Machine Learning Analytic
"Variable Selection" Results

by: jbae7@ncsu.edu

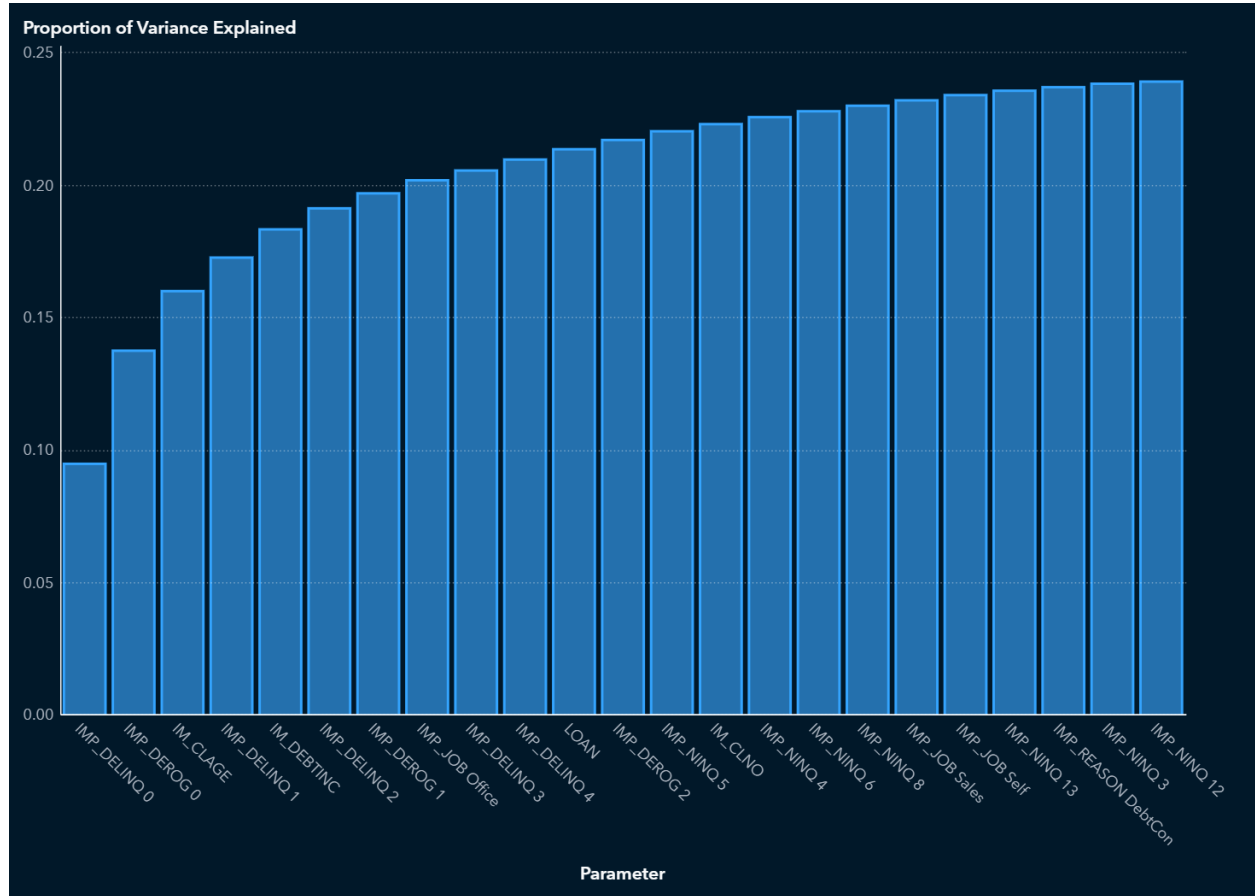# Contents

Variable Selection

Name	Variable Label	Variable Level	Role
BAD		BINARY	TARGET
IMP_DELINQ	Imputed DELINQ	NOMINAL	INPUT
IMP_DEROG	Imputed DEROG	NOMINAL	INPUT
IMP_JOB	Imputed JOB	NOMINAL	INPUT
IMP_NINQ	Imputed NINQ	NOMINAL	INPUT
IMP_REASON	Imputed REASON	BINARY	INPUT
IM_CLAGE		INTERVAL	INPUT
IM_CLNO		INTERVAL	INPUT
IM_DEBTINC		INTERVAL	INPUT
LOAN		INTERVAL	INPUT
DMINDEX		INTERVAL	KEY
IMP_VALUE	Imputed VALUE	INTERVAL	REJECTED
IM_MORTDUE		INTERVAL	REJECTED
IM_YOJ		INTERVAL	REJECTED

Reason
Variance Explained (Supervised)
Variance Explained (Supervised)
Variance Explained (Supervised)

Cumulative Variance Explained - Fast Selection

Proportion of Variance Explained bar chart with x-axis labeled "Parameter" showing parameters: IMP_DELINQ 0, IMP_DEROG 0, IM_CLAGE, IMP_DELINQ 1, IM_DEBTINC, IMP_DELINQ 2, IMP_DEROG 1, IMP_JOB Office, IMP_DELINQ 3, IMP_DELINQ 4, LOAN, IMP_DEROG 2, IMP_NINQ 5, IM_CLNO, IMP_NINQ 4, IMP_NINQ 6, IMP_NINQ 8, IMP_JOB Sales, IMP_JOB Self, IMP_NINQ 13, IMP_REASON DebtCon, IMP_NINQ 3, IMP_NINQ 12.

Variance Explained Values - Fast Selection

Iteration	Parameter	Variable Label	Proportion of Variance Explained
1	IMP_DELINQ 0	Imputed DELINQ	0.0950
2	IMP_DEROG 0	Imputed DEROG	0.1377
3	IM_CLAGE	IM_CLAGE	0.1601
4	IMP_DELINQ 1	Imputed DELINQ	0.1728
5	IM_DEBTINC	IM_DEBTINC	0.1834
6	IMP_DELINQ 2	Imputed DELINQ	0.1914
7	IMP_DEROG 1	Imputed DEROG	0.1970
8	IMP_JOB Office	Imputed JOB	0.2020
9	IMP_DELINQ 3	Imputed DELINQ	0.2056
10	IMP_DELINQ 4	Imputed DELINQ	0.2098
11	LOAN	LOAN	0.2137
12	IMP_DEROG 2	Imputed DEROG	0.2172
13	IMP_NINQ 5	Imputed NINQ	0.2205
14	IM_CLNO	IM_CLNO	0.2231
15	IMP_NINQ 4	Imputed NINQ	0.2258
16	IMP_NINQ 6	Imputed NINQ	0.2280
17	IMP_NINQ 8	Imputed NINQ	0.2301
18	IMP_JOB Sales	Imputed JOB	0.2321
19	IMP_JOB Self	Imputed JOB	0.2341
20	IMP_NINQ 13	Imputed NINQ	0.2358
21	IMP_REASON DebtCon	Imputed REASON	0.2371
22	IMP_NINQ 3	Imputed NINQ	0.2384
23	IMP_NINQ 12	Imputed NINQ	0.2392

Incremental Variance Explained
0
0.0427
0.0225
0.0127
0.0106
0.0079
0.0057
0.0049
0.0037
0.0041
0.0039
0.0035
0.0033
0.0027
0.0026
0.0022
0.0021
0.0020
0.0020
0.0017
0.0013
0.0013
0.0008

Properties

Property Name	Property Value
alpha	0.2000
bonferroni	false
chooseCriterion	SBC
chooseFcp	SBC
codeLocation	mlearning
confidence	0.2500
criterionMethod	ENTROPY
criterionMethod_f	IGR
cumulativeRedu	1
cumulative_Super	1
cvccFolds	10
dataMiningVersion	V2024.03
defaultVarsPerTree _f	true
defaultVarsPerTree _g	true
distribution	GAUSSIAN
earlyStop	true
earlyStopMethod	STAGNATION
ensembleCrit	ANY
esMetric	MCR
esMinimum	false
esThreshold	0
esThresholdIter	0
fast_Enabled	true
forest_Enabled	false
fullDatasetReconstit ution	false

Property Name	Property Value
gradient_Enabled	false
hLeafSize	5
iCriterionMethod	VARIANCE
iCriterionMethod_f	VARIANCE
incrementRedu	0.0010
increment_Super	0.0010
intBinMethod_f	QUANTILE
intBinMethod_g	QUANTILE
intBinMethod_t	QUANTILE
intervalBins_f	50
intervalBins_g	50
intervalBins_t	50
lasso	0
leafSize	5
learningRate	0.1000
loh	0
maxBranch_f	2
maxBranch_g	2
maxBranch_t	2
maxCategories_f	128
maxCategories_g	128
maxCategories_t	128
maxDepth_f	20
maxDepth_g	4
maxDepth_t	10
maxEffects	0
maxL2	1
maxLevel	50
maxSteps	0

Property Name	Property Value
maxStepsRedu	200
maxStepsSuper	200
maxTime	600
maxTrees	100
maxeffects_Redu	200
maxeffects_Super	200
minEffects	0
minL2	0
minLeafSize	5
minUseInSearch_f	1
minUseInSearch_g	1
minUseinsearch_t	1
missingPercent	50
missingValue	USEINSEARCH
nPLeaves	1
ntrees	100
numAlpha	4
numL2	50
numLambda	10
optTech	MILP
parmValueAlpha	SEARCH
parmValueL2	SEARCH
parmValueLambda	SEARCH
partitionSeed	12,345
pearson_Redu	CORR
pearson_Redu_Super	CORR
power	1.5000
prescreen_Enabled	false

Property Name	Property Value
pruningMethod	COSTCOMPLEXITY
reg_Enabled	false
relativeImportance_f	0.2500
relativeImportance_g	0.2500
relativeImportance_t	0.2500
reportingOnly	false
ridge	1
seRule	false
seed_f	12,345
seed_g	12,345
seed_t	12,345
selMethod	AUTOMATIC
selectCriterion	SBC
selectMethod	STEPWISE
selectProcess	SEQUENTIAL
slEntry	0.0500
slStay	0.0500
stagnation	5
stopCriterion	SBC
stopSuper	BIC
subsampleRate	0.5000
suppressIntercept	false
templateRevision	5
tolerance	0
topx	10
topx_Enabled	false

Property Name	Property Value
trainFraction	0.6000
tree_Enabled	false
unsuper_enabled	false
useVarOnce	false
validation	true
validationProb	0.3000
varsToTry_f	100
varsToTry_g	100

Output

Fast Variable Selection

The VARREDUCE Procedure

Number of Observations Read	5960
Number of Observations Used	5960

Selection Summary							
Iteration	Parameter	Proportion of Variance Explained	SSE	MSE	AIC	AICC	BIC
1	IMP_DELINQ 0	0.094958	0.905042	0.00015188	-0.098096	1.901905	-0.098315
2	IMP_DEROG 0	0.137653	0.862347	0.00014474	-0.145748	1.854254	-0.145180
3	IM_CLAGE	0.160131	0.839869	0.00014099	-0.171490	1.828513	-0.170134
4	IMP_DELINQ 1	0.172785	0.827215	0.00013889	-0.185999	1.814005	-0.183856
5	IM_DEBTINC	0.183433	0.816567	0.00013712	-0.198284	1.801721	-0.195354
6	IMP_DELINQ 2	0.191369	0.808631	0.00013581	-0.207379	1.792628	-0.203662
7	IMP_DEROG 1	0.197029	0.802971	0.00013489	-0.213733	1.786277	-0.209228
8	IMP_JOB Office	0.201954	0.798046	0.00013408	-0.219214	1.780798	-0.213921
9	IMP_DELINQ 3	0.205643	0.794357	0.00013348	-0.223176	1.776839	-0.217096
10	IMP_DELINQ 4	0.209784	0.790216	0.00013281	-0.227731	1.772286	-0.220863
11	LOAN	0.213668	0.786332	0.00013218	-0.231987	1.768033	-0.224332
12	IMP_DEROG 2	0.217151	0.782849	0.00013162	-0.235755	1.764268	-0.227313
13	IMP_NINQ 5	0.220454	0.779546	0.00013108	-0.239312	1.760714	-0.230083
14	IM_CLNO	0.223149	0.776851	0.00013065	-0.242104	1.757926	-0.232087
15	IMP_NINQ 4	0.225787	0.774213	0.00013023	-0.244834	1.755200	-0.234030
16	IMP_NINQ 6	0.228010	0.771990	0.00012988	-0.247038	1.752999	-0.235447
17	IMP_NINQ 8	0.230086	0.769914	0.00012955	-0.249060	1.750982	-0.236681
18	IMP_JOB Sales	0.232126	0.767874	0.00012923	-0.251042	1.749004	-0.237876
19	IMP_JOB Self	0.234102	0.765898	0.00012892	-0.252948	1.747103	-0.238995
20	IMP_NINQ 13	0.235757	0.764243	0.00012866	-0.254439	1.745617	-0.239698
21	IMP_REASON DebtCon	0.237081	0.762919	0.00012846	-0.255503	1.744558	-0.239975
22	IMP_NINQ 3	0.238392	0.761608	0.00012826	-0.256552	1.743515	-0.240236
23	IMP_NINQ 12	0.239195	0.760805	0.00012815	-0.256936	1.743136	-0.239833

Selected Effects		
Number	Selected Variable	Variable Type
1	IMP_DELINQ	CLASS
2	IMP_DEROG	CLASS
3	IM_CLAGE	INTERVAL
4	IM_DEBTINC	INTERVAL
5	IMP_JOB	CLASS
6	LOAN	INTERVAL
7	IMP_NINQ	CLASS
8	IM_CLNO	INTERVAL
9	IMP_REASON	CLASS