Bayesian Network

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Contents

Bayesian Network

Bayesian Network

Bayesian Network **Risk**   Event: **good**   Fit: **Validation F1 Score 0.804**   Observations: **1,000 (100.0%)**

Network
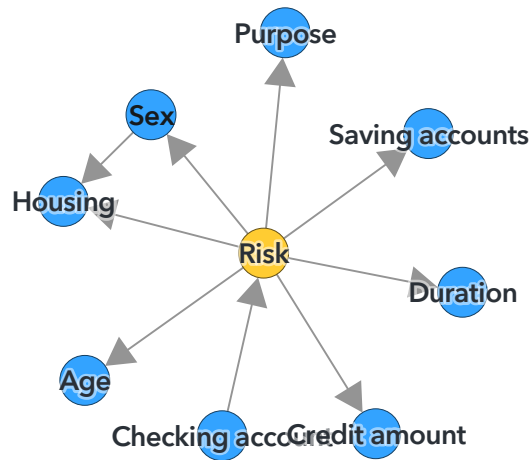
Variables in Network

BIC Score
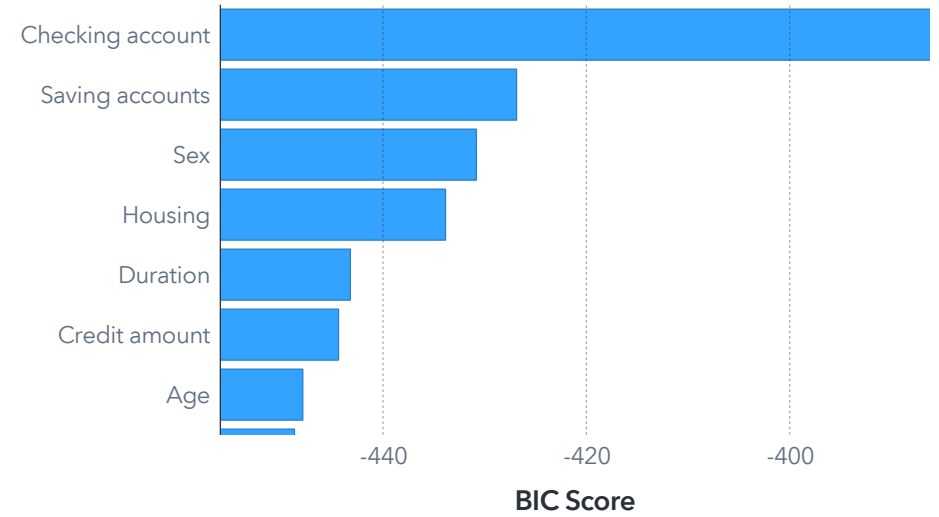
Model Selection

Validation Misclassification Rate

Maximum Parents

| Structure | Markov blanket | Naïve | Parent-child | T... |

ROC

Sensitivity

1 - Specificity

— Training   — Validation

Bayesian network - Risk 1 Supplement 1
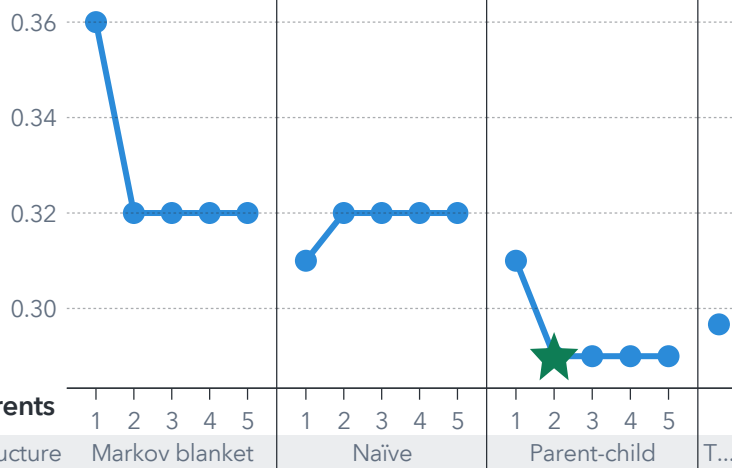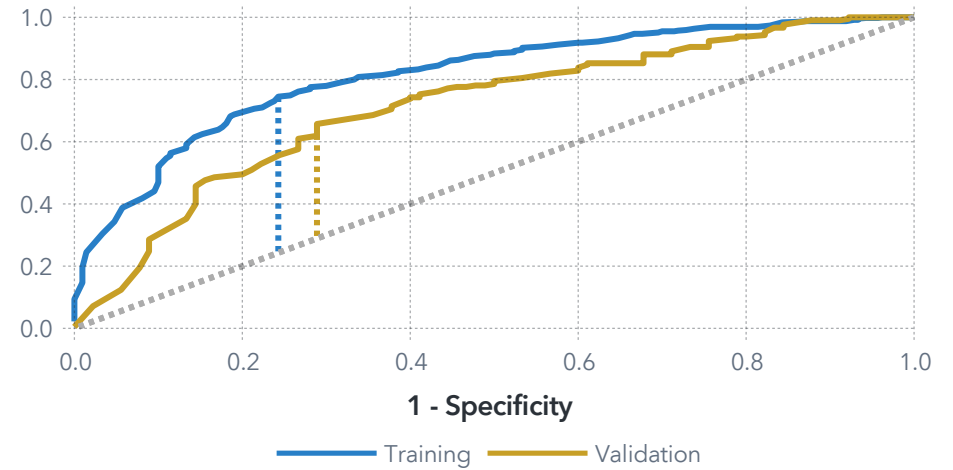
Description	Value
Significance level	0.2
Prescreen predictors	True
Variable selection	None
Best structure	Parent-child
Attempted structures	Naïve, Tree-augmented naïve, Parent-child, Markov blanket
Parenting method	Set of parents
Maximum number of parents	2
Missing interval variable handling	Ignore
Missing nominal variable handling	Ignore
Number of bins	10
Independence test statistic	Chi and G-square

Bayesian network - Risk 1 Supplement 2

Description	Value
Number of observations read	1,000
Number of observations used	1,000
Number of observations used for training	700
Number of observations used for validation	300
Number of observations used for test	0

Bayesian network - Risk 1 Supplement 3

Description	Value
Number of Nodes	9
Number of Links	9
Average Degree	2.0000
Maximum Number of Parents in Network	2
Number of Parameters	93
BIC Score	-7,972.8410
Validation Misclassification Rate	0.2900
Test Misclassification Rate	.

Best Model	Validation Misclassification Rate	Significance Level	Prescreening	Variable Selection	Structure	Parenting Method	Maximum Parents
	0.3600	0.2	True	Markov blanket	Markov blanket	Set of parents	1
	0.3200	0.2	True	Markov blanket	Markov blanket	Set of parents	2
	0.3200	0.2	True	Markov blanket	Markov blanket	Set of parents	3
	0.3200	0.2	True	Markov blanket	Markov blanket	Set of parents	4
	0.3200	0.2	True	Markov blanket	Markov blanket	Set of parents	5
	0.3100	0.2	True	None	Naïve	Set of parents	1
	0.3200	0.2	True	None	Naïve	Set of parents	2
	0.3200	0.2	True	None	Naïve	Set of parents	3
	0.3200	0.2	True	None	Naïve	Set of parents	4
	0.3200	0.2	True	None	Naïve	Set of parents	5
	0.3100	0.2	True	None	Parent-child	Set of parents	1
Yes	0.2900	0.2	True	None	Parent-child	Set of parents	2
	0.2900	0.2	True	None	Parent-child	Set of parents	3
	0.2900	0.2	True	None	Parent-child	Set of parents	4
	0.2900	0.2	True	None	Parent-child	Set of parents	5
	0.2967	0.2	True	None	Tree-augmented naïve	Set of parents	2

Bayesian network - Risk 1 Supplement 5

Variable	Selected	Chi-Square	Pr > Chi-Square	G-Square	Pr > G-Square	Degrees of Freedom	Mutual Information	Conditional Variable
Checking account	Yes	111.1460	<0.00001	122.0098	<0.00001	3	0.3999	
Housing	Yes	7.3121	0.02583	7.1563	0.02793	2	0.1009	
Purpose	Yes	10.3267	0.17080	10.2084	0.17707	7	0.1203	
Saving accounts	Yes	30.9087	<0.00001	34.2373	<0.00001	4	0.2185	
Sex	Yes	6.8043	0.00909	6.6784	0.00976	1	0.0974	
Age	Yes	23.4336	0.00529	24.9442	0.00303	9	0.1871	
Credit amount	Yes	32.4198	0.00017	31.9703	0.00020	9	0.2113	
Duration	Yes	34.7684	0.00007	34.2905	0.00008	9	0.2186	
Job	No	1.6644	0.64487	1.5660	0.66712	3	0.0473	

Variable	Level Index	Level Value	Frequency
Risk	0	good	490
Risk	1	bad	210
Checking account	0	NA	264
Checking account	1	little	199
Checking account	2	moderate	189
Checking account	3	rich	48
Housing	0	free	74
Housing	1	own	490
Housing	2	rent	136
Purpose	0	business	61
Purpose	1	car	238
Purpose	2	domestic appliances	6
Purpose	3	education	45
Purpose	4	furniture/equipment	132
Purpose	5	radio/TV	195
Purpose	6	repairs	15
Purpose	7	vacation/others	8
Saving accounts	0	NA	133
Saving accounts	1	little	422
Saving accounts	2	moderate	74
Saving accounts	3	quite rich	42
Saving accounts	4	rich	29
Sex	0	female	221
Sex	1	male	479
Age	0	<24.6	104
Age	1	<30.2	188
Age	2	<35.8	128
Age	3	<41.4	106
Age	4	<47	63
Age	5	<52.6	51

Variable	Level Index	Level Value	Frequency
Age	6	<58.2	25
Age	7	<63.8	14
Age	8	<69.4	16
Age	9	>=69.4	5
Credit amount	0	<2090.8	311
Credit amount	1	<3905.6	207
Credit amount	2	<5720.4	69
Credit amount	3	<7535.2	53
Credit amount	4	<9350	28
Credit amount	5	<11164.8	16
Credit amount	6	<12979.6	8
Credit amount	7	<14794.4	4
Credit amount	8	<16609.2	3
Credit amount	9	>=16609.2	1
Duration	0	<10.8	118
Duration	1	<17.6	189
Duration	2	<24.4	242
Duration	3	<31.2	38
Duration	4	<38	53
Duration	5	<44.8	15
Duration	6	<51.6	33
Duration	7	<58.4	2
Duration	8	<65.2	9
Duration	9	>=65.2	1
Job	0	<0.3	16
Job	1	<0.6	0
Job	2	<0.9	0
Job	3	<1.2	135
Job	4	<1.5	0
Job	5	<1.8	0

Variable	Level Index	Level Value	Frequency
Job	6	<2.1	438
Job	7	<2.4	0
Job	8	<2.7	0
Job	9	>=2.7	111

Bayesian network - Risk 1 Supplement 7

Variable	Order	BIC Score
Checking account	1	-379.7023
Saving accounts	2	-426.8641
Sex	3	-430.8169
Housing	4	-433.8535
Job	5	-439.5717
Duration	6	-443.2152
Credit amount	7	-444.3753
Age	8	-447.8883
Purpose	9	-448.7051

Bayesian network - Risk 1 Supplement 8

Predicted	Observed	Training Frequency	Training Percentage	Validation Frequency	Validation Percentage
bad	bad	106	50.48%	35	38.89%
good	bad	104	49.52%	55	61.11%
bad	good	59	12.04%	32	15.24%
good	good	431	87.96%	178	84.76%

Percentile	Training Observations	Training Events	Training Lift	Training Lift Best	Training Cumulative Lift	Training Cumulative Lift Best	Validation Observations
5.00	35	35	1.4286	1.4286	1.4286	1.4286	15
10.00	35	33	1.3469	1.4286	1.3878	1.4286	15
15.00	35	35	1.4286	1.4286	1.4014	1.4286	15
20.00	35	33	1.3469	1.4286	1.3878	1.4286	15
25.00	35	30	1.2245	1.4286	1.3551	1.4286	15
30.00	35	30	1.2245	1.4286	1.3333	1.4286	15
35.00	35	29	1.1837	1.4286	1.3120	1.4286	15
40.00	35	34	1.3878	1.4286	1.3214	1.4286	15
45.00	35	28	1.1429	1.4286	1.3016	1.4286	15
50.00	35	27	1.1020	1.4286	1.2816	1.4286	15
55.00	35	28	1.1429	1.4286	1.2690	1.4286	15
60.00	35	24	0.9796	1.4286	1.2449	1.4286	15
65.00	35	22	0.8980	1.4286	1.2182	1.4286	15
70.00	35	18	0.7347	1.4286	1.1837	1.4286	15
75.00	35	21	0.8571	0.0000	1.1619	1.3333	15
80.00	35	17	0.6939	0.0000	1.1327	1.2500	15
85.00	35	15	0.6122	0.0000	1.1020	1.1765	15
90.00	35	14	0.5714	0.0000	1.0726	1.1111	15
95.00	35	11	0.4490	0.0000	1.0397	1.0526	15
100.00	35	6	0.2449	0.0000	1.0000	1.0000	15

Validation Events	Validation Lift	Validation Lift Best	Validation Cumulative Lift	Validation Cumulative Lift Best
13	1.2381	1.4286	1.2381	1.4286
13	1.2381	1.4286	1.2381	1.4286
12	1.1429	1.4286	1.2063	1.4286
14	1.3333	1.4286	1.2381	1.4286
11	1.0476	1.4286	1.2000	1.4286
15	1.4286	1.4286	1.2381	1.4286
14	1.3333	1.4286	1.2517	1.4286
10	0.9524	1.4286	1.2143	1.4286
13	1.1905	1.4286	1.2116	1.4286
12	1.0952	1.4286	1.2000	1.4286
12	1.1429	1.4286	1.1948	1.4286
8	0.7619	1.4286	1.1587	1.4286
12	1.1429	1.4286	1.1575	1.4286
7	0.6667	1.4286	1.1224	1.4286
7	0.6667	0.0000	1.0921	1.3333
7	0.6667	0.0000	1.0655	1.2500
10	0.9524	0.0000	1.0588	1.1765
9	0.8095	0.0000	1.0450	1.1111
10	0.9048	0.0000	1.0376	1.0526
3	0.2857	0.0000	1.0000	1.0000

Cutoff	Training Sensitivity	Training 1 - Specificity	Training KS (Youden)	Validation Sensitivity	Validation 1 - Specificity	Validation KS (Youden)
0.00	1.0000	1.000		1.0000	1.000	
0.01	1.0000	0.995		1.0000	1.000	
0.02	1.0000	0.995		1.0000	1.000	
0.03	1.0000	0.990		1.0000	0.989	
0.04	1.0000	0.976		1.0000	0.989	
0.05	1.0000	0.971		1.0000	0.978	
0.06	1.0000	0.962		1.0000	0.978	
0.07	1.0000	0.962		1.0000	0.956	
0.08	0.9980	0.957		1.0000	0.956	
0.09	0.9980	0.957		1.0000	0.956	
0.10	0.9980	0.943		1.0000	0.956	
0.11	0.9959	0.933		1.0000	0.922	
0.12	0.9918	0.933		1.0000	0.922	
0.13	0.9918	0.929		0.9952	0.922	
0.14	0.9898	0.924		0.9952	0.922	
0.15	0.9878	0.919		0.9905	0.911	
0.16	0.9878	0.910		0.9905	0.900	
0.17	0.9878	0.895		0.9905	0.878	
0.18	0.9878	0.871		0.9905	0.878	
0.19	0.9878	0.871		0.9905	0.878	
0.20	0.9857	0.862		0.9857	0.867	
0.21	0.9857	0.862		0.9810	0.856	
0.22	0.9837	0.843		0.9810	0.856	
0.23	0.9735	0.829		0.9762	0.844	
0.24	0.9694	0.814		0.9762	0.844	
0.25	0.9694	0.800		0.9667	0.844	
0.26	0.9694	0.790		0.9667	0.833	
0.27	0.9694	0.776		0.9524	0.822	
0.28	0.9694	0.757		0.9476	0.822	
0.29	0.9633	0.738		0.9429	0.822	

Cutoff	Training Sensitivity	Training 1 - Specificity	Training KS (Youden)	Validation Sensitivity	Validation 1 - Specificity	Validation KS (Youden)
0.30	0.9592	0.729		0.9381	0.800	
0.31	0.9571	0.719		0.9381	0.789	
0.32	0.9551	0.714		0.9333	0.789	
0.33	0.9551	0.700		0.9238	0.756	
0.34	0.9510	0.695		0.9190	0.756	
0.35	0.9469	0.676		0.9143	0.756	
0.36	0.9469	0.667		0.9143	0.756	
0.37	0.9429	0.662		0.9048	0.756	
0.38	0.9327	0.648		0.9048	0.733	
0.39	0.9224	0.624		0.9048	0.733	
0.40	0.9204	0.614		0.8905	0.711	
0.41	0.9184	0.605		0.8810	0.711	
0.42	0.9184	0.600		0.8810	0.700	
0.43	0.9122	0.576		0.8810	0.678	
0.44	0.9061	0.557		0.8762	0.678	
0.45	0.9020	0.533		0.8667	0.678	
0.46	0.8959	0.533		0.8619	0.678	
0.47	0.8918	0.524		0.8524	0.678	
0.48	0.8878	0.524		0.8524	0.622	
0.49	0.8837	0.500		0.8524	0.611	
0.50	0.8796	0.495		0.8476	0.611	
0.51	0.8755	0.476		0.8381	0.600	
0.52	0.8633	0.457		0.8286	0.600	
0.53	0.8612	0.448		0.8190	0.567	
0.54	0.8449	0.433		0.8048	0.533	
0.55	0.8388	0.419		0.7952	0.500	
0.56	0.8327	0.410		0.7857	0.500	
0.57	0.8265	0.386		0.7810	0.489	
0.58	0.8224	0.386		0.7810	0.489	
0.59	0.8143	0.367		0.7810	0.478	

Cutoff	Training Sensitivity	Training 1 - Specificity	Training KS (Youden)	Validation Sensitivity	Validation 1 - Specificity	Validation KS (Youden)
0.60	0.8082	0.338		0.7762	0.467	
0.61	0.8000	0.333		0.7762	0.456	
0.62	0.7918	0.319		0.7714	0.444	
0.63	0.7796	0.300		0.7619	0.433	
0.64	0.7755	0.281		0.7619	0.433	
0.65	0.7694	0.281		0.7524	0.411	
0.66	0.7612	0.267		0.7429	0.411	
0.67	0.7490	0.257		0.7429	0.400	
0.68	0.7449	0.243	Yes	0.7381	0.400	
0.69	0.7306	0.238		0.7143	0.378	
0.70	0.7245	0.233		0.7048	0.378	
0.71	0.7102	0.224		0.6857	0.356	
0.72	0.7061	0.214		0.6714	0.322	
0.73	0.6878	0.190		0.6619	0.300	
0.74	0.6816	0.186		0.6571	0.289	Yes
0.75	0.6592	0.181		0.6524	0.289	
0.76	0.6469	0.176		0.6476	0.289	
0.77	0.6388	0.171		0.6190	0.289	
0.78	0.6245	0.152		0.6143	0.278	
0.79	0.6143	0.143		0.6095	0.267	
0.80	0.5918	0.133		0.5952	0.267	
0.81	0.5796	0.133		0.5810	0.267	
0.82	0.5714	0.124		0.5762	0.267	
0.83	0.5633	0.114		0.5571	0.244	
0.84	0.5551	0.114		0.5286	0.222	
0.85	0.5469	0.110		0.5095	0.211	
0.86	0.5204	0.100		0.4952	0.200	
0.87	0.5061	0.100		0.4857	0.167	
0.88	0.4878	0.100		0.4762	0.156	
0.89	0.4694	0.100		0.4571	0.144	

Cutoff	Training Sensitivity	Training 1 - Specificity	Training KS (Youden)	Validation Sensitivity	Validation 1 - Specificity	Validation KS (Youden)
0.90	0.4408	0.095		0.4429	0.144	
0.91	0.4184	0.081		0.4238	0.144	
0.92	0.3878	0.057		0.4000	0.144	
0.93	0.3429	0.048		0.3524	0.133	
0.94	0.3041	0.033		0.2857	0.089	
0.95	0.2449	0.014		0.2476	0.089	
0.96	0.1959	0.010		0.1952	0.078	
0.97	0.1469	0.010		0.1238	0.056	
0.98	0.0939	0.000		0.0714	0.022	
0.99	0.0224	0.000		0.0048	0.000	

Cutoff	Training Accuracy	Training Sensitivity	Training Specificity	Training False Positive Rate	Training False Negative Rate	Training Kolmogorov-Smirnov (KS)
0.00	0.7000	1.0000	0.0000	1.0000	0.0000	0.0000
0.01	0.7014	1.0000	0.0048	0.9952	0.0000	0.0048
0.02	0.7014	1.0000	0.0048	0.9952	0.0000	0.0048
0.03	0.7029	1.0000	0.0095	0.9905	0.0000	0.0095
0.04	0.7071	1.0000	0.0238	0.9762	0.0000	0.0238
0.05	0.7086	1.0000	0.0286	0.9714	0.0000	0.0286
0.06	0.7114	1.0000	0.0381	0.9619	0.0000	0.0381
0.07	0.7114	1.0000	0.0381	0.9619	0.0000	0.0381
0.08	0.7114	0.9980	0.0429	0.9571	0.0020	0.0408
0.09	0.7114	0.9980	0.0429	0.9571	0.0020	0.0408
0.10	0.7157	0.9980	0.0571	0.9429	0.0020	0.0551
0.11	0.7171	0.9959	0.0667	0.9333	0.0041	0.0626
0.12	0.7143	0.9918	0.0667	0.9333	0.0082	0.0585
0.13	0.7157	0.9918	0.0714	0.9286	0.0082	0.0633
0.14	0.7157	0.9898	0.0762	0.9238	0.0102	0.0660
0.15	0.7157	0.9878	0.0810	0.9190	0.0122	0.0687
0.16	0.7186	0.9878	0.0905	0.9095	0.0122	0.0782
0.17	0.7229	0.9878	0.1048	0.8952	0.0122	0.0925
0.18	0.7300	0.9878	0.1286	0.8714	0.0122	0.1163
0.19	0.7300	0.9878	0.1286	0.8714	0.0122	0.1163
0.20	0.7314	0.9857	0.1381	0.8619	0.0143	0.1238
0.21	0.7314	0.9857	0.1381	0.8619	0.0143	0.1238
0.22	0.7357	0.9837	0.1571	0.8429	0.0163	0.1408
0.23	0.7329	0.9735	0.1714	0.8286	0.0265	0.1449
0.24	0.7343	0.9694	0.1857	0.8143	0.0306	0.1551
0.25	0.7386	0.9694	0.2000	0.8000	0.0306	0.1694
0.26	0.7414	0.9694	0.2095	0.7905	0.0306	0.1789
0.27	0.7457	0.9694	0.2238	0.7762	0.0306	0.1932

Training False Discovery Rate	Training F0.5 Score	Training F1 Score	Training Misclassification Rate (Event)	Validation Accuracy	Validation Sensitivity	Validation Specificity
0.3000	0.7447	0.8235	0.3000	0.7000	1.0000	0.0000
0.2990	0.7456	0.8242	0.2986	0.7000	1.0000	0.0000
0.2990	0.7456	0.8242	0.2986	0.7000	1.0000	0.0000
0.2980	0.7465	0.8249	0.2971	0.7033	1.0000	0.0111
0.2950	0.7492	0.8270	0.2929	0.7033	1.0000	0.0111
0.2939	0.7502	0.8277	0.2914	0.7067	1.0000	0.0222
0.2919	0.7520	0.8291	0.2886	0.7067	1.0000	0.0222
0.2919	0.7520	0.8291	0.2886	0.7133	1.0000	0.0444
0.2913	0.7523	0.8288	0.2886	0.7133	1.0000	0.0444
0.2913	0.7523	0.8288	0.2886	0.7133	1.0000	0.0444
0.2882	0.7551	0.8309	0.2843	0.7133	1.0000	0.0444
0.2865	0.7564	0.8313	0.2829	0.7233	1.0000	0.0778
0.2874	0.7551	0.8294	0.2857	0.7233	1.0000	0.0778
0.2863	0.7561	0.8301	0.2843	0.7200	0.9952	0.0778
0.2857	0.7564	0.8298	0.2843	0.7200	0.9952	0.0778
0.2851	0.7567	0.8295	0.2843	0.7200	0.9905	0.0889
0.2830	0.7586	0.8309	0.2814	0.7233	0.9905	0.1000
0.2798	0.7615	0.8330	0.2771	0.7300	0.9905	0.1222
0.2744	0.7663	0.8366	0.2700	0.7300	0.9905	0.1222
0.2744	0.7663	0.8366	0.2700	0.7300	0.9905	0.1222
0.2726	0.7676	0.8371	0.2686	0.7300	0.9857	0.1333
0.2726	0.7676	0.8371	0.2686	0.7300	0.9810	0.1444
0.2686	0.7710	0.8390	0.2643	0.7300	0.9810	0.1444
0.2673	0.7708	0.8361	0.2671	0.7300	0.9762	0.1556
0.2647	0.7726	0.8363	0.2657	0.7300	0.9762	0.1556
0.2613	0.7756	0.8385	0.2614	0.7233	0.9667	0.1556
0.2590	0.7777	0.8400	0.2586	0.7267	0.9667	0.1667
0.2555	0.7807	0.8422	0.2543	0.7200	0.9524	0.1778

Validation False Positive Rate	Validation False Negative Rate	Validation Kolmogorov-Smirnov (KS)	Validation False Discovery Rate	Validation F0.5 Score	Validation F1 Score
1.0000	0.0000	0.0000	0.3000	0.7447	0.8235
1.0000	0.0000	0.0000	0.3000	0.7447	0.8235
1.0000	0.0000	0.0000	0.3000	0.7447	0.8235
0.9889	0.0000	0.0111	0.2977	0.7468	0.8251
0.9889	0.0000	0.0111	0.2977	0.7468	0.8251
0.9778	0.0000	0.0222	0.2953	0.7489	0.8268
0.9778	0.0000	0.0222	0.2953	0.7489	0.8268
0.9556	0.0000	0.0444	0.2905	0.7532	0.8300
0.9556	0.0000	0.0444	0.2905	0.7532	0.8300
0.9556	0.0000	0.0444	0.2905	0.7532	0.8300
0.9556	0.0000	0.0444	0.2905	0.7532	0.8300
0.9222	0.0000	0.0778	0.2833	0.7598	0.8350
0.9222	0.0000	0.0778	0.2833	0.7598	0.8350
0.9222	0.0048	0.0730	0.2842	0.7583	0.8327
0.9222	0.0048	0.0730	0.2842	0.7583	0.8327
0.9111	0.0095	0.0794	0.2828	0.7591	0.8320
0.9000	0.0095	0.0905	0.2803	0.7613	0.8337
0.8778	0.0095	0.1127	0.2753	0.7658	0.8370
0.8778	0.0095	0.1127	0.2753	0.7658	0.8370
0.8778	0.0095	0.1127	0.2753	0.7658	0.8370
0.8667	0.0143	0.1190	0.2737	0.7667	0.8364
0.8556	0.0190	0.1254	0.2721	0.7675	0.8357
0.8556	0.0190	0.1254	0.2721	0.7675	0.8357
0.8444	0.0238	0.1317	0.2705	0.7684	0.8350
0.8444	0.0238	0.1317	0.2705	0.7684	0.8350
0.8444	0.0333	0.1222	0.2724	0.7655	0.8303
0.8333	0.0333	0.1333	0.2698	0.7678	0.8320
0.8222	0.0476	0.1302	0.2701	0.7657	0.8264

Validation Misclassification Rate (Event)
0.3000
0.3000
0.3000
0.2967
0.2967
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0.2700
0.2767
0.2733
0.2800

Cutoff	Training Accuracy	Training Sensitivity	Training Specificity	Training False Positive Rate	Training False Negative Rate	Training Kolmogorov-Smirnov (KS)
0.28	0.7514	0.9694	0.2429	0.7571	0.0306	0.2122
0.29	0.7529	0.9633	0.2619	0.7381	0.0367	0.2252
0.30	0.7529	0.9592	0.2714	0.7286	0.0408	0.2306
0.31	0.7543	0.9571	0.2810	0.7190	0.0429	0.2381
0.32	0.7543	0.9551	0.2857	0.7143	0.0449	0.2408
0.33	0.7586	0.9551	0.3000	0.7000	0.0449	0.2551
0.34	0.7571	0.9510	0.3048	0.6952	0.0490	0.2558
0.35	0.7600	0.9469	0.3238	0.6762	0.0531	0.2707
0.36	0.7629	0.9469	0.3333	0.6667	0.0531	0.2803
0.37	0.7614	0.9429	0.3381	0.6619	0.0571	0.2810
0.38	0.7586	0.9327	0.3524	0.6476	0.0673	0.2850
0.39	0.7586	0.9224	0.3762	0.6238	0.0776	0.2986
0.40	0.7600	0.9204	0.3857	0.6143	0.0796	0.3061
0.41	0.7614	0.9184	0.3952	0.6048	0.0816	0.3136
0.42	0.7629	0.9184	0.4000	0.6000	0.0816	0.3184
0.43	0.7657	0.9122	0.4238	0.5762	0.0878	0.3361
0.44	0.7671	0.9061	0.4429	0.5571	0.0939	0.3490
0.45	0.7714	0.9020	0.4667	0.5333	0.0980	0.3687
0.46	0.7671	0.8959	0.4667	0.5333	0.1041	0.3626
0.47	0.7671	0.8918	0.4762	0.5238	0.1082	0.3680
0.48	0.7643	0.8878	0.4762	0.5238	0.1122	0.3639
0.49	0.7686	0.8837	0.5000	0.5000	0.1163	0.3837
0.50	0.7671	0.8796	0.5048	0.4952	0.1204	0.3844
0.51	0.7700	0.8755	0.5238	0.4762	0.1245	0.3993
0.52	0.7671	0.8633	0.5429	0.4571	0.1367	0.4061
0.53	0.7686	0.8612	0.5524	0.4476	0.1388	0.4136
0.54	0.7614	0.8449	0.5667	0.4333	0.1551	0.4116
0.55	0.7614	0.8388	0.5810	0.4190	0.1612	0.4197

Training False Discovery Rate	Training F0.5 Score	Training F1 Score	Training Misclassification Rate (Event)	Validation Accuracy	Validation Sensitivity	Validation Specificity
0.2508	0.7849	0.8452	0.2486	0.7167	0.9476	0.1778
0.2472	0.7872	0.8451	0.2471	0.7133	0.9429	0.1778
0.2456	0.7881	0.8446	0.2471	0.7167	0.9381	0.2000
0.2435	0.7896	0.8450	0.2457	0.7200	0.9381	0.2111
0.2427	0.7900	0.8448	0.2457	0.7167	0.9333	0.2111
0.2390	0.7932	0.8471	0.2414	0.7200	0.9238	0.2444
0.2386	0.7931	0.8457	0.2429	0.7167	0.9190	0.2444
0.2343	0.7962	0.8467	0.2400	0.7133	0.9143	0.2444
0.2318	0.7983	0.8483	0.2371	0.7133	0.9143	0.2444
0.2313	0.7982	0.8469	0.2386	0.7067	0.9048	0.2444
0.2293	0.7984	0.8440	0.2414	0.7133	0.9048	0.2667
0.2247	0.8009	0.8425	0.2414	0.7133	0.9048	0.2667
0.2224	0.8025	0.8430	0.2400	0.7100	0.8905	0.2889
0.2201	0.8041	0.8435	0.2386	0.7033	0.8810	0.2889
0.2188	0.8053	0.8443	0.2371	0.7067	0.8810	0.3000
0.2130	0.8092	0.8450	0.2343	0.7133	0.8810	0.3222
0.2086	0.8120	0.8449	0.2329	0.7100	0.8762	0.3222
0.2022	0.8167	0.8467	0.2286	0.7033	0.8667	0.3222
0.2033	0.8148	0.8434	0.2329	0.7000	0.8619	0.3222
0.2011	0.8159	0.8428	0.2329	0.6933	0.8524	0.3222
0.2018	0.8146	0.8406	0.2357	0.7100	0.8524	0.3778
0.1952	0.8195	0.8424	0.2314	0.7133	0.8524	0.3889
0.1944	0.8194	0.8410	0.2329	0.7100	0.8476	0.3889
0.1890	0.8231	0.8420	0.2300	0.7067	0.8381	0.4000
0.1850	0.8242	0.8385	0.2329	0.7000	0.8286	0.4000
0.1822	0.8262	0.8390	0.2314	0.7033	0.8190	0.4333
0.1802	0.8247	0.8322	0.2386	0.7033	0.8048	0.4667
0.1764	0.8266	0.8311	0.2386	0.7067	0.7952	0.5000

Validation False Positive Rate	Validation False Negative Rate	Validation Kolmogorov-Smirnov (KS)	Validation False Discovery Rate	Validation F0.5 Score	Validation F1 Score
0.8222	0.0524	0.1254	0.2711	0.7642	0.8240
0.8222	0.0571	0.1206	0.2721	0.7627	0.8216
0.8000	0.0619	0.1381	0.2677	0.7659	0.8225
0.7889	0.0619	0.1492	0.2649	0.7683	0.8243
0.7889	0.0667	0.1444	0.2659	0.7668	0.8218
0.7556	0.0762	0.1683	0.2595	0.7711	0.8220
0.7556	0.0810	0.1635	0.2605	0.7695	0.8195
0.7556	0.0857	0.1587	0.2615	0.7680	0.8170
0.7556	0.0857	0.1587	0.2615	0.7680	0.8170
0.7556	0.0952	0.1492	0.2636	0.7649	0.8120
0.7333	0.0952	0.1714	0.2578	0.7699	0.8155
0.7333	0.0952	0.1714	0.2578	0.7699	0.8155
0.7111	0.1095	0.1794	0.2550	0.7702	0.8113
0.7111	0.1190	0.1698	0.2570	0.7670	0.8061
0.7000	0.1190	0.1810	0.2540	0.7696	0.8079
0.6778	0.1190	0.2032	0.2480	0.7747	0.8114
0.6778	0.1238	0.1984	0.2490	0.7731	0.8088
0.6778	0.1333	0.1889	0.2510	0.7699	0.8035
0.6778	0.1381	0.1841	0.2521	0.7683	0.8009
0.6778	0.1476	0.1746	0.2542	0.7650	0.7956
0.6222	0.1476	0.2302	0.2383	0.7783	0.8045
0.6111	0.1476	0.2413	0.2350	0.7810	0.8063
0.6111	0.1524	0.2365	0.2361	0.7793	0.8036
0.6000	0.1619	0.2381	0.2348	0.7788	0.8000
0.6000	0.1714	0.2286	0.2368	0.7754	0.7945
0.5667	0.1810	0.2524	0.2287	0.7804	0.7945
0.5333	0.1952	0.2714	0.2212	0.7839	0.7916
0.5000	0.2048	0.2952	0.2123	0.7892	0.7915

Validation Misclassification Rate (Event)
0.2833
0.2867
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0.2800
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0.3000
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0.2933

Cutoff	Training Accuracy	Training Sensitivity	Training Specificity	Training False Positive Rate	Training False Negative Rate	Training Kolmogorov-Smirnov (KS)
0.56	0.7600	0.8327	0.5905	0.4095	0.1673	0.4231
0.57	0.7629	0.8265	0.6143	0.3857	0.1735	0.4408
0.58	0.7600	0.8224	0.6143	0.3857	0.1776	0.4367
0.59	0.7600	0.8143	0.6333	0.3667	0.1857	0.4476
0.60	0.7643	0.8082	0.6619	0.3381	0.1918	0.4701
0.61	0.7600	0.8000	0.6667	0.3333	0.2000	0.4667
0.62	0.7586	0.7918	0.6810	0.3190	0.2082	0.4728
0.63	0.7557	0.7796	0.7000	0.3000	0.2204	0.4796
0.64	0.7586	0.7755	0.7190	0.2810	0.2245	0.4946
0.65	0.7543	0.7694	0.7190	0.2810	0.2306	0.4884
0.66	0.7529	0.7612	0.7333	0.2667	0.2388	0.4946
0.67	0.7471	0.7490	0.7429	0.2571	0.2510	0.4918
0.68	0.7486	0.7449	0.7571	0.2429	0.2551	0.5020
0.69	0.7400	0.7306	0.7619	0.2381	0.2694	0.4925
0.70	0.7371	0.7245	0.7667	0.2333	0.2755	0.4912
0.71	0.7300	0.7102	0.7762	0.2238	0.2898	0.4864
0.72	0.7300	0.7061	0.7857	0.2143	0.2939	0.4918
0.73	0.7243	0.6878	0.8095	0.1905	0.3122	0.4973
0.74	0.7214	0.6816	0.8143	0.1857	0.3184	0.4959
0.75	0.7071	0.6592	0.8190	0.1810	0.3408	0.4782
0.76	0.7000	0.6469	0.8238	0.1762	0.3531	0.4707
0.77	0.6957	0.6388	0.8286	0.1714	0.3612	0.4673
0.78	0.6914	0.6245	0.8476	0.1524	0.3755	0.4721
0.79	0.6871	0.6143	0.8571	0.1429	0.3857	0.4714
0.80	0.6743	0.5918	0.8667	0.1333	0.4082	0.4585
0.81	0.6657	0.5796	0.8667	0.1333	0.4204	0.4463
0.82	0.6629	0.5714	0.8762	0.1238	0.4286	0.4476
0.83	0.6600	0.5633	0.8857	0.1143	0.4367	0.4490

Training False Discovery Rate	Training F0.5 Score	Training F1 Score	Training Misclassification Rate (Event)	Validation Accuracy	Validation Sensitivity	Validation Specificity
0.1741	0.8273	0.8293	0.2400	0.7000	0.7857	0.5000
0.1667	0.8320	0.8299	0.2371	0.7000	0.7810	0.5111
0.1674	0.8306	0.8275	0.2400	0.7000	0.7810	0.5111
0.1618	0.8333	0.8261	0.2400	0.7033	0.7810	0.5222
0.1520	0.8397	0.8276	0.2357	0.7033	0.7762	0.5333
0.1515	0.8383	0.8235	0.2400	0.7067	0.7762	0.5444
0.1473	0.8398	0.8212	0.2414	0.7067	0.7714	0.5556
0.1416	0.8414	0.8171	0.2443	0.7033	0.7619	0.5667
0.1344	0.8459	0.8181	0.2414	0.7033	0.7619	0.5667
0.1353	0.8438	0.8143	0.2457	0.7033	0.7524	0.5889
0.1305	0.8454	0.8118	0.2471	0.6967	0.7429	0.5889
0.1283	0.8441	0.8057	0.2529	0.7000	0.7429	0.6000
0.1226	0.8473	0.8057	0.2514	0.6967	0.7381	0.6000
0.1225	0.8435	0.7973	0.2600	0.6867	0.7143	0.6222
0.1213	0.8428	0.7942	0.2629	0.6800	0.7048	0.6222
0.1190	0.8406	0.7864	0.2700	0.6733	0.6857	0.6444
0.1151	0.8423	0.7855	0.2700	0.6733	0.6714	0.6778
0.1061	0.8433	0.7774	0.2757	0.6733	0.6619	0.7000
0.1046	0.8426	0.7740	0.2786	0.6733	0.6571	0.7111
0.1053	0.8351	0.7591	0.2929	0.6700	0.6524	0.7111
0.1045	0.8316	0.7512	0.3000	0.6667	0.6476	0.7111
0.1032	0.8298	0.7461	0.3043	0.6467	0.6190	0.7111
0.0947	0.8306	0.7391	0.3086	0.6467	0.6143	0.7222
0.0906	0.8297	0.7333	0.3129	0.6467	0.6095	0.7333
0.0881	0.8229	0.7178	0.3257	0.6367	0.5952	0.7333
0.0897	0.8170	0.7082	0.3343	0.6267	0.5810	0.7333
0.0850	0.8168	0.7035	0.3371	0.6233	0.5762	0.7333
0.0800	0.8166	0.6987	0.3400	0.6167	0.5571	0.7556

Validation False Positive Rate	Validation False Negative Rate	Validation Kolmogorov-Smirnov (KS)	Validation False Discovery Rate	Validation F0.5 Score	Validation F1 Score
0.5000	0.2143	0.2857	0.2143	0.7857	0.7857
0.4889	0.2190	0.2921	0.2115	0.7869	0.7847
0.4889	0.2190	0.2921	0.2115	0.7869	0.7847
0.4778	0.2190	0.3032	0.2077	0.7900	0.7866
0.4667	0.2238	0.3095	0.2049	0.7913	0.7855
0.4556	0.2238	0.3206	0.2010	0.7943	0.7874
0.4444	0.2286	0.3270	0.1980	0.7957	0.7864
0.4333	0.2381	0.3286	0.1960	0.7952	0.7824
0.4333	0.2381	0.3286	0.1960	0.7952	0.7824
0.4111	0.2476	0.3413	0.1897	0.7980	0.7802
0.4111	0.2571	0.3317	0.1917	0.7943	0.7742
0.4000	0.2571	0.3429	0.1875	0.7975	0.7761
0.4000	0.2619	0.3381	0.1885	0.7957	0.7731
0.3778	0.2857	0.3365	0.1848	0.7928	0.7614
0.3778	0.2952	0.3270	0.1868	0.7889	0.7551
0.3556	0.3143	0.3302	0.1818	0.7877	0.7461
0.3222	0.3286	0.3492	0.1706	0.7921	0.7421
0.3000	0.3381	0.3619	0.1627	0.7952	0.7394
0.2889	0.3429	0.3683	0.1585	0.7968	0.7380
0.2889	0.3476	0.3635	0.1595	0.7947	0.7346
0.2889	0.3524	0.3587	0.1605	0.7925	0.7312
0.2889	0.3810	0.3302	0.1667	0.7794	0.7104
0.2778	0.3857	0.3365	0.1623	0.7809	0.7088
0.2667	0.3905	0.3429	0.1579	0.7824	0.7072
0.2667	0.4048	0.3286	0.1611	0.7754	0.6964
0.2667	0.4190	0.3143	0.1644	0.7683	0.6854
0.2667	0.4238	0.3095	0.1655	0.7658	0.6817
0.2444	0.4429	0.3127	0.1583	0.7637	0.6705

Validation Misclassification Rate (Event)
0.3000
0.3000
0.3000
0.2967
0.2967
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0.2933
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0.2967
0.2967
0.3033
0.3000
0.3033
0.3133
0.3200
0.3267
0.3267
0.3267
0.3267
0.3300
0.3333
0.3533
0.3533
0.3533
0.3633
0.3733
0.3767
0.3833

Cutoff	Training Accuracy	Training Sensitivity	Training Specificity	Training False Positive Rate	Training False Negative Rate	Training Kolmogorov-Smirnov (KS)
0.84	0.6543	0.5551	0.8857	0.1143	0.4449	0.4408
0.85	0.6500	0.5469	0.8905	0.1095	0.4531	0.4374
0.86	0.6343	0.5204	0.9000	0.1000	0.4796	0.4204
0.87	0.6243	0.5061	0.9000	0.1000	0.4939	0.4061
0.88	0.6114	0.4878	0.9000	0.1000	0.5122	0.3878
0.89	0.5986	0.4694	0.9000	0.1000	0.5306	0.3694
0.90	0.5800	0.4408	0.9048	0.0952	0.5592	0.3456
0.91	0.5686	0.4184	0.9190	0.0810	0.5816	0.3374
0.92	0.5543	0.3878	0.9429	0.0571	0.6122	0.3306
0.93	0.5257	0.3429	0.9524	0.0476	0.6571	0.2952
0.94	0.5029	0.3041	0.9667	0.0333	0.6959	0.2707
0.95	0.4671	0.2449	0.9857	0.0143	0.7551	0.2306
0.96	0.4343	0.1959	0.9905	0.0095	0.8041	0.1864
0.97	0.4000	0.1469	0.9905	0.0095	0.8531	0.1374
0.98	0.3657	0.0939	1.0000	0.0000	0.9061	0.0939
0.99	0.3157	0.0224	1.0000	0.0000	0.9776	0.0224

Training False Discovery Rate	Training F0.5 Score	Training F1 Score	Training Misclassification Rate (Event)	Validation Accuracy	Validation Sensitivity	Validation Specificity
0.0811	0.8124	0.6921	0.3457	0.6033	0.5286	0.7778
0.0790	0.8102	0.6863	0.3500	0.5933	0.5095	0.7889
0.0761	0.7999	0.6658	0.3657	0.5867	0.4952	0.8000
0.0781	0.7918	0.6535	0.3757	0.5900	0.4857	0.8333
0.0808	0.7810	0.6373	0.3886	0.5867	0.4762	0.8444
0.0837	0.7697	0.6208	0.4014	0.5767	0.4571	0.8556
0.0847	0.7531	0.5950	0.4200	0.5667	0.4429	0.8556
0.0766	0.7438	0.5758	0.4314	0.5533	0.4238	0.8556
0.0594	0.7319	0.5491	0.4457	0.5367	0.4000	0.8556
0.0562	0.6988	0.5030	0.4743	0.5067	0.3524	0.8667
0.0449	0.6688	0.4613	0.4971	0.4733	0.2857	0.9111
0.0244	0.6110	0.3915	0.5329	0.4467	0.2476	0.9111
0.0204	0.5442	0.3265	0.5657	0.4133	0.1952	0.9222
0.0270	0.4580	0.2553	0.6000	0.3700	0.1238	0.9444
0.0000	0.3412	0.1716	0.6343	0.3433	0.0714	0.9778
0.0000	0.1030	0.0439	0.6843	0.3033	0.0048	1.0000

Validation False Positive Rate	Validation False Negative Rate	Validation Kolmogorov-Smirnov (KS)	Validation False Discovery Rate	Validation F0.5 Score	Validation F1 Score
0.2222	0.4714	0.3063	0.1527	0.7561	0.6510
0.2111	0.4905	0.2984	0.1508	0.7493	0.6369
0.2000	0.5048	0.2952	0.1475	0.7450	0.6265
0.1667	0.5143	0.3190	0.1282	0.7522	0.6239
0.1556	0.5238	0.3206	0.1228	0.7508	0.6173
0.1444	0.5429	0.3127	0.1193	0.7430	0.6019
0.1444	0.5571	0.2984	0.1226	0.7334	0.5886
0.1444	0.5762	0.2794	0.1275	0.7201	0.5705
0.1444	0.6000	0.2556	0.1340	0.7023	0.5472
0.1333	0.6476	0.2190	0.1395	0.6679	0.5000
0.0889	0.7143	0.1968	0.1176	0.6224	0.4317
0.0889	0.7524	0.1587	0.1333	0.5778	0.3852
0.0778	0.8048	0.1175	0.1458	0.5100	0.3178
0.0556	0.8762	0.0683	0.1613	0.3892	0.2158
0.0222	0.9286	0.0492	0.1176	0.2698	0.1322
0.0000	0.9952	0.0048	0.0000	0.0234	0.0095

Validation Misclassification Rate (Event)
0.3967
0.4067
0.4133
0.4100
0.4133
0.4233
0.4333
0.4467
0.4633
0.4933
0.5267
0.5533
0.5867
0.6300
0.6567
0.6967

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Response	Event	Value	Training Frequency	Validation Frequency
Correct	good	True Positive	431	178
Incorrect	good	False Negative	59	32
Correct	bad	True Negative	106	35
Incorrect	bad	False Positive	104	55

Partition	KS (Youden)	Misclassification Rate	Misclassification Rate (Event)	C Statistic	False Positive Rate	False Discovery Rate	F1 Score	Lift	Cumulative Lift
Training	0.5020	0.2329	0.2329	0.813	0.495	0.194	0.841	1.429	1.429
Validation	0.3683	0.2900	0.2900	0.713	0.611	0.236	0.804	1.238	1.238

Cumulative % Events	Cumulative % Captured	Gain	Gini	Gamma	Tau	Observations Used	Unused
100.000	7.143	0.429	0.627	0.633	0.264	700	0
86.667	6.190	0.238	0.427	0.433	0.180	300	0

Plot	Summary
Confusion Matrix	The confusion matrix plot displays the number of observations predicting each response level. A greater number of observations where the observed level and predicted level are the same indicates a better model. For this data, the percentages of each observed value that are correctly predicted in the validation partition are as follows: bad - 38.89% and good - 84.76%.
Lift	The lift plot measures the ratio of percent captured response to the baseline percent response. The validation partition has a lift of 1.2381 at the 5% quantile meaning there are about 1.24 times more events in that quantile than expected by random (5% of the total number of events).
Cumulative Lift	Cumulative lift measures the ratio of percent captured response to the baseline percent response, up to and including the specified quantile. The validation partition has a cumulative lift of 1.2381 in the 10% quantile meaning there are about 1.24 times more events in the first two quantiles than expected by random (10% of the total number of events). Because this value is greater than 1, it is better to use your model to identify responders than no model, based on the validation partition.
ROC	The receiver operator characteristic (ROC) is a plot of sensitivity (the true positive rate) against 1-specificity (the false positive rate), which are both measures of classification based on the confusion matrix. These measures are calculated at various cutoff values. To help identify the best cutoff to use when scoring your data, the KS cutoff reference line is drawn at the value of 1-specificity where the greatest difference between sensitivity and 1-specificity is observed for the validation partition. The KS cutoff line is drawn at the cutoff value 0.74 where the 1-specificity value is 0.289 and the sensitivity value is 0.657. Cutoff values range from 0 to 0.99, inclusive, in increments of 0.01. At each cutoff value, the predicted response classification is determined by whether the predicted probability of the response Risk being good is greater than or equal to the cutoff value. When the predicted probability of the event is greater than or equal to the cutoff value, then the predicted classification is good, otherwise it is NOT good.
Cutoff	The cutoff plot shows how different model assessment statistics change as the prediction cutoff value changes. The model assessment statistics are based on the selected event for the model compared to non-events. You can interactively move the cutoff line to represent different prediction cutoff values. As you move the cutoff line, the model assessment statistics are updated. This allows you to choose a cutoff that best represents your particular problem and business objective. When the accuracy statistic is enabled, its value for the selected cutoff is always displayed.

Plot	Summary
Misclassification	The misclassification plot is a visual representation of the accuracy of the prediction at the specified cutoff value, 0.50. The plot displays the number of true positives for events that are correctly classified, false positives for NOT events that are classified as events, false negatives for events that are classified as NOT events, and true negatives for NOT events that are classified as NOT events. True negatives include NOT event classifications that predict a different level from observed, as long as both are NOT events.

The predicted response classification is determined by whether the predicted probability of the level good for the response Risk is greater than or equal to the cutoff value. When it is greater than or equal to the cutoff value, the predicted classification is an event, otherwise it is a NOT event.

For this data, for the bar corresponding to the event level of Risk, good, the segment of the bar colored as "Correct" corresponds to true positives. |