Adaptive Model Report

Model report for: HP.ElitePad.256GB at 2019-11-20

Model Performance and Propensity Mapping

The model scores (sum of the log odds of the Naive Bayes classifier) are mapped to propensities in the Classifier of ADM. This classifier is constructed using the PAV (Pool Adjacent Violaters) algorithm, a form of monotonic regression.

The model reports a performance of 0.92713 measured in AUC. If supporting data is available, the actual AUC is recalculated using only those bins that fall into the current score range (if available, shown in parenthesis in the title and bins not in range greyed out).

Total Positives	Total Negatives	Total Responses	Overall Propensity
674	494	1168	57.71%

Score Distribution of the Classifier
Performance: 0.92713 (AUC) (actual: 0.932)
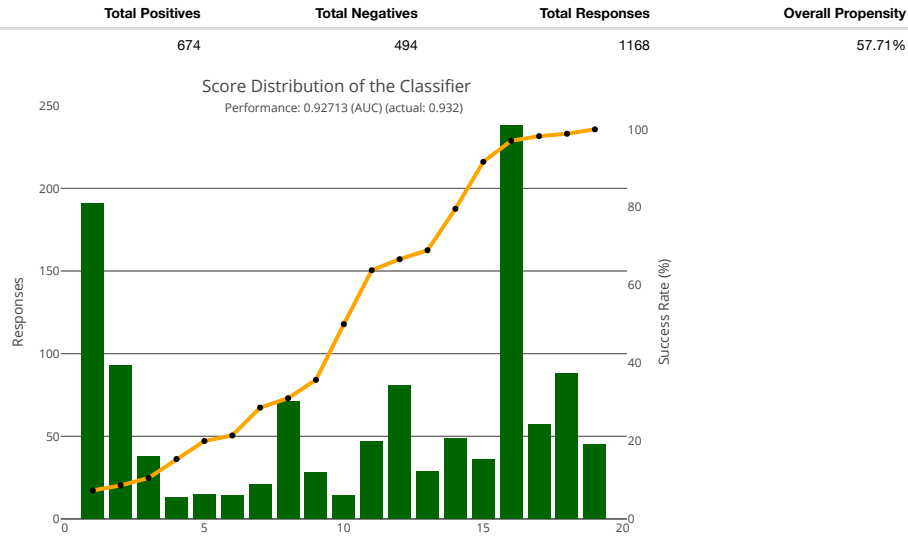
The success rate is defined as $\frac{positives}{positives+negatives}$ per bin.

The adjusted propensity that is returned is a small modification (Laplace smoothing) to this and calculated as $\frac{0.5+positives}{1+positives+negatives}$ so empty models return a propensity of 0.5.

Index	Bin	Positives	Negatives	Success Rate (%)	Adjusted Propensity (%)	Z-Ratio	Lift (%)	In Current Range
1	<-0.48	14	177	7.329843	7.552083	-15.161493	12.7022	TRUE
2	[-0.48, -0.34>	8	85	8.602151	9.042553	-9.161068	14.9070	TRUE
3	[-0.34, -0.3>	4	34	10.526316	11.538462	-5.344221	18.2414	TRUE
4	[-0.3, -0.28>	2	11	15.384615	17.857143	-2.772407	26.6606	TRUE
5	[-0.28, -0.26>	3	12	20.000000	21.875000	-2.686223	34.6588	TRUE
6	[-0.26, -0.24>	3	11	21.428571	23.333333	-2.503463	37.1344	TRUE
7	[-0.24, -0.22>	6	15	28.571429	29.545455	-2.517319	49.5125	TRUE
8	[-0.22, -0.12>	22	49	30.985916	31.250000	-4.410031	53.6967	TRUE
9	[-0.12, -0.08>	10	18	35.714286	36.206897	-2.242777	61.8906	TRUE
10	[-0.08, -0.06>	7	7	50.000000	50.000000	-0.573594	86.6469	TRUE

Index	Bin	Positives	Negatives	Success Rate (%)	Adjusted Propensity (%)	Z-Ratio	Lift (%)	In Current Range
11	[-0.06, 0.0>	30	17	63.829787	63.541667	0.884365	110.6130	TRUE
12	[0.0, 0.1>	54	27	66.666667	66.463415	1.740851	115.5292	TRUE
13	[0.1, 0.14>	20	9	68.965517	68.333333	1.289376	119.5129	TRUE
14	[0.14, 0.24>	39	10	79.591837	79.000000	3.419611	137.9277	TRUE
15	[0.24, 0.3>	33	3	91.666667	90.540541	4.756449	158.8526	TRUE
16	[0.3, 0.54>	231	7	97.058824	96.861925	17.256799	168.1969	TRUE
17	[0.54, 0.64>	56	1	98.245614	97.413793	7.490314	170.2535	TRUE
18	[0.64, 8.98>	87	1	98.863636	98.314607	9.719545	171.3245	TRUE
19	>=8.98	45	0	100.000000	98.913044	6.944019	173.2938	TRUE

Predictor summary

Number of positives and negatives in each bin and the derived lift and Z-ratio. If grouping information is available, strongly correlated predictors are grouped, with the highest performance predictor groups on top. Groups are indicated by indentation.

Predictor	Negatives	Positives	Active	Type	Bins	Performance	Group
IH.CallCenter.Inbound.Reject.pyHistoricalOutcomeCount	451	162	Active	numeric	7	0.940756	17
Age	494	674	Active	numeric	13	0.903681	8
IH.CallCenter.Inbound.Reject.pxLastOutcomeTime.DaysSince	451	162	Active	numeric	4	0.851989	18
Income	494	674	Active	numeric	10	0.840704	11
IH.CallCenter.Inbound.Reject.pxLastGroupID	451	162	Active	symbolic	4	0.833176	19
IH.CallCenter.Inbound.Accept.pyHistoricalOutcomeCount	120	674	Active	numeric	8	0.831040	21
Param.OverallUsage	494	674	Active	numeric	10	0.800235	0
PaymentHistory	494	674	Active	symbolic	3	0.769405	10
Devices(1).DeviceModel	494	674	Active	symbolic	7	0.676752	16
Param.ChurnSegment	494	674	Active	symbolic	3	0.634282	2
Param.FourG	494	674	Active	symbolic	2	0.621551	4
Param.SubscriptionCount	494	674	Active	numeric	3	0.615200	6
Subscriptions(1).SubscriptionType	494	674	Active	symbolic	4	0.607194	14
Param.UnlimitedSMS	494	674	Active	symbolic	2	0.583513	3
Param.Sentiment	494	674	Active	symbolic	3	0.581287	7
Devices(1).DeviceType	494	674	Active	symbolic	2	0.570790	15
Param.CLVSegment	494	674	Active	symbolic	4	0.570113	1
IH.CallCenter.Inbound.Accept.pxLastGroupID	120	674	Active	symbolic	3	0.565875	20
IH.CallCenter.Inbound.Accept.pxLastOutcomeTime.DaysSince	120	674	Inactive	numeric	1	0.500000	20
Param.International	494	674	Active	symbolic	2	0.532701	5
CreditHistory	494	674	Active	symbolic	3	0.530004	13
Gender	494	674	Inactive	symbolic	2	0.516326	9
CreditStatus	494	674	Inactive	symbolic	1	0.500000	12

Predictor Binning

Binning of all individual predictors. Predictors are listed in the same order as in the summary above.

IH.CallCenter.Inbound.Reject.pyHistoricalOutcomeCount

Field	Value
Univariate Performance (AUC)	0.940756
Status	Active
Predictor Group	17
Total Positives	162
Total Negatives	451
Total Responses	613
Overall Propensity	26.43%

IH.CallCenter.Inbound.Reject.pyHistoricalOutcomeCount
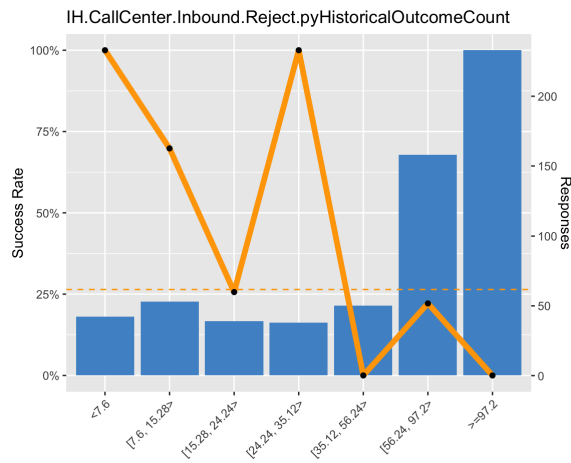
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<7.6	42	0	100.00000	7.529940	378.3951
2	[7.6, 15.28>	37	16	69.81132	5.655227	264.1626
3	[15.28, 24.24>	10	29	25.64103	-0.116134	97.0244
4	[24.24, 35.12>	38	0	100.00000	7.045932	378.3951
5	[35.12, 56.24>	0	50	0.00000	-7.498961	0.0000
6	[56.24, 97.2>	35	123	22.15190	-1.470640	83.8217
7	>=97.2	0	233	0.00000	-21.955230	0.0000

Age

Field	Value
Univariate Performance (AUC)	0.903681
Status	Active
Predictor Group	8
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%
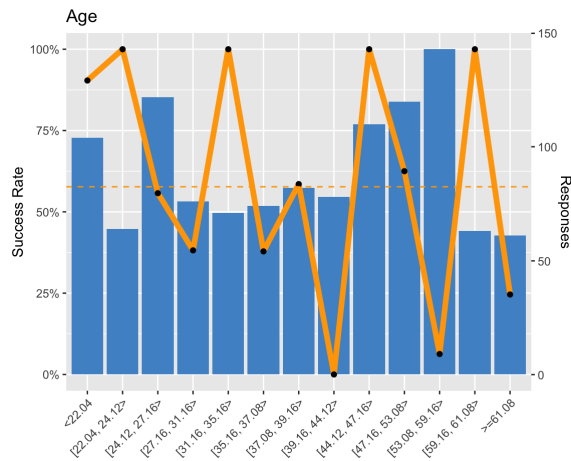
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<22.04	94	10	90.384615	8.070873	156.6309
2	[22.04, 24.12>	64	0	100.000000	8.409207	173.2938
3	[24.12, 27.16>	68	54	55.737705	-0.462417	96.5900
4	[27.16, 31.16>	29	47	38.157895	-3.396993	66.1253
5	[31.16, 35.16>	71	0	100.000000	8.908416	173.2938
6	[35.16, 37.08>	28	46	37.837838	-3.400563	65.5706
7	[37.08, 39.16>	48	34	58.536585	0.158373	101.4403
8	[39.16, 44.12>	0	78	0.000000	-9.624188	0.0000
9	[44.12, 47.16>	110	0	100.000000	11.465335	173.2938
10	[47.16, 53.08>	75	45	62.500000	1.138390	108.3086
11	[53.08, 59.16>	9	134	6.293706	-12.588815	10.9066
12	[59.16, 61.08>	63	0	100.000000	8.336421	173.2938
13	>=61.08	15	46	24.590164	-4.970748	42.6132

IH.CallCenter.Inbound.Reject.pxLastOutcomeTime.DaysSince

Field	Value

Field	Value
Univariate Performance (AUC)	0.851989
Status	Active
Predictor Group	18
Total Positives	162
Total Negatives	451
Total Responses	613
Overall Propensity	26.43%

IH.CallCenter.Inbound.Reject.pxLastOutcomeTime.DaysSince
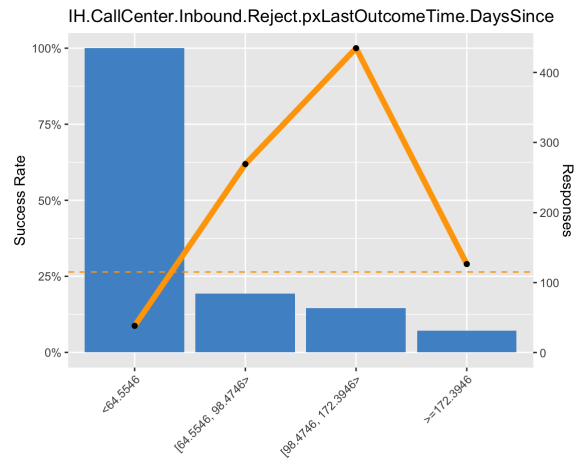
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<64.5546	38	397	8.735632	-17.625947	33.0552
2	[64.5546, 98.4746>	52	32	61.904762	6.474094	234.2446
3	[98.4746, 172.3946>	63	0	100.000000	10.153369	378.3951
4	>=172.3946	9	22	29.032258	0.327958	109.8566

Income

Field	Value
Univariate Performance (AUC)	0.840704
Status	Active
Predictor Group	11
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Income
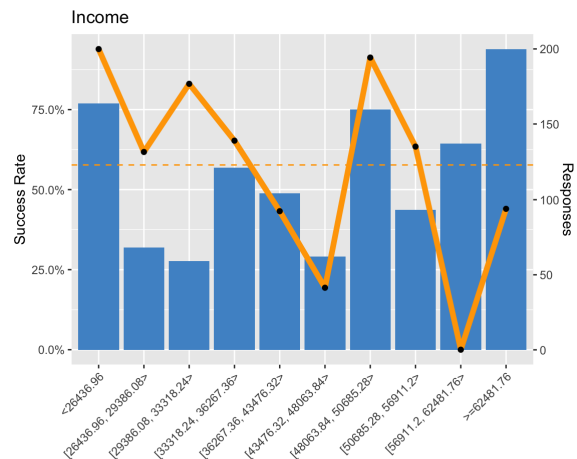
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<26436.96	154	10	93.90244	11.989199	162.7271
2	[26436.96, 29386.08>	42	26	61.76471	0.706903	107.0344
3	[29386.08, 33318.24>	49	10	83.05085	4.430765	143.9219
4	[33318.24, 36267.36>	79	42	65.28926	1.825373	113.1422
5	[36267.36, 43476.32>	45	59	43.26923	-3.014072	74.9829
6	[43476.32, 48063.84>	12	50	19.35484	-5.754557	33.5407
7	[48063.84, 50685.28>	146	14	91.25000	10.736549	158.1306
8	[50685.28, 56911.2>	59	34	63.44086	1.187581	109.9391
9	[56911.2, 62481.76>	0	137	0.00000	-13.768596	0.0000
10	>=62481.76	88	112	44.00000	-4.203367	76.2493

IH.CallCenter.Inbound.Reject.pxLastGroupID

Field	Value
Univariate Performance (AUC)	0.833176
Status	Active
Predictor Group	19
Total Positives	162
Total Negatives	451
Total Responses	613
Overall Propensity	26.43%

IH.CallCenter.Inbound.Reject.pxLastGroupID
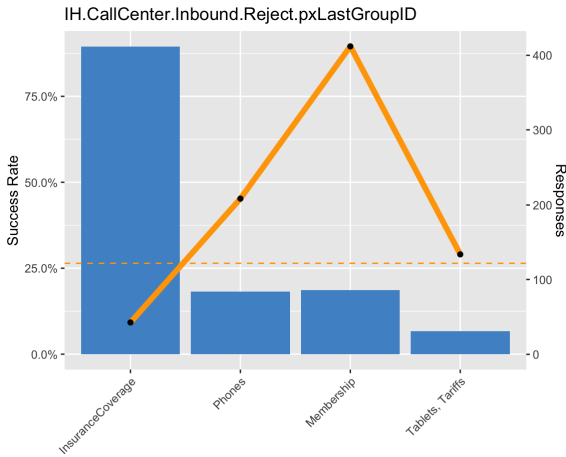
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	InsuranceCoverage	38	374	9.223301	-15.769292	34.9005
2	Phones	38	46	45.238095	3.660886	171.1787
3	Membership	77	9	89.534884	11.445470	338.7956
4	Tablets, Tariffs	9	22	29.032258	0.327958	109.8566

IH.CallCenter.Inbound.Accept.pyHistoricalOutcomeCount

Field	Value
Univariate Performance (AUC)	0.83104
Status	Active
Predictor Group	21
Total Positives	674
Total Negatives	120
Total Responses	794
Overall Propensity	84.89%

IH.CallCenter.Inbound.Accept.pyHistoricalOutcomeCount
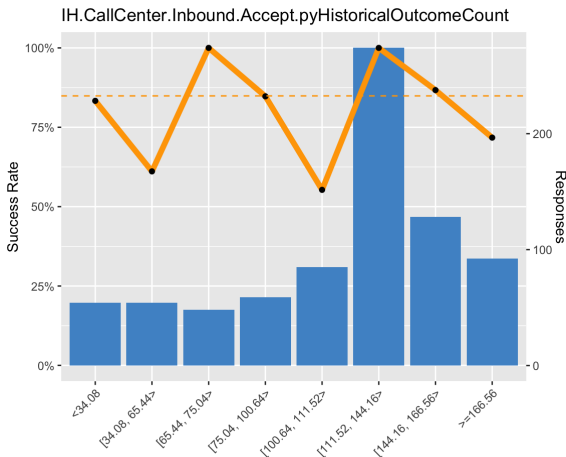
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<34.08	45	9	83.33333	-0.317988	98.1701
2	[34.08, 65.44>	33	21	61.11111	-3.533653	71.9914
3	[65.44, 75.04>	48	0	100.00000	7.188916	117.8042
4	[75.04, 100.64>	50	9	84.74576	-0.031293	99.8340
5	[100.64, 111.52>	47	38	55.29412	-5.665813	65.1388
6	[111.52, 144.16>	274	0	100.00000	21.486973	117.8042
7	[144.16, 166.56>	111	17	86.71875	0.659811	102.1583
8	>=166.56	66	26	71.73913	-3.020571	84.5117

Param.OverallUsage

Field	Value
Univariate Performance (AUC)	0.800235
Status	Active
Predictor Group	0
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%
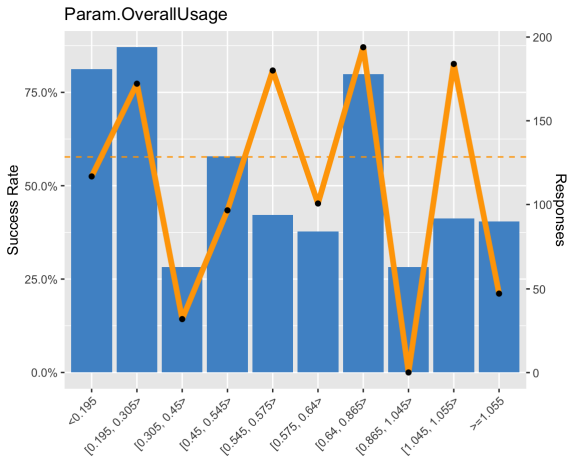
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<0.195	95	86	52.48619	-1.527467	90.9553
2	[0.195, 0.305>	150	44	77.31959	6.505939	133.9900
3	[0.305, 0.45>	9	54	14.28571	-6.519541	24.7563
4	[0.45, 0.545>	56	73	43.41085	-3.372226	75.2283
5	[0.545, 0.575>	76	18	80.85106	5.151435	140.1099
6	[0.575, 0.64>	38	46	45.23810	-2.324057	78.3948
7	[0.64, 0.865>	155	23	87.07865	9.767604	150.9019
8	[0.865, 1.045>	0	63	0.00000	-8.497577	0.0000
9	[1.045, 1.055>	76	16	82.60870	5.521528	143.1557
10	>=1.055	19	71	21.11111	-6.787116	36.5842

PaymentHistory

Field	Value
Univariate Performance (AUC)	0.769405
Status	Active
Predictor Group	10
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%
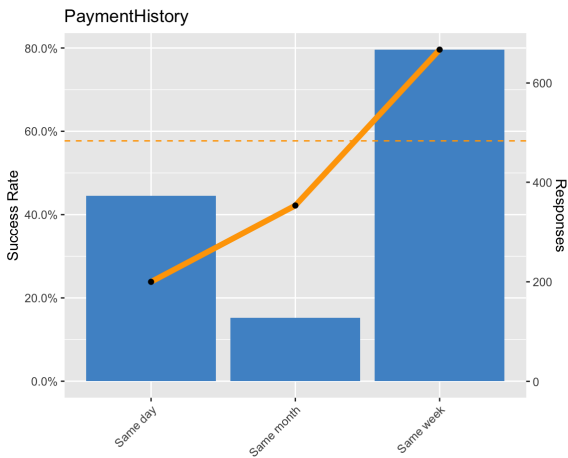
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Same day	89	284	23.86059	-17.17610	41.3489
2	Same month	54	74	42.18750	-3.63643	73.1083
3	Same week	531	136	79.61019	20.07425	137.9595

Devices(1).DeviceModel

Field	Value
Univariate Performance (AUC)	0.676752
Status	Active
Predictor Group	16
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Devices(1).DeviceModel
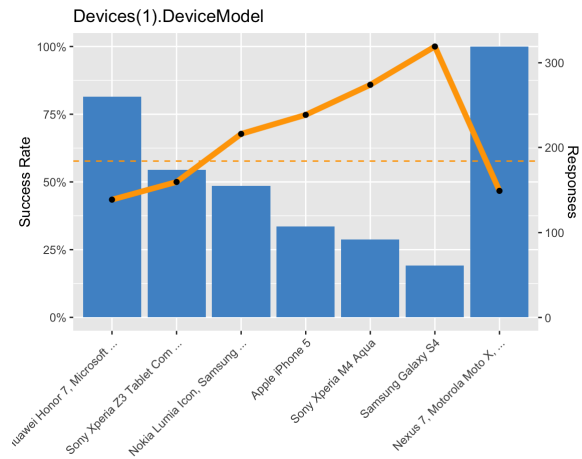
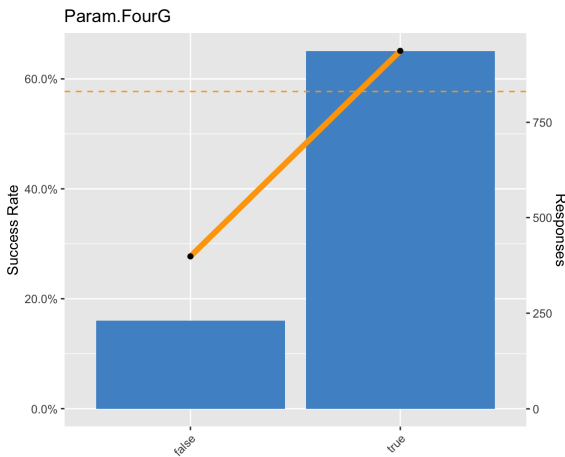| Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Huawei Honor 7, Microsoft Surface Pro 4	113	147	43.46154	-5.175259	75.3161
2	Sony Xperia Z3 Tablet Compact, Apple iPad 3	87	87	50.00000	-2.191716	86.6469
3	Nokia Lumia Icon, Samsung Galaxy Tab Pro	105	50	67.74194	2.802132	117.3926
4	Apple iPhone 5	80	27	74.76636	3.973072	129.5654
5	Sony Xperia M4 Aqua	79	13	85.86957	6.342364	148.8066
6	Samsung Galaxy S4	61	0	100.00000	8.189637	173.2938
7	Nexus 7, Motorola Moto X, Blackberry Leap, HTC One M8, Samsung Galaxy S5, Apple iPad Air, LG G3, Samsung Galaxy Tab 4	149	170	46.70846	-4.610698	80.9429

Param.ChurnSegment

Field	Value
Univariate Performance (AUC)	0.634282
Status	Active
Predictor Group	2
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.ChurnSegment
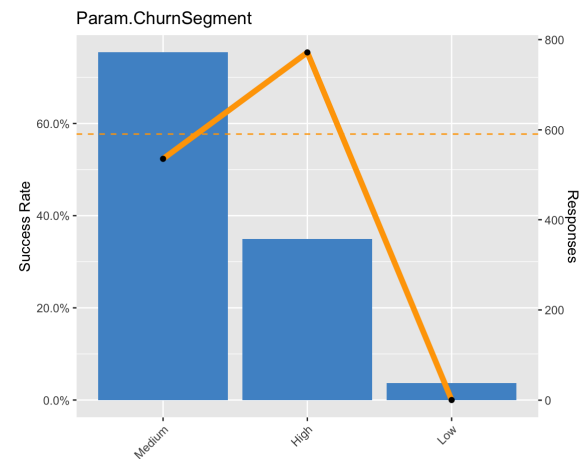
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Medium	404	368	52.33161	-5.346699	90.6874
2	High	270	88	75.41899	8.707874	130.6964
3	Low	0	38	0.00000	-6.416126	0.0000

Param.FourG

Field	Value
Univariate Performance (AUC)	0.621551
Status	Active
Predictor Group	4
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.FourG

Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	false	64	167	27.70563	-10.08996	48.0121
2	true	610	327	65.10139	10.08996	112.8166

Param.SubscriptionCount

Field	Value
Univariate Performance (AUC)	0.6152
Status	Active
Predictor Group	6
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.SubscriptionCount
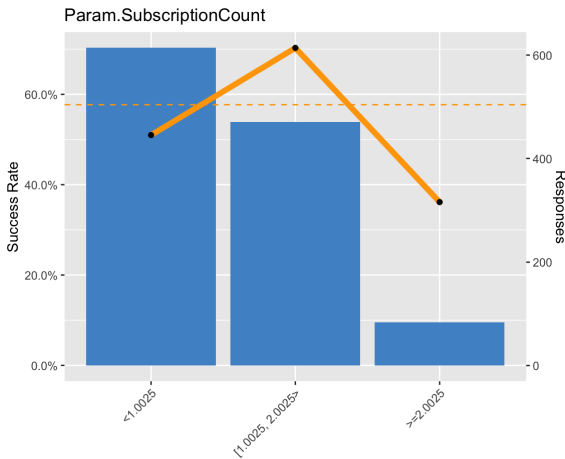
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	<1.0025	313	301	50.97720	-4.968020	88.3403
2	[1.0025, 2.0025>	331	140	70.27601	7.427684	121.7839
3	>=2.0025	30	53	36.14458	-3.916078	62.6363

Subscriptions(1).SubscriptionType

Field	Value
Univariate Performance (AUC)	0.607194
Status	Active
Predictor Group	14
Total Positives	674
Total Negatives	494
Total Responses	1168

Field	Value
Overall Propensity	57.71%

Subscriptions(1).SubscriptionType
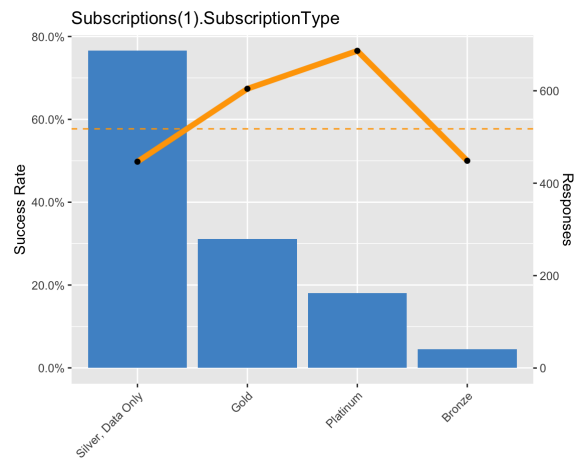
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Silver, Data Only	342	345	49.78166	-6.763186	86.2685
2	Gold	188	91	67.38351	3.858578	116.7714
3	Platinum	124	38	76.54321	5.592094	132.6446
4	Bronze	20	20	50.00000	-0.981485	86.6469

Param.UnlimitedSMS

Field	Value
Univariate Performance (AUC)	0.583513
Status	Active
Predictor Group	3
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.UnlimitedSMS
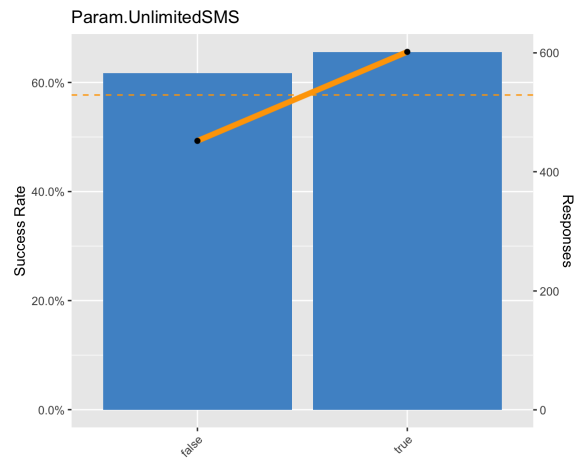
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	false	279	287	49.29329	-5.719722	85.4222
2	true	395	207	65.61462	5.719722	113.7060

Param.Sentiment

Field	Value
Univariate Performance (AUC)	0.581287
Status	Active
Predictor Group	7
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.Sentiment
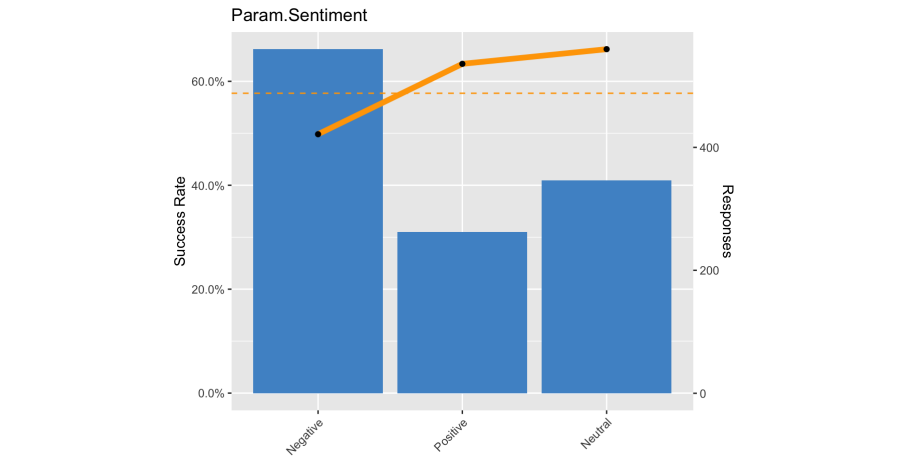
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Negative	279	281	49.82143	-5.292378	86.3374
2	Positive	166	96	63.35878	2.134854	109.7968
3	Neutral	229	117	66.18497	3.893615	114.6944

Devices(1).DeviceType

Field	Value
Univariate Performance (AUC)	0.57079
Status	Active
Predictor Group	15
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Devices(1).DeviceType
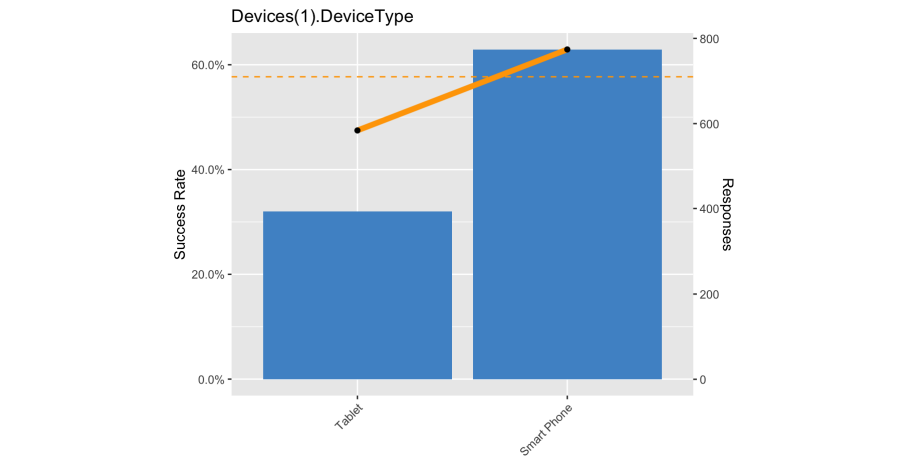
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Tablet	187	207	47.46193	-5.036451	82.2486
2	Smart Phone	487	287	62.91990	5.036451	109.0363

Param.CLVSegment

Field	Value
Univariate Performance (AUC)	0.570113
Status	Active
Predictor Group	1
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.CLVSegment
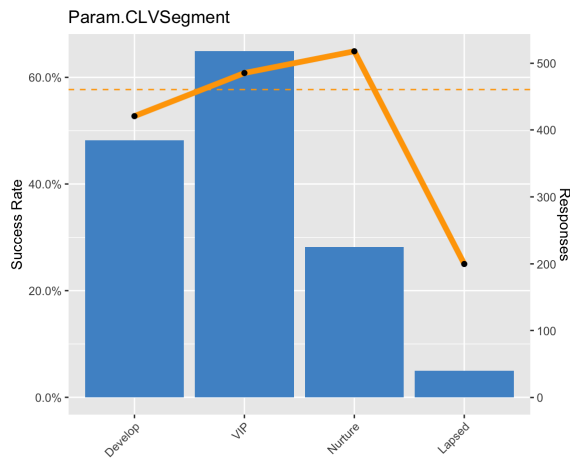
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Develop	203	182	52.72727	-2.402289	91.3731
2	VIP	315	203	60.81081	1.924899	105.3813
3	Nurture	146	79	64.88889	2.477522	112.4484
4	Lapsed	10	30	25.00000	-3.918618	43.3234

IH.CallCenter.Inbound.Accept.pxLastGroupID

Field	Value
Univariate Performance (AUC)	0.565875
Status	Active
Predictor Group	20
Total Positives	674
Total Negatives	120
Total Responses	794
Overall Propensity	84.89%

Correlated Predictors:

IH.CallCenter.Inbound.Accept.pxLastGroupID
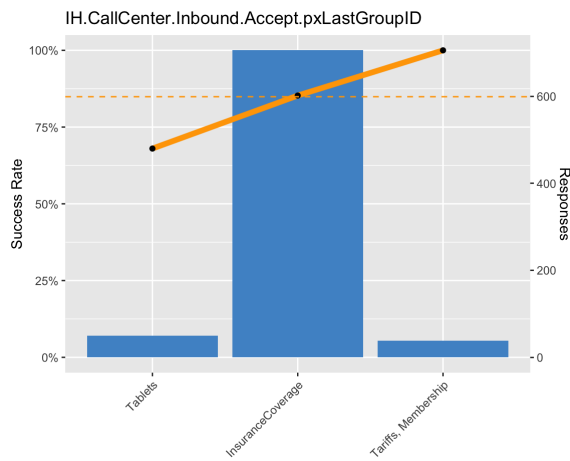
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Tablets	34	16	68.00000	-2.577662	80.1068
2	InsuranceCoverage	602	104	85.26912	0.797619	100.4506
3	Tariffs, Membership	38	0	100.00000	6.345899	117.8042

Param.International

Field	Value
Univariate Performance (AUC)	0.532701
Status	Active
Predictor Group	5
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Param.International
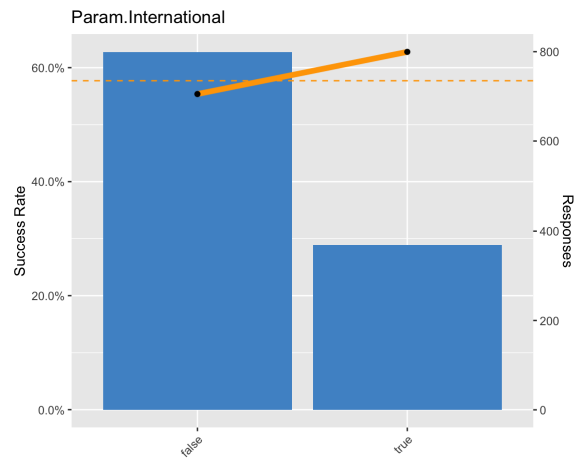
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	false	443	357	55.37500	-2.404348	95.9614
2	true	231	137	62.77174	2.404348	108.7795

CreditHistory

Field	Value
Univariate Performance (AUC)	0.530004
Status	Active
Predictor Group	13
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%
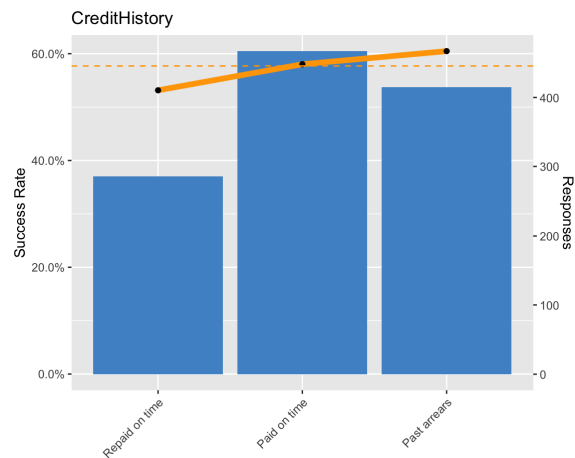
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	Repaid on time	152	134	53.14685	-1.781216	92.1002
2	Paid on time	271	196	58.02998	0.183290	100.5623
3	Past arrears	251	164	60.48193	1.432917	104.8114

Gender

Field	Value
Univariate Performance (AUC)	0.516326
Status	Inactive
Predictor Group	9
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Gender
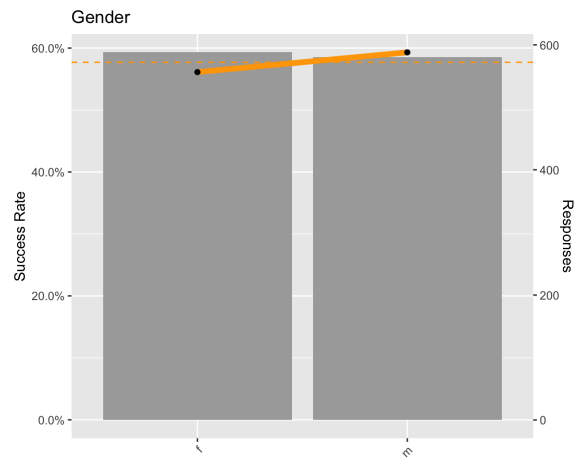
Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	f	330	258	56.12245	-1.103349	97.2567
2	m	344	236	59.31034	1.103349	102.7811

CreditStatus

Field	Value
Univariate Performance (AUC)	0.5
Status	Inactive
Predictor Group	12
Total Positives	674
Total Negatives	494
Total Responses	1168
Overall Propensity	57.71%

Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	NON-MISSING	674	494	57.70548	0	100

IH.CallCenter.Inbound.Accept.pxLastOutcomeTime.DaysSince

Field	Value
Univariate Performance (AUC)	0.5
Status	Inactive
Predictor Group	20
Total Positives	674
Total Negatives	120
Total Responses	794
Overall Propensity	84.89%

Correlated Predictors:

Index	Bin	Positives	Negatives	Success Rate (%)	Z-Ratio	Lift (%)
1	NON-MISSING	674	120	84.88665	0	100