2437	0.0000	1.0000	1.0000

Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	1.0000	1.000
0.02	1.0000	1.000
0.03	1.0000	1.000
0.04	1.0000	1.000
0.05	1.0000	1.000
0.06	1.0000	1.000
0.07	1.0000	1.000
0.08	1.0000	1.000
0.09	1.0000	1.000
0.10	1.0000	1.000
0.11	1.0000	1.000
0.12	1.0000	1.000
0.13	1.0000	1.000
0.14	1.0000	1.000
0.15	1.0000	0.999
0.16	1.0000	0.999
0.17	1.0000	0.999
0.18	1.0000	0.998
0.19	1.0000	0.997
0.20	1.0000	0.997
0.21	1.0000	0.995
0.22	1.0000	0.993
0.23	1.0000	0.991
0.24	0.9998	0.988
0.25	0.9992	0.982
0.26	0.9988	0.976
0.27	0.9969	0.968
0.28	0.9957	0.957
0.29	0.9932	0.944
0.30	0.9917	0.931
0.31	0.9884	0.917
0.32	0.9847	0.897
0.33	0.9812	0.877
0.34	0.9742	0.854
0.35	0.9672	0.827
0.36	0.9612	0.799
0.37	0.9500	0.769
0.38	0.9381	0.735
0.39	0.9244	0.703
0.40	0.9096	0.672
0.41	0.8889	0.633
0.42	0.8705	0.596
0.43	0.8482	0.559
0.44	0.8239	0.520
0.45	0.8007	0.484
0.46	0.7702	0.443
0.47	0.7427	0.403
0.48	0.7082	0.367
0.49	0.6756	0.330
0.50	0.6442	0.295
0.51	0.6151	0.270
0.52	0.5843	0.239
0.53	0.5501	0.210
0.54	0.5168	0.185
0.55	0.4873	0.165
0.56	0.4536	0.140
0.57	0.4243	0.123
0.58	0.3952	0.107
0.59	0.3616	0.091
0.60	0.3308	0.078
0.61	0.3002	0.068
0.62	0.2752	0.057
0.63	0.2503	0.047
0.64	0.2278	0.039
0.65	0.2055	0.034
0.66	0.1865	0.028
0.67	0.1660	0.024
0.68	0.1491	0.019
0.69	0.1321	0.014
0.70	0.1144	0.011
0.71	0.0999	0.008
0.72	0.0873	0.007
0.73	0.0729	0.004
0.74	0.0617	0.003
0.75	0.0541	0.002
0.76	0.0450	0.001
0.77	0.0390	0.001
0.78	0.0324	0.000
0.79	0.0275	0.000
0.80	0.0219	0.000
0.81	0.0165	0.000
0.82	0.0126	0.000
0.83	0.0095	0.000
0.84	0.0062	0.000
0.85	0.0043	0.000
0.86	0.0029	0.000
0.87	0.0019	0.000
0.88	0.0012	0.000
0.89	0.0004	0.000
0.90	0.0000	0.000
0.91	0.0000	0.000
0.92	0.0000	0.000
0.93	0.0000	0.000
0.94	0.0000	0.000
0.95	0.0000	0.000
0.96	0.0000	0.000
0.97	0.0000	0.000
0.98	0.0000	0.000
0.99	0.0000	0.000

Response	Event	Value	Frequency
Correct	1	True Positive	34,320
Incorrect	1	False Negative	18,953
Correct	0	True Negative	37,532
Incorrect	0	False Positive	15,741

Gradient boosting - Target Gift Flag 2 Supplement 7

[illegible]

Description	Value	
Data Source	SVSO35.PVA	
Response Variable	Target Gift Flag	
Distribution	Binary	
Link Function	Logit	
Optimization Technique	Newton-Raphson with Ridging	
Predicted Response Level	I_TARGET_B	

Description	Value	✕✕
Number of Model Effects	26	
Number of Classification Effects	4	
Number of Columns in X	87	
Rank of Cross-product Matrix	83	
Number of Observations Read	106,546	
Number of Observations Used	64,988	



Logistic regression - Target Gift Flag 1 Supplement 3

Ordered Value	Count	Target Gift Flag
1	34111	1
2	30877	0



Logistic regression - Target Gift Flag 1 Supplement 4

Iteration	Evaluations	Objective	Change	Max Gradient
0	4	0.669821	.	1424.487
1	2	0.667259	0.002562	84.64979
2	2	0.667251	8.299E-6	0.248079
3	2	0.667251	7.52E-11	2.486E-6

Logistic regression - Target Gift Flag 1 Supplement 5

Reason	Status 
Convergence criterion (GCONV=1E-6) satisfied.	0

Statistic	Value	✕✕
-2 Log Likelihood	86726.58	
AIC	86890.58	
AICC	86890.79	
BIC	87635.3	
Max-rescaled R-Square	0.064212	
R-Square	0.048119	

Parameter	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	0.746633	0.132281	31.85808	<0.00001
Demographic Cluster 00	-0.03055	0.095002	0.103414	0.74777
Demographic Cluster 01	-0.21077	0.110711	3.624416	0.05694
Demographic Cluster 02	-0.57852	0.090144	41.18746	<0.00001
Demographic Cluster 03	0.053205	0.098758	0.290235	0.59007
Demographic Cluster 04	-0.18192	0.136898	1.765872	0.18389
Demographic Cluster 05	-0.45943	0.102038	20.27236	<0.00001
Demographic Cluster 06	-0.73607	0.13668	29.00158	<0.00001
Demographic Cluster 07	-0.37903	0.115948	10.68639	0.00108
Demographic Cluster 08	-0.60671	0.088628	46.86217	<0.00001
Demographic Cluster 09	-0.48598	0.120466	16.2747	0.00005
Demographic Cluster 10	-0.9427	0.093609	101.4183	<0.00001
Demographic Cluster 11	-0.51844	0.085715	36.58282	<0.00001
Demographic Cluster 12	-0.40636	0.080446	25.51549	<0.00001
Demographic Cluster 13	-0.18828	0.086046	4.787945	0.02866
Demographic Cluster 14	-0.1657	0.086201	3.694856	0.05458
Demographic Cluster 15	-0.65073	0.100992	41.51697	<0.00001
Demographic Cluster 16	-0.48054	0.08563	31.49259	<0.00001
Demographic Cluster 17	-0.5608	0.091163	37.84267	<0.00001
Demographic Cluster 18	-0.15318	0.080001	3.666411	0.05552
Demographic Cluster 19	-0.86908	0.135368	41.21788	<0.00001
Demographic Cluster 20	-0.26468	0.092334	8.217178	0.00415
Demographic Cluster 21	-0.55194	0.093209	35.06433	<0.00001
Demographic Cluster 22	-0.23449	0.098527	5.664076	0.01732
Demographic Cluster 23	-0.44091	0.095729	21.2135	<0.00001
Demographic Cluster 24	-0.30058	0.078858	14.5288	0.00014
Demographic Cluster 25	-0.63081	0.09971	40.02351	<0.00001
Demographic Cluster 26	-0.52551	0.101746	26.67669	<0.00001
Demographic Cluster 27	-0.23882	0.079731	8.971918	0.00274
Demographic Cluster 28	-0.27576	0.087643	9.90029	0.00165
Demographic Cluster 29	-0.28756	0.111438	6.658879	0.00987
Demographic Cluster 30	-0.74109	0.082919	79.87888	<0.00001
Demographic Cluster 31	-0.45938	0.101796	20.36457	<0.00001
Demographic Cluster 32	-1.25262	0.11789	112.8974	<0.00001
Demographic Cluster 33	-0.27443	0.12643	4.711574	0.02996
Demographic Cluster 34	-0.23927	0.097565	6.014492	0.01419
Demographic Cluster 35	-0.26583	0.079361	11.21971	0.00081
Demographic Cluster 36	-0.39995	0.078585	25.90215	<0.00001
Demographic Cluster 37	-0.62486	0.107226	33.96005	<0.00001
Demographic Cluster 38	-0.38602	0.101868	14.35954	0.00015
Demographic Cluster 39	-0.14536	0.085555	2.886728	0.08931
Demographic Cluster 40	-0.32023	0.077935	16.88302	0.00004
Demographic Cluster 41	-0.94999	0.088557	115.0762	<0.00001
Demographic Cluster 42	-0.27648	0.095933	8.305993	0.00395
Demographic Cluster 43	-0.66927	0.088421	57.29122	<0.00001
Demographic Cluster 44	-0.95873	0.089902	113.7235	<0.00001
Demographic Cluster 45	-0.6777	0.088966	58.02623	<0.00001
Demographic Cluster 46	-0.1342	0.09051	2.198322	0.13816
Demographic Cluster 47	-0.73562	0.120347	37.36205	<0.00001
Demographic Cluster 48	-0.61081	0.107324	32.39012	<0.00001
Demographic Cluster 49	-0.56611	0.081659	48.06044	<0.00001
Demographic Cluster 50	-0.4184	0.12056	12.04418	0.00052
Demographic Cluster 51	-0.56276	0.088995	39.98667	<0.00001
Demographic Cluster 52	-0.96091	0.155891	37.99445	<0.00001
Demographic Cluster 53	0	.	.	.
Gender F	0.023866	0.046181	0.267069	0.60530
Gender M	-0.00448	0.046607	0.009221	0.92350
Gender U	0	.	.	.
Home Owner H	0.10843	0.019442	31.10361	<0.00001
Home Owner U	0	.	.	.
Status Category 96NK A	-0.01991	0.023813	0.698721	0.40321
Status Category 96NK E	0.42474	0.09378	20.51306	<0.00001
Status Category 96NK F	-0.11516	0.058088	3.930017	0.04743
Status Category 96NK L	-0.49575	0.146311	11.48063	0.00070
Status Category 96NK N	0.049457	0.049686	0.990803	0.31955
Status Category 96NK S	0	.	.	.
Age	0.004571	0.000514	79.19708	<0.00001
Gift Amount Average 36 Months	-0.02412	0.004275	31.81835	<0.00001
Gift Amount Average All Months	0.007722	0.002976	6.733052	0.00946
Gift Amount Average Card 36 Months	0.009852	0.003281	9.014973	0.00268
Gift Amount Last	0.000878	0.001554	0.319451	0.57194
Gift Count 36 Months	0.069428	0.009175	57.26609	<0.00001
Gift Count All Months	-0.00367	0.002982	1.513329	0.21863
Gift Count Card 36 Months	0.01622	0.01305	1.544679	0.21392
Gift Count Card All Months	-0.00567	0.006317	0.805675	0.36940
Median Home Value Region	8.366E-7	0	.	<0.00001
Median Income Region	-1.48E-6	3.94E-7	14.1176	0.00017
Percent Veterans Region	-0.00135	0.000905	2.223048	0.13596
Promotion Count 12 Months	-0.00664	0.007709	0.741464	0.38919
Promotion Count 36 Months	-0.0264	0.007061	13.97986	0.00018
Promotion Count All Months	0.015255	0.002141	50.78786	<0.00001
Promotion Count Card 12 Months	-0.01316	0.017225	0.583429	0.44497
Promotion Count Card 36 Months	0.071586	0.01327	29.10172	<0.00001
Promotion Count Card All Months	-0.06537	0.006105	114.646	<0.00001
Status Category Star All Months	0.1071	0.022923	21.82996	<0.00001
Time Since First Gift	0.00913	0.000781	136.8103	<0.00001
Time Since Last Gift	-0.04942	0.002757	321.2607	<0.00001

Effect	DF	Chi-Square	Pr > ChiSq
Demographic Cluster	53	828.9107	<0.00001
Gender	2	2.958882	0.22776
Home Owner	1	31.10361	<0.00001
Status Category 96NK	5	49.3616	<0.00001
Age	1	79.19708	<0.00001
Gift Amount Average 36 Months	1	31.81835	<0.00001
Gift Amount Average All Months	1	6.733052	0.00946
Gift Amount Average Card 36 Months	1	9.014973	0.00268
Gift Amount Last	1	0.319451	0.57194
Gift Count 36 Months	1	57.26609	<0.00001
Gift Count All Months	1	1.513329	0.21863
Gift Count Card 36 Months	1	1.544679	0.21392
Gift Count Card All Months	1	0.805675	0.36940
Median Home Value Region	0	.	.
Median Income Region	1	14.1176	0.00017
Percent Veterans Region	1	2.223048	0.13596
Promotion Count 12 Months	1	0.741464	0.38919
Promotion Count 36 Months	1	13.97986	0.00018
Promotion Count All Months	1	50.78786	<0.00001
Promotion Count Card 12 Months	1	0.583429	0.44497
Promotion Count Card 36 Months	1	29.10172	<0.00001
Promotion Count Card All Months	1	114.646	<0.00001
Status Category Star All Months	1	21.82996	<0.00001
Time Since First Gift	1	136.8103	<0.00001
Time Since Last Gift	1	321.2607	<0.00001

Logistic regression - Target Gift Flag 1 Supplement 9

Predicted	Observed	Frequency	Percentage
0	0	15,686	50.80%
1	0	15,191	49.20%
0	1	11,165	32.73%
1	1	22,946	67.27%

Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	3250	2381	1.3960	1.9055	1.3960	1.9055
10.00	3250	2348	1.3767	1.9055	1.3864	1.9055
15.00	3250	2106	1.2348	1.9055	1.3358	1.9055
20.00	3250	2053	1.2037	1.9055	1.3028	1.9055
25.00	3250	1749	1.0255	1.9055	1.2473	1.9055
30.00	3250	2035	1.1932	1.9055	1.2383	1.9055
35.00	3250	1982	1.1621	1.9055	1.2274	1.9055
40.00	3250	1776	1.0413	1.9055	1.2042	1.9055
45.00	3250	1885	1.1052	1.9055	1.1932	1.9055
50.00	3250	1705	0.9997	1.9055	1.1738	1.9055
55.00	3250	1771	1.0384	0.9446	1.1615	1.8182
60.00	3250	1600	0.9381	0.0000	1.1429	1.6667
65.00	3250	1414	0.8291	0.0000	1.1187	1.5385
70.00	3250	1412	0.8279	0.0000	1.0980	1.4286
75.00	3250	1457	0.8543	0.0000	1.0817	1.3333
80.00	3250	1619	0.9493	0.0000	1.0734	1.2500
85.00	3250	1405	0.8238	0.0000	1.0588	1.1765
90.00	3250	1204	0.7059	0.0000	1.0392	1.1111
95.00	3250	1296	0.7599	0.0000	1.0245	1.0526
100.00	3238	913	0.5353	0.0000	1.0000	1.0000



Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	1.0000	1.000
0.02	1.0000	1.000
0.03	1.0000	1.000
0.04	1.0000	1.000
0.05	1.0000	1.000
0.06	1.0000	1.000
0.07	1.0000	1.000
0.08	1.0000	1.000
0.09	1.0000	1.000
0.10	1.0000	1.000
0.11	1.0000	1.000
0.12	1.0000	1.000
0.13	1.0000	1.000
0.14	1.0000	1.000
0.15	1.0000	1.000
0.16	1.0000	1.000
0.17	1.0000	1.000
0.18	1.0000	1.000
0.19	1.0000	1.000
0.20	1.0000	1.000
0.21	0.9994	0.999
0.22	0.9994	0.998
0.23	0.9987	0.996
0.24	0.9974	0.995
0.25	0.9974	0.991
0.26	0.9961	0.989
0.27	0.9952	0.984
0.28	0.9942	0.981
0.29	0.9932	0.978
0.30	0.9900	0.973
0.31	0.9871	0.965
0.32	0.9839	0.957
0.33	0.9787	0.943
0.34	0.9736	0.926
0.35	0.9645	0.916
0.36	0.9574	0.902
0.37	0.9484	0.883
0.38	0.9368	0.866
0.39	0.9226	0.841
0.40	0.9126	0.816
0.41	0.8968	0.787
0.42	0.8820	0.764
0.43	0.8623	0.739
0.44	0.8349	0.711
0.45	0.8078	0.679
0.46	0.7878	0.647
0.47	0.7591	0.612
0.48	0.7323	0.571
0.49	0.7033	0.533
0.50	0.6727	0.492
0.51	0.6430	0.457
0.52	0.6056	0.421
0.53	0.5711	0.388
0.54	0.5385	0.355
0.55	0.4947	0.321
0.56	0.4628	0.290
0.57	0.4276	0.261
0.58	0.3847	0.232
0.59	0.3544	0.207
0.60	0.3154	0.184
0.61	0.2854	0.157
0.62	0.2557	0.128
0.63	0.2293	0.110
0.64	0.2019	0.095
0.65	0.1774	0.080
0.66	0.1554	0.067
0.67	0.1354	0.055
0.68	0.1135	0.045
0.69	0.0964	0.036
0.70	0.0793	0.030
0.71	0.0655	0.027
0.72	0.0526	0.024
0.73	0.0406	0.018
0.74	0.0329	0.012
0.75	0.0235	0.010
0.76	0.0174	0.006
0.77	0.0139	0.004
0.78	0.0103	0.002
0.79	0.0077	0.001
0.80	0.0068	0.001
0.81	0.0048	0.001
0.82	0.0032	0.000
0.83	0.0019	0.000
0.84	0.0010	0.000
0.85	0.0003	0.000
0.86	0.0003	0.000
0.87	0.0003	0.000
0.88	0.0003	0.000
0.89	0.0000	0.000
0.90	0.0000	0.000
0.91	0.0000	0.000
0.92	0.0000	0.000
0.93	0.0000	0.000
0.94	0.0000	0.000
0.95	0.0000	0.000
0.96	0.0000	0.000
0.97	0.0000	0.000
0.98	0.0000	0.000
0.99	0.0000	0.000


Logistic regression - Target Gift Flag 1 Supplement 12

Response	Event	Value	Frequency
Correct	1	True Positive	22,946
Incorrect	1	False Negative	11,165
Correct	0	True Negative	15,686
Incorrect	0	False Positive	15,191

Logistic regression - Target Gift Flag 1 Supplement 13

[illegible]

Description	Value	✕✕
Model	Neural Net	
Number of Observations Used	64,988	
Number of Observations Read	106,546	
Target/Response Variable	Target Gift Flag	
Number of Neurons	98	
Number of Input Neurons	86	
Number of Output Neurons	2	
Number of Hidden Neurons	10	
Number of Hidden Layers	1	
Number of Weight Parameters	870	
Number of Bias Parameters	12	
Architecture	MLP	
Number of Neural Nets	1	
Objective Value	2.767802	

Iterations	Objective	Loss 
1	3.8170	2.7996
2	3.7979	2.7851
3	3.7805	2.7722
4	3.6980	2.7332
5	3.6585	2.7287
6	3.6004	2.7469
7	3.5428	2.7646
8	3.4828	2.8195
9	3.4475	2.7948
10	3.4098	2.7445
11	3.3971	2.7449
12	3.3614	2.7345
13	3.3334	2.7236
14	3.2957	2.7176
15	3.2189	2.7182
16	3.1823	2.7222
17	3.1637	2.7358
18	3.1312	2.7318
19	3.0647	2.7138
20	3.0479	2.7160
21	3.0364	2.7160
22	2.9945	2.7148
23	2.9355	2.7134
24	2.9178	2.7120
25	2.9091	2.7040
26	2.9049	2.7032
27	2.8782	2.7038
28	2.8600	2.7084
29	2.8450	2.7347
30	2.8306	2.7291
31	2.8249	2.7200
32	2.8114	2.7249
33	2.8081	2.7259
34	2.8052	2.7270
35	2.7973	2.7352
36	2.7936	2.7422
37	2.7921	2.7450
38	2.7914	2.7431
39	2.7898	2.7482
40	2.7887	2.7510
41	2.7866	2.7551
42	2.7828	2.7648
43	2.7817	2.7669
44	2.7792	2.7680
45	2.7776	2.7680
46	2.7764	2.7677
47	2.7746	2.7676
48	2.7717	2.7677
49	2.7708	2.7677
50	2.7700	2.7678
51	2.7695	2.7679
52	2.7692	2.7679
53	2.7691	2.7678
54	2.7688	2.7677
55	2.7684	2.7677
56	2.7682	2.7677
57	2.7681	2.7677
58	2.7680	2.7677
59	2.7679	2.7677
60	2.7679	2.7677
61	2.7678	2.7677
62	2.7678	2.7677
63	2.7678	2.7677

Neural network - Target Gift Flag 1 Supplement 3

**Reason**



The optimization achieved the desired objective value.

Neural network - Target Gift Flag 1 Supplement 4

Predicted	Observed	Frequency	Percentage
0	0	0	0.00%
1	0	30,877	100.00%
0	1	0	0.00%
1	1	34,111	100.00%

Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	3250	1237	0.7253	1.9055	0.7253	1.9055
10.00	3250	1271	0.7452	1.9055	0.7352	1.9055
15.00	3250	1386	0.8126	1.9055	0.7610	1.9055
20.00	3250	1364	0.7997	1.9055	0.7707	1.9055
25.00	3250	1617	0.9481	1.9055	0.8062	1.9055
30.00	3242	1496	0.8771	1.9009	0.8180	1.9048
35.00	3256	1771	1.0384	1.9091	0.8495	1.9054
40.00	3252	1833	1.0747	1.9067	0.8776	1.9055
45.00	3250	1688	0.9897	1.9055	0.8901	1.9055
50.00	3244	1715	1.0055	1.9020	0.9016	1.9052
55.00	3256	1749	1.0255	0.9481	0.9129	1.8182
60.00	3250	1826	1.0706	0.0000	0.9260	1.6667
65.00	3250	1770	1.0378	0.0000	0.9346	1.5385
70.00	3250	1695	0.9938	0.0000	0.9389	1.4286
75.00	3250	1780	1.0437	0.0000	0.9459	1.3333
80.00	3250	1776	1.0413	0.0000	0.9518	1.2500
85.00	3250	1941	1.1380	0.0000	0.9628	1.1765
90.00	3237	2104	1.2336	0.0000	0.9778	1.1111
95.00	3263	2031	1.1908	0.0000	0.9890	1.0526
100.00	3238	2061	1.2084	0.0000	1.0000	1.0000



Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	1.0000	1.000
0.02	1.0000	1.000
0.03	1.0000	1.000
0.04	1.0000	1.000
0.05	1.0000	1.000
0.06	1.0000	1.000
0.07	1.0000	1.000
0.08	1.0000	1.000
0.09	1.0000	1.000
0.10	1.0000	1.000
0.11	1.0000	1.000
0.12	1.0000	1.000
0.13	1.0000	1.000
0.14	1.0000	1.000
0.15	1.0000	1.000
0.16	1.0000	1.000
0.17	1.0000	1.000
0.18	1.0000	1.000
0.19	1.0000	1.000
0.20	1.0000	1.000
0.21	1.0000	1.000
0.22	1.0000	1.000
0.23	1.0000	1.000
0.24	1.0000	1.000
0.25	1.0000	1.000
0.26	1.0000	1.000
0.27	1.0000	1.000
0.28	1.0000	1.000
0.29	1.0000	1.000
0.30	1.0000	1.000
0.31	1.0000	1.000
0.32	1.0000	1.000
0.33	1.0000	1.000
0.34	1.0000	1.000
0.35	1.0000	1.000
0.36	1.0000	1.000
0.37	1.0000	1.000
0.38	1.0000	1.000
0.39	1.0000	1.000
0.40	1.0000	1.000
0.41	1.0000	1.000
0.42	1.0000	1.000
0.43	1.0000	1.000
0.44	1.0000	1.000
0.45	1.0000	1.000
0.46	1.0000	1.000
0.47	1.0000	1.000
0.48	1.0000	1.000
0.49	1.0000	1.000
0.50	1.0000	1.000
0.51	1.0000	1.000
0.52	1.0000	1.000
0.53	0.0000	0.000
0.54	0.0000	0.000
0.55	0.0000	0.000
0.56	0.0000	0.000
0.57	0.0000	0.000
0.58	0.0000	0.000
0.59	0.0000	0.000
0.60	0.0000	0.000
0.61	0.0000	0.000
0.62	0.0000	0.000
0.63	0.0000	0.000
0.64	0.0000	0.000
0.65	0.0000	0.000
0.66	0.0000	0.000
0.67	0.0000	0.000
0.68	0.0000	0.000
0.69	0.0000	0.000
0.70	0.0000	0.000
0.71	0.0000	0.000
0.72	0.0000	0.000
0.73	0.0000	0.000
0.74	0.0000	0.000
0.75	0.0000	0.000
0.76	0.0000	0.000
0.77	0.0000	0.000
0.78	0.0000	0.000
0.79	0.0000	0.000
0.80	0.0000	0.000
0.81	0.0000	0.000
0.82	0.0000	0.000
0.83	0.0000	0.000
0.84	0.0000	0.000
0.85	0.0000	0.000
0.86	0.0000	0.000
0.87	0.0000	0.000
0.88	0.0000	0.000
0.89	0.0000	0.000
0.90	0.0000	0.000
0.91	0.0000	0.000
0.92	0.0000	0.000
0.93	0.0000	0.000
0.94	0.0000	0.000
0.95	0.0000	0.000
0.96	0.0000	0.000
0.97	0.0000	0.000
0.98	0.0000	0.000
0.99	0.0000	0.000

Neural network - Target Gift Flag 1 Supplement 7

Response	Event	Value	Frequency
Correct	1	True Positive	34,111
Incorrect	1	False Negative	0
Correct	0	True Negative	0
Incorrect	0	False Positive	30,877

Neural network - Target Gift Flag 1 Supplement 8

[illegible]

Description	Value	✕✕
Optimization technique	Interior Point	
Scale	YES	
Kernel Function	Linear	
Penalty Method	C	
Penalty Value	1	
Maximum Iterations	25	
Tolerance	1E-6	

Iteration	Complementarity	Feasibility✖✖
1	1001986.6448	5172511.5949
2	500.05808942	0.0517251149
3	0.4141799322	0.000042842
4	0.0714010252	3.4062525E-6
5	0.0273039096	1.0753209E-6
6	0.0117408294	3.8155621E-7
7	0.0056885267	1.4359004E-7
8	0.0027349998	5.3827376E-8
9	0.0010188967	1.3967738E-8
10	0.0003541886	7.022033E-10
11	0.0000687258	9.401857E-11
12	0.0000242394	2.07323E-11
13	6.0483274E-6	2.495426E-11
14	5.2305811E-7	1.631406E-11

Description	Value
Inner Product of Weights	67.065986691
Bias	-0.262258354
Total Slack (Constraint Violations)	56909.347536
Norm of Longest Vector	3.5854339263
Number of Support Vectors	57651
Number of Support Vectors On Margin	56628
Maximum F	2.4565311509
Minimum F	-2.339786423
Number of Effects	25
Columns in Data Matrix	86

Support vector machine - Target Gift Flag 1 Supplement 4

Statistic	Value
Accuracy	0.5943
Error	0.4057
Sensitivity	0.6924
Specificity	0.4859

Support vector machine - Target Gift Flag 1 Supplement 5

Predicted	Observed	Frequency	Percentage
1	1	23,617	69.24%
0	1	10,494	30.76%
1	0	15,873	51.41%
0	0	15,004	48.59%



Percentile	Observations	Events	Model	Best	Cumulative Model	Cumulative Best
5.00	3250	2277	1.3351	1.9055	1.3351	1.9055
10.00	3250	2254	1.3216	1.9055	1.3283	1.9055
15.00	3250	2355	1.3808	1.9055	1.3458	1.9055
20.00	3250	2024	1.1867	1.9055	1.3060	1.9055
25.00	3250	1972	1.1562	1.9055	1.2761	1.9055
30.00	3250	1757	1.0302	1.9055	1.2351	1.9055
35.00	3250	1839	1.0782	1.9055	1.2127	1.9055
40.00	3250	1809	1.0607	1.9055	1.1937	1.9055
45.00	3250	1907	1.1181	1.9055	1.1853	1.9055
50.00	3250	1782	1.0448	1.9055	1.1712	1.9055
55.00	3250	1540	0.9029	0.9446	1.1468	1.8182
60.00	3250	1826	1.0706	0.0000	1.1405	1.6667
65.00	3250	1551	0.9094	0.0000	1.1227	1.5385
70.00	3250	1533	0.8988	0.0000	1.1067	1.4286
75.00	3250	1413	0.8285	0.0000	1.0882	1.3333
80.00	3250	1300	0.7622	0.0000	1.0678	1.2500
85.00	3250	1496	0.8771	0.0000	1.0566	1.1765
90.00	3250	1364	0.7997	0.0000	1.0423	1.1111
95.00	3250	1078	0.6321	0.0000	1.0207	1.0526
100.00	3238	1034	0.6063	0.0000	1.0000	1.0000

Cutoff	Sensitivity	1 - Specificity
0.00	1.0000	1.000
0.01	0.9997	1.000
0.02	0.9997	1.000
0.03	0.9997	1.000
0.04	0.9997	1.000
0.05	0.9997	1.000
0.06	0.9997	1.000
0.07	0.9997	1.000
0.08	0.9997	1.000
0.09	0.9994	0.999
0.10	0.9990	0.998
0.11	0.9987	0.998
0.12	0.9984	0.998
0.13	0.9981	0.996
0.14	0.9981	0.995
0.15	0.9974	0.994
0.16	0.9971	0.991
0.17	0.9968	0.991
0.18	0.9961	0.989
0.19	0.9945	0.988
0.20	0.9932	0.984
0.21	0.9916	0.981
0.22	0.9900	0.978
0.23	0.9887	0.975
0.24	0.9874	0.970
0.25	0.9865	0.968
0.26	0.9826	0.962
0.27	0.9800	0.955
0.28	0.9761	0.945
0.29	0.9726	0.937
0.30	0.9671	0.916
0.31	0.9636	0.906
0.32	0.9578	0.893
0.33	0.9490	0.877
0.34	0.9397	0.863
0.35	0.9307	0.847
0.36	0.9197	0.831
0.37	0.9084	0.815
0.38	0.9000	0.800
0.39	0.8849	0.781
0.40	0.8717	0.762
0.41	0.8552	0.741
0.42	0.8420	0.719
0.43	0.8272	0.698
0.44	0.8126	0.670
0.45	0.7981	0.646
0.46	0.7775	0.621
0.47	0.7559	0.594
0.48	0.7333	0.567
0.49	0.7143	0.540
0.50	0.6924	0.514
0.51	0.6682	0.492
0.52	0.6382	0.470
0.53	0.6143	0.446
0.54	0.5940	0.416
0.55	0.5682	0.393
0.56	0.5401	0.368
0.57	0.5166	0.344
0.58	0.4924	0.320
0.59	0.4602	0.297
0.60	0.4321	0.273
0.61	0.4079	0.253
0.62	0.3821	0.232
0.63	0.3586	0.215
0.64	0.3344	0.191
0.65	0.3151	0.169
0.66	0.2899	0.155
0.67	0.2644	0.134
0.68	0.2383	0.119
0.69	0.2177	0.105
0.70	0.1983	0.090
0.71	0.1787	0.082
0.72	0.1445	0.068
0.73	0.1271	0.060
0.74	0.1084	0.054
0.75	0.0977	0.046
0.76	0.0832	0.038
0.77	0.0719	0.033
0.78	0.0616	0.028
0.79	0.0519	0.025
0.80	0.0442	0.021
0.81	0.0361	0.017
0.82	0.0290	0.013
0.83	0.0232	0.011
0.84	0.0213	0.009
0.85	0.0184	0.007
0.86	0.0139	0.005
0.87	0.0106	0.004
0.88	0.0087	0.003
0.89	0.0074	0.002
0.90	0.0052	0.001
0.91	0.0045	0.001
0.92	0.0029	0.001
0.93	0.0016	0.001
0.94	0.0013	0.000
0.95	0.0013	0.000
0.96	0.0010	0.000
0.97	0.0010	0.000
0.98	0.0010	0.000
0.99	0.0006	0.000

Support vector machine - Target Gift Flag 1 Supplement 8

Response	Event	Value	Frequency
Correct	1	True Positive	23,617
Incorrect	1	False Negative	10,494
Correct	0	True Negative	15,004
Incorrect	0	False Positive	15,873

Support vector machine - Target Gift Flag 1 Supplement 9

[illegible]

Model comparison 1 Supplement 1

Selected	Model	Visualization Type	Number Of Observations	Percentile	Prediction cutoff	C Statistic	Cumulative % Captured	Cumulative % Events	Cumulative Lift	F1 Score	FDR	FPR	Gain	Gamma	Gini	KS (Youden)	Lift	Misclassification Rate (Event)	Tau <sup>✖✖</sup>
No	Decision tree - Target Gift Flag 1	Decision Tree	106,546	5	0.5	0.618	7.852	78.510	1.5704	0.580	0.417	0.413	0.570	0.271	0.235	0.164	1.5704	0.418	0.118
Yes	Bayesian network - Target Gift Flag 2	Unknown	64,988	5	0.5	0.817	9.528	100.000	1.9055	0.727	0.251	0.262	0.906	0.638	0.634	0.449	1.9055	0.279	0.316
No	Forest - Target Gift Flag 2	Forest	106,546	5	0.5	0.609	7.186	71.852	1.4372	0.408	0.350	0.160	0.437	0.223	0.218	0.156	1.4372	0.431	0.109
No	Gradient boosting - Target Gift Flag 2	Gradient Boosting	106,546	5	0.5	0.742	9.279	92.774	1.8557	0.664	0.314	0.295	0.856	0.495	0.485	0.349	1.8557	0.326	0.242
No	Logistic regression - Target Gift Flag 1	Logistic Regression	64,988	5	0.5	0.625	6.980	73.262	1.3960	0.635	0.398	0.492	0.396	0.256	0.250	0.186	1.3960	0.406	0.125
No	Neural network - Target Gift Flag 1	Neural Network	64,988	5	0.5	0.500	3.626	38.062	0.7253	0.688	0.475	1.000	-0.275	.	0.000	0.000	0.7253	0.475	0.000
No	Support vector machine - Target Gift Flag 1	Support Vector Machine	64,988	5	0.5	0.623	6.675	70.062	1.3351	0.642	0.402	0.514	0.335	0.251	0.246	0.178	1.3351	0.406	0.123

Variable	Decision tree - Target Gift Flag 1 Rank	Bayesian network - Target Gift Flag 2 Rank	Forest - Target Gift Flag 2 Rank	Gradient boosting - Target Gift Flag 2 Rank	Logistic regression - Target Gift Flag 1 Rank	Neural network - Target Gift Flag 1 Rank	Support vector machine - Target Gift Flag 1 Rank	Decision tree - Target Gift Flag 1 Importance	Bayesian network - Target Gift Flag 2 Importance	Forest - Target Gift Flag 2 Importance	Gradient boosting - Target Gift Flag 2 Importance	Logistic regression - Target Gift Flag 1 Importance	Neural network - Target Gift Flag 1 Importance	Support vector machine - Target Gift Flag 1 Importance	✖✖
Gift Count 36 Months	1	5	4	2	6			900.477447	-44,462.021777	83.363544	44.418332	0.000000			
Gift Amount Last	2	2	1	5	24			223.235310	-31,195.253593	131.712135	30.488133	0.571938			
Status Category Star All Months	3	25	13	23	12			191.922762	-46,564.000000	15.416050	4.445783	0.000003			
Gift Amount Average All Months	4	14	3	8	16			186.469691	-44,734.168830	90.443736	14.939000	0.009464			
Gift Count All Months	5	10	8	14	19			175.766576	-44,664.749337	33.596602	10.191751	0.218632			
Median Home Value Region	6	21	17	7	25			158.147573	-44,882.899581	13.100765	17.938003	0.000000			
Time Since Last Gift	7	8	5	4	2			153.874421	-44,617.093951	72.663643	33.193662	0.000000			
Age	8	16	15	3	5			142.009534	-44,791.973319	14.343847	33.200609	0.000000			
Promotion Count 12 Months	9	19	19	10	22			140.225622	-44,832.136752	10.403245	12.338726	0.389192			
Percent Veterans Region	10	22	22	16	17			123.602891	-44,970.863298	3.557962	9.597824	0.135964			
Promotion Count Card 36 Months	11	15	12	21	11			91.127344	-44,740.764733	20.905672	5.416952	0.000000			
Time Since First Gift	12	13	9	9	3			49.771975	-44,732.505569	32.941177	14.044913	0.000000			
Demographic Cluster	13	18	14	1	1			37.190341	-44,810.621508	14.442314	133.894504	0.000000			
Home Owner	14	3	25	25	10			33.198896	-41,224.802218	0.435109	0.395211	0.000000			
Gift Count Card All Months	15	6	11	12	21			20.777778	-44,534.665625	23.324324	11.489798	0.369402			
Gender	16	23	24	24	20			0.000000	-44,979.865591	1.053014	2.509092	0.227765			
Gift Amount Average 36 Months	17	4	6	13	9			0.000000	-43,743.858785	55.428227	10.320238	0.000000			
Gift Amount Average Card 36 Months	18	1	2	6	15			0.000000	-29,154.834352	111.101945	22.912188	0.002678			
Gift Count Card 36 Months	19	7	7	20	18			0.000000	-44,553.268287	40.511004	5.543942	0.213923			
Median Income Region	20	24	23	11	13			0.000000	-44,981.525235	1.078504	12.132542	0.000172			
Promotion Count 36 Months	21	17	20	18	14			0.000000	-44,800.630239	9.991197	8.341749	0.000185			
Promotion Count All Months	22	12	18	19	7			0.000000	-44,721.610838	12.516714	7.067661	0.000000			
Promotion Count Card 12 Months	23	20	10	22	23			0.000000	-44,843.793225	31.515295	4.825785	0.444971			
Promotion Count Card All Months	24	11	21	15	4			0.000000	-44,691.279246	8.073920	10.002097	0.000000			
Status Category 96NK	25	9	16	17	8			0.000000	-44,624.347601	14.225870	8.751574	0.000000			