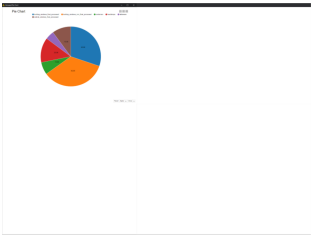**MACHINE LEARNING LABORATORY**
LAB – 03 – KNIME TOOL

Various algorithm using Knime tool:-
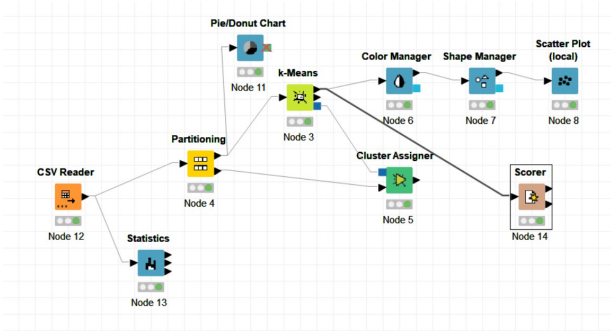
Dataset – [Index of /ml/machine-learning-databases/glass (uci.edu)](#)

Statistics:-

Column	Min	Mean	Median	Max	Std. Dev.	Skewness	Kurtosis	No. Missing	No. +∞	No. -∞	Histogram
RI	1.5111	1.5184	?	1.5339	0.003	1.6254	4.9317	0	0	0	
Na	10.73	13.4079	?	17.38	0.8166	0.4542	3.0522	0	0	0	
Mg	0.0	2.6845	?	4.49	1.4424	-1.1326	-0.4103	0	0	0	
Al	0.29	1.4449	?	3.5	0.4993	0.9073	2.0806	0	0	0	
Si	69.81	72.6509	?	75.41	0.7741	-0.7304	2.9679	0	0	0	
K	0.0	0.4971	?	6.21	0.6522	8.5518	54.8897	0	0	0	
Ca	5.43	8.957	?	16.19	1.4232	2.0471	6.682	0	0	0	
Ba	0.0	0.175	?	3.15	0.4972	3.4164	12.3411	0	0	0	
Fe	0.0	0.057	?	0.51	0.0974	1.7343	2.682	0	0	0	

1. **Clustering algorithm (K-means) :-**

Cluster assigner (some rows are shown):-

Console Node Monitor

Node: Cluster Assigner (5:5)

State: EXECUTED

Port Output Port 0   Load data   Rows: 65, Columns: 11

ID	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Type	Cluster
2	1.51761	13.89	3.6	1.36	72.73	0.48	7.83	0.0	0.0	building_windows_float_processed	cluster_1
3	1.51618	13.53	3.55	1.54	72.99	0.39	7.78	0.0	0.0	building_windows_float_processed	cluster_1
9	1.51918	14.04	3.58	1.37	72.08	0.56	8.3	0.0	0.0	building_windows_float_processed	cluster_1
13	1.51589	12.88	3.43	1.4	73.28	0.69	8.05	0.0	0.24	building_windows_float_processed	cluster_1
15	1.51763	12.61	3.59	1.31	73.29	0.58	8.5	0.0	0.0	building_windows_float_processed	cluster_1
17	1.51784	12.68	3.67	1.16	73.11	0.61	8.7	0.0	0.0	building_windows_float_processed	cluster_1
18	1.52196	14.36	3.85	0.89	71.36	0.15	9.15	0.0	0.0	building_windows_float_processed	cluster_1
25	1.5172	13.38	3.5	1.15	72.85	0.5	8.43	0.0	0.0	building_windows_float_processed	cluster_1

ID	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Type	Cluster
165	1.51915	12.73	1.85	1.86	72.69	0.6	10...	0.0	0.0	containers	cluster_1
167	1.52151	11.03	1.71	1.56	73.44	0.58	11...	0.0	0.0	containers	cluster_0
174	1.52043	13.38	0.0	1.4	72.25	0.33	12.5	0.0	0.0	containers	cluster_0
183	1.51916	14.15	0.0	2.09	72.74	0.0	10...	0.0	0.0	tableware	cluster_0
184	1.51969	14.56	0.0	0.56	73.48	0.0	11...	0.0	0.0	tableware	cluster_0
186	1.51131	13.69	3.2	1.81	72.81	1.76	5.43	1.19	0.0	headlamps	cluster_1
187	1.51838	14.32	3.26	2.22	71.25	1.46	5.79	1.63	0.0	headlamps	cluster_1
188	1.52315	13.44	3.34	1.23	72.38	0.6	8.83	0.0	0.0	headlamps	cluster_1
190	1.52365	15.79	1.83	1.31	70.43	0.31	8.61	1.68	0.0	headlamps	cluster_2
191	1.51613	13.88	1.78	1.79	73.1	0.0	8.67	0.76	0.0	headlamps	cluster_2
196	1.51545	14.14	0.0	2.68	73.39	0.08	9.07	0.61	0.05	headlamps	cluster_2
210	1.51623	14.14	0.0	2.88	72.61	0.08	9.18	1.06	0.0	headlamps	cluster_2
211	1.51685	14.92	0.0	1.99	73.06	0.0	8.4	1.59	0.0	headlamps	cluster_2

Clustering output

ID	cluster_0	cluster_1	cluster_2
building_windows_float_processed	0	45	0
building_windows_non_float_processed	10	42	0
vehicle_windows_float_processed	0	15	0
containers	5	2	3
tableware	0	4	3
headlamps	0	1	19

Node: Scorer (5:14)
State: EXECUTED
Port Output: Port 0   Load data   Rows: 9, Columns: 9

Scatter Plot:-
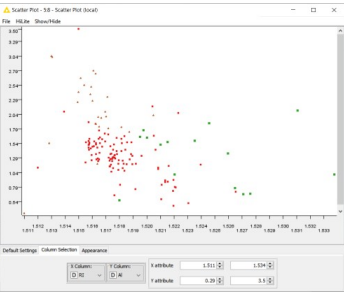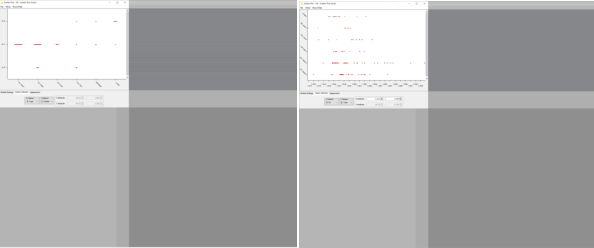
2. Classification Algorithms (Decision tree)
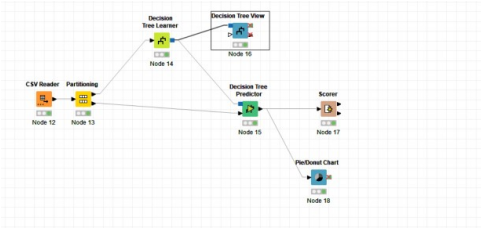
Desision tree view:-
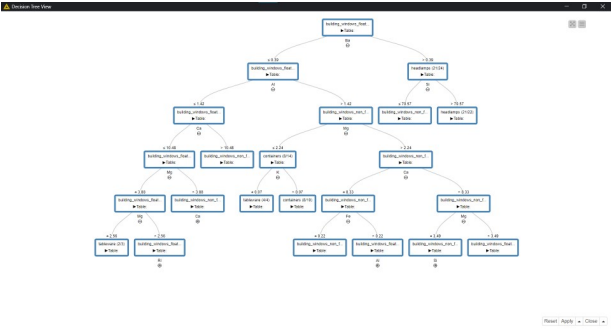
Prediction value:-

ID	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Type	Prediction (Type)
64	1.52227	14.17	3.81	0.78	71.35	0.0	9.69	0.0	0.0	building_windows_float_processed	building_windows_float_processed
72	1.51848	13.64	3.87	1.27	71.96	0.54	8.32	0.0	0.32	building_windows_non_float_processed	building_windows_non_float_processed
73	1.51593	13.09	3.59	1.52	73.1	0.67	7.83	0.0	0.0	building_windows_non_float_processed	building_windows_non_float_processed
75	1.51596	13.02	3.56	1.54	73.11	0.72	7.9	0.0	0.0	building_windows_non_float_processed	building_windows_non_float_processed
76	1.5159	13.02	3.58	1.51	73.12	0.69	7.96	0.0	0.0	building_windows_non_float_processed	building_windows_non_float_processed
79	1.51613	13.92	3.52	1.25	72.88	0.37	7.94	0.0	0.14	building_windows_non_float_processed	vehicle_windows_float_processed
82	1.51593	13.25	3.45	1.43	73.17	0.61	7.86	0.0	0.0	building_windows_non_float_processed	building_windows_non_float_processed
83	1.51646	13.41	3.55	1.25	72.81	0.68	8.1	0.0	0.0	building_windows_non_float_processed	vehicle_windows_float_processed
88	1.51645	13.4	3.49	1.52	72.65	0.67	8.08	0.0	0.1	building_windows_non_float_processed	building_windows_non_float_processed

Confusion matrix:-

Prediction (Type) \ Type	building_windows_float_processed	building_windows_non_float_processed	vehicle_windows_float_processed	containers	headlamps	tableware
building_windows_float_processed	7	2	1	0	0	0
building_windows_non_float_pro...	0	12	0	1	1	3
vehicle_windows_float_processed	0	3	4	0	0	0
containers	0	1	0	3	1	0
headlamps	0	0	0	0	4	0
tableware	0	0	0	0	0	0

Correct classified: 30   Wrong classified: 13

Accuracy: 69.767 %   Error: 30.233 %

Cohen's kappa (κ) 0.599

Prediction pie chart vs normal pie chart:-
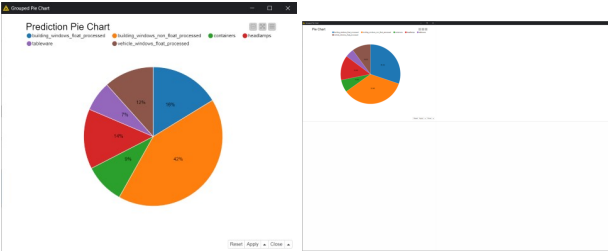
3. Logistic Regression
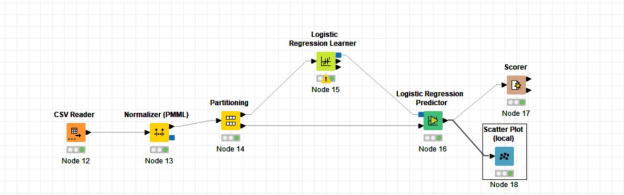
Confusion matrix:-

Confusion Matrix - 7:17 - Scorer

File Hilite

Type \Pre...	building_windows_float_processed	building_windows_non_float_processed	vehicle_windows_float_processed	containers	tableware	headlamps
building_win...	10	5	1	0	0	0
building_win...	4	17	0	0	0	1
vehicle_win...	3	1	0	0	0	0
containers	0	1	0	2	0	1
tableware	0	0	0	0	1	0
headlamps	0	1	0	0	0	6

Correct classified: 36	Wrong classified: 18
Accuracy: 66.667 %	Error: 33.333 %
Cohen's kappa (κ) 0.52	

Normalized output:-

Console / Node Monitor

Node: Normalizer (PMML) (7:13)

State: EXECUTED

Port Output Port 0   Load data   Rows: 214, Columns: 10

ID	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Type
1	0.8708258...	0.28428670...	1.251703737...	-0.6908221...	-1.12444555935...	-0.670134221...	-0.145425366...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed
2	-0.248750...	0.59045281...	0.634679915...	-0.1709614...	0.102079723490...	-0.026151928...	-0.791877072...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed
3	-0.719030...	0.14958241...	0.600015656...	0.19046512...	0.437760327216...	-0.164148134...	-0.027010317...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed
4	-0.232285...	-0.24228846...	0.697075583...	-0.3102662...	-0.05284978592...	0.1118442766...	-0.517837761...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed
5	-0.311314...	-0.1688095...	0.648545619...	-0.4104125...	0.553957459275...	0.0811784512...	-0.623237496...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed
6	-0.762073...	-0.7566100...	0.641612767...	0.35069918...	0.411938742314...	0.2191746588...	-0.623237496...	-0.352051384254744	2.08326520037323 4	building_windows_float_processed
7	-0.308021...	-0.1320720...	0.634679915...	-0.6107051...	0.566868251726...	0.1271771684...	-0.552971606...	-0.352051384254744	-0.585079084819370 7	building_windows_float_processed

Pie chart:-

Pie Chart - 7:19 - Interactive Pie chart (local)

File HiLite

building_windows_float_processed: Row count 33.75 %
building_windows_non_float_processed: Row count 33.75 %
vehicle_windows_float_processed: Row count 8.12 %
tableware: Row count 5 %
containers: Row count 5.62 %
headlamps: Row count 13.75 %

Default Settings Column/Aggregation settings Visualization settings Details

Mouse Mode Selection   Fit to size   Background Color   ☐ Use anti-aliasing