

# FE10

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## **1.Part I**

[1] Neural networks are computational models inspired by the human brain, which consist of a network architecture composed of artificial neurons to detect patterns hidden in the data.

Input layer: dendrites

Links: axon

Output layer: axon terminals

[2] An artificial neural network is typically used to model non linear and complex relationships between input and output variables.

[3] Between the prediction and confidence percentages, we can use neural networks to find interesting observations that may not be obvious, but still represent good opportunities to answer questions or solve problems.

[4] These can be clicked on to reveal the attribute name that each left hand node represents.

[5] This is the first layer named input layer which represents the input or features.

The hidden layer performs the comparison between all attributes.

The output layer represents the possible values for our prediction.

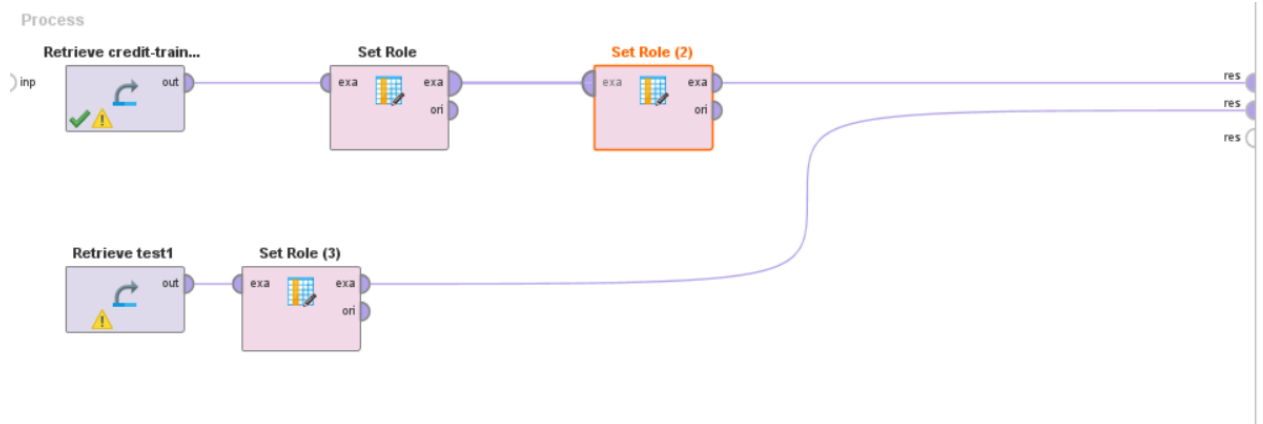
## **2.Part II**

- [1]     (a)     Low-Moderate-High-Very Low-DO NOT LEND  
         (b)     189545.633

[2]

	Applicant_	Credit_Scc	Late_Payn	Months_Ir	Debt_Inco	Loan_Amt	Liquid_Ass	Num_Cred	Credit_Risk	
1	123456	400	5	29	3.414	103519	2696	6	Moderate	
3	234567	500	5	29	3.414	103519	2696	6	Moderate	
4	345678	600	5	29	3.414	103519	2696	6	Moderate	
5	456789	700	5	29	3.414	103519	2696	6	Moderate	
6	456780	800	5	29	3.414	103519	2696	6	Moderate	
7	567890	900	5	29	3.414	103519	2696	6	Moderate	
8	98765	700	10	17	7.618	141109	2126	8	High	
9	987654	800	10	17	7.618	141109	2126	8	High	
10	876543	900	10	17	7.618	141109	2126	8	High	
11	765432	456	4	5	3.471	283847	6389	6	Moderate	
12	654321	678	1	60	0.09	276408	9044	3	Very Low	
13	134579	321	7	10	3.064	185903	7248	6	Moderate	
14	124567	456	2	14	2.219	267418	5922	4	Moderate	
15	126789	789	15	15	9.147	151388	2675	8	High	
16	127869	908	15	5	5.927	122848	2717	6	High	
17	345216	783	5	5	2.502	143333	4691	6	Moderate	
18	348907	356	1	27	1.01	225889	18787	4	Low	
19	167083	689	3	19	4.956	176578	2195	3	Moderate	
20	154327	341	2	54	1.97	323732	9578	2	Low	
21	179253	756	3	40	2.27	289792	5763	3	High	

[3]



Application\_ID has target role id and Credit\_Risk has target role label

[4]

# ParameterSet

Parameter set:

Performance:

PerformanceVector [  
-----accuracy: 96.06%

ConfusionMatrix:

True:	Moderate	High	Low	DO NOT LEND	Very Low
Moderate:	53	4	0	0	0
High:	0	60	0	2	0
Low:	0	0	62	0	0
DO NOT LEND:	0	0	0	0	0
Very Low:	0	0	2	0	20

Neural Net.learning\_rate = 0.8

Neural Net.training\_cycles = 90

[5]

Name	Type	Missing	Statistics			Filter (15 / 15 attributes): <input type="text" value="Search for Attributes"/>
Applicant_ID	Integer	0	Min 98765	Max 987654	Average 363823.250	
prediction(Credit_Risk)	Polynomial	0	Least Very Low (0)	Most Moderate (11)	Values Moderate (11), Low (7), ...[3 more]	
confidence(Moderate)	Real	0	Min 0.000	Max 0.969	Average 0.505	
confidence(High)	Real	0	Min 0.000	Max 0.945	Average 0.121	
confidence(Low)	Real	0	Min 0.000	Max 1.000	Average 0.369	
confidence(DO NOT LEND)	Real	0	Min 0.000	Max 0.043	Average 0.005	
confidence(Very Low)	Real	0	Min 0.000	Max 0.002	Average 0.000	
Credit_Score	Integer	0	Min 321	Max 908	Average 641.650	
Late_Payments	Integer	0	Min 1	Max 15	Average 5.900	
			Min	Max	Average	

Showing attributes 1 - 15

Example 28: Credit Attributes: 7, Gender Attributes:

Row No.	Applicant_ID	prediction(C...	confidence(...	confidence(...	confidence(...	confidence(...	confidence(...	Credit_Score	Late_Payme...	Months_In_...	Debt_Incom...	Loan_Amt	Liquid_Asse...
1	123456	High	0.011	0.945	0.000	0.043	0.002	400	5	29	3.414	103519	2696
2	234567	Moderate	0.961	0.036	0.000	0.002	0.000	500	5	29	3.414	103519	2696
3	345678	Moderate	0.962	0.036	0.000	0.002	0.000	600	5	29	3.414	103519	2696
4	456789	Moderate	0.858	0.003	0.138	0.001	0.000	700	5	29	3.414	103519	2696
5	456780	Low	0.000	0.000	1.000	0.000	0.000	800	5	29	3.414	103519	2696
6	567890	Low	0.000	0.000	1.000	0.000	0.000	900	5	29	3.414	103519	2696
7	98765	Moderate	0.962	0.036	0.000	0.002	0.000	700	10	17	7.618	141109	2126
8	987654	Moderate	0.969	0.005	0.025	0.001	0.000	800	10	17	7.618	141109	2126
9	876543	Low	0.000	0.000	1.000	0.000	0.000	900	10	17	7.618	141109	2126
10	765432	Moderate	0.721	0.273	0.000	0.005	0.001	456	4	5	3.471	283847	6389
11	654321	Low	0.000	0.000	1.000	0.000	0.000	678	1	60	0.090	276408	9044
12	134579	High	0.011	0.945	0.000	0.043	0.002	321	7	10	3.064	185903	7248
13	124567	Moderate	0.962	0.036	0.000	0.002	0.000	456	2	14	2.219	267418	5922
14	126789	Moderate	0.963	0.035	0.000	0.002	0.000	789	15	15	9.147	151388	2675
15	127869	Low	0.000	0.000	1.000	0.000	0.000	908	15	5	5.927	122848	2717
16	345216	Low	0.000	0.000	1.000	0.000	0.000	783	5	5	2.502	143333	4691
17	348907	Moderate	0.962	0.036	0.000	0.002	0.000	356	1	27	1.010	225889	18787
18	167083	Moderate	0.788	0.002	0.208	0.001	0.000	689	3	19	4.956	176578	2195
19	154327	Moderate	0.962	0.036	0.000	0.002	0.000	341	2	54	1.970	323732	9578
20	179253	Low	0.000	0.000	1.000	0.000	0.000	756	3	40	2.270	289792	5763

It gave more assuring answers as some moderates became high and some moderates became low, also a lot of the risks changed in the prediction and the most surprising is the last entry as it went from high to low.