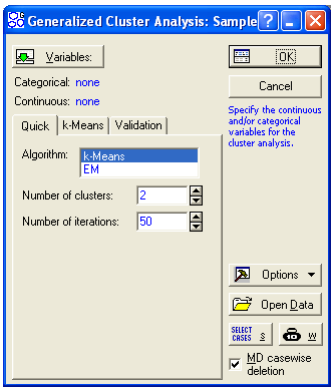
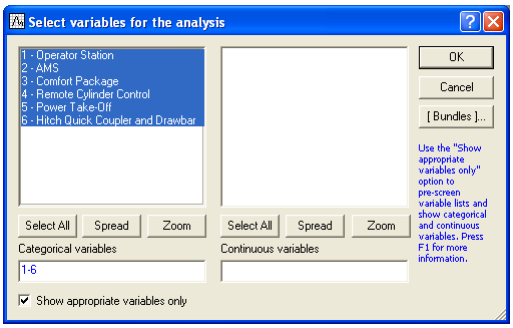
Outline

- Clustering
- Association rules
- Graphic user interface

Clustering

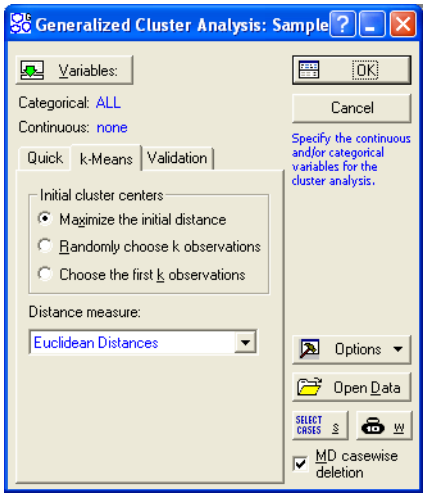
- Select k-Means and choose the variables





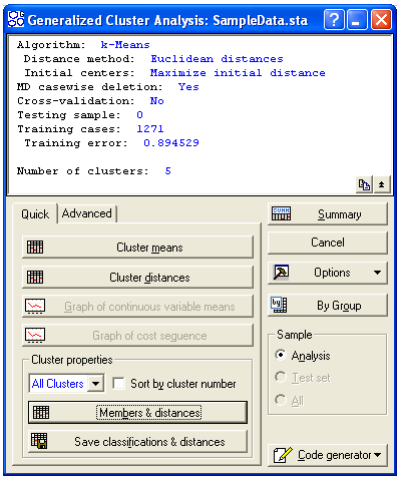
Clustering

- Choose the distance metrics and initial cluster centers



Clustering

- 5 clusters and see the results



Clustering

- Centroids (cluster means)

Centroids for k-means clustering (SampleData.sta)
Number of clusters: 5
Total number of training cases: 1271

Cluster	Operator Station	AMS	Comfort Package	Remote Cylinder Control	Power Take-Off	Hitch Quick Coupler and Drawbar	Number of cases	Percentage(%)
1	991	1005	1210	2400	2410	2530	386	30.36979
2	989	1005	1200	2400	2410	2530	420	33.04485
3	991	1005	1200	2400	2410	2530	150	11.80173
4	986	1005	1200	2300	2410	2530	152	11.95909
5	989	1005	1200	2300	2420	2530	163	12.82455

Clustering

- Members and their distance to the centroids

Cluster members (SampleData.sta)
Number of clusters: 5
Total number of training cases: 1271

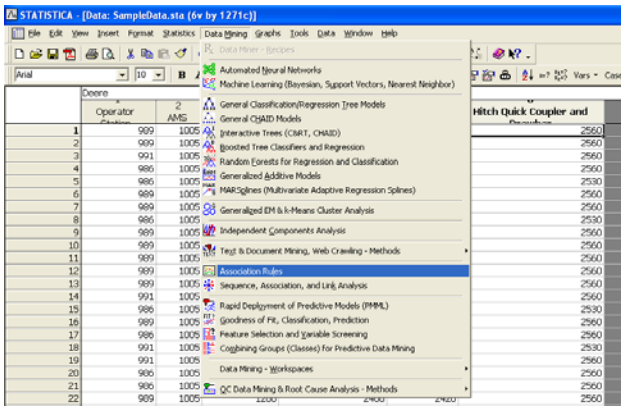
Case No.	Final classification	Operator Station	AMS	Comfort Package	Remote Cylinder Control	Power Take-Off	Hitch Quick Coupler and Drawbar	Distance to centroid
67	3	991	1005	1200	2400	2410	2560	1.000000
68	2	989	1005	1200	2400	2410	2560	1.000000
69	2	989	1005	1200	2400	2410	2560	1.000000
70	2	989	1005	1200	2400	2410	2560	1.000000
71	2	989	1005	1200	2400	2410	2560	1.000000
72	2	989	1005	1200	2400	2410	2560	1.000000
73	2	989	1005	1200	2300	2410	2530	1.000000
74	2	989	1005	1200	2300	2410	2530	1.000000
75	2	989	1005	1200	2400	2410	2560	1.000000
76	5	989	1005	1200	2300	2420	2530	0.000000
77	5	989	1005	1200	2300	2420	2530	0.000000
78	2	989	1005	1200	2400	2410	2560	1.000000
79	2	989	1005	1200	2400	2420	2560	1.414214
80	2	989	1005	1200	2400	2410	2530	0.000000
81	2	989	1005	1200	2400	2410	2560	1.000000

Centroids for k-means clustering (SampleData.sta) | Cluster members (SampleData.sta)

SampleData.sl | C1,V1 | 1 | CAP | NUM

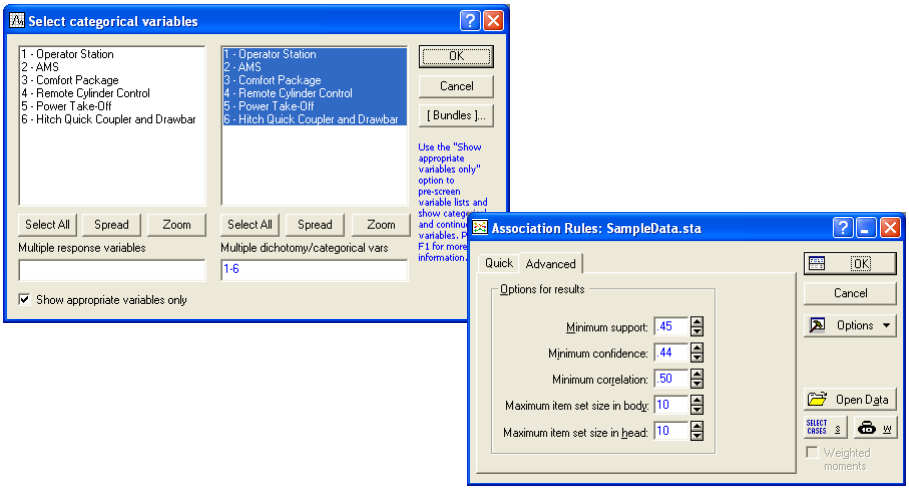
Association rules

- Use the Deere data set



Association rules

- Select variables and set up proper parameters



Association rules

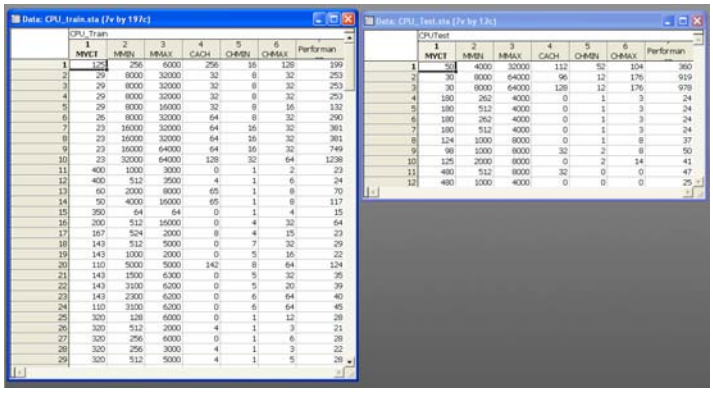
- See rules

Summary of association rules (SampleData.sta)
Min. support = 40.0%, Min. confidence = 44.0%, Min. correlation = 50.0%
Max. size of body = 10, Max. size of head = 10

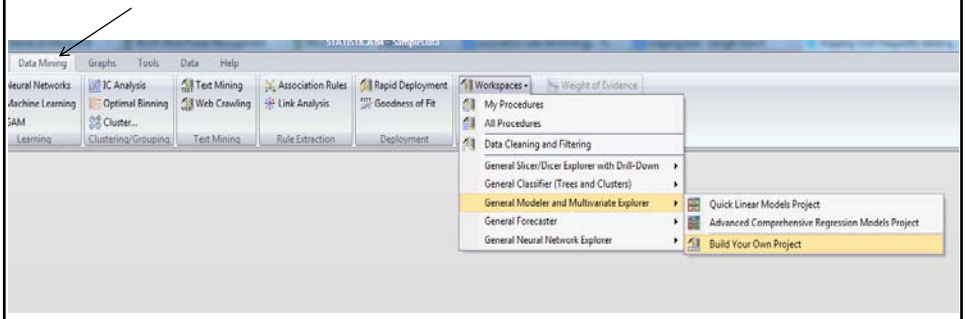
	Body	==>	Head	Support(%)	Confidence(%)	Correlation(%)
1	Comfort Package == 1200	==>	Power Take-Off == 2410	46.57750	69.81132	72.05552
2	Comfort Package == 1200	==>	Hitch Quick Coupler and Drawbar == 2530	44.92526	67.33491	67.93846
3	Remote Cylinder Control == 2300	==>	Hitch Quick Coupler and Drawbar == 2530	42.64359	83.00153	73.48864
4	Power Take-Off == 2410	==>	Comfort Package == 1200	46.57750	74.37186	72.05552
5	Hitch Quick Coupler and Drawbar == 2530	==>	Comfort Package == 1200	44.92526	68.54742	67.93846
6	Hitch Quick Coupler and Drawbar == 2530	==>	Remote Cylinder Control == 2300	42.64359	65.06603	73.48864

Graphic User Interface

- Divide CPU data into training and testing data set

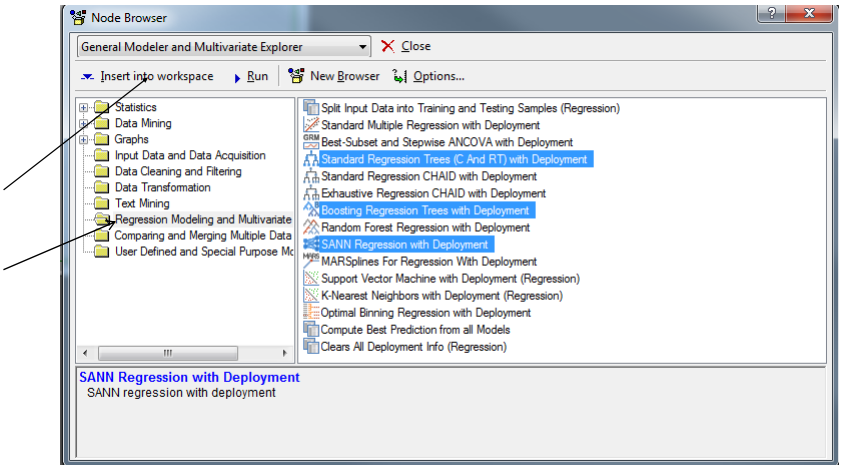


Graphic User Interface



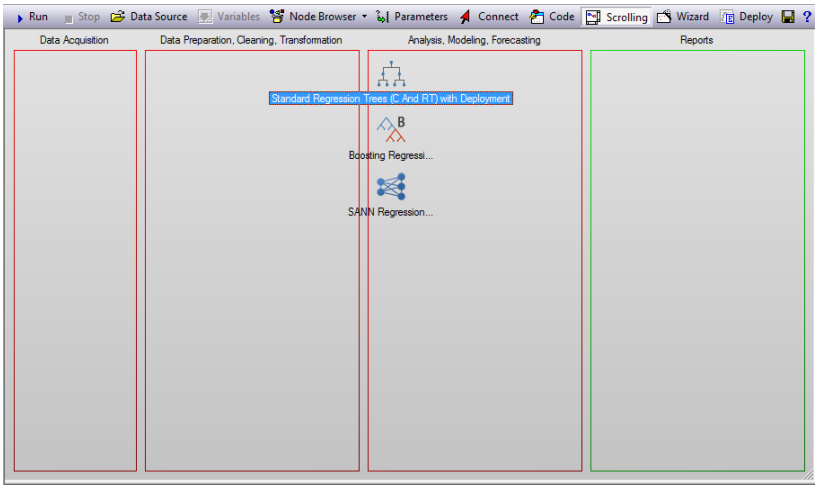
Graphic User Interface

- Choose different algorithms



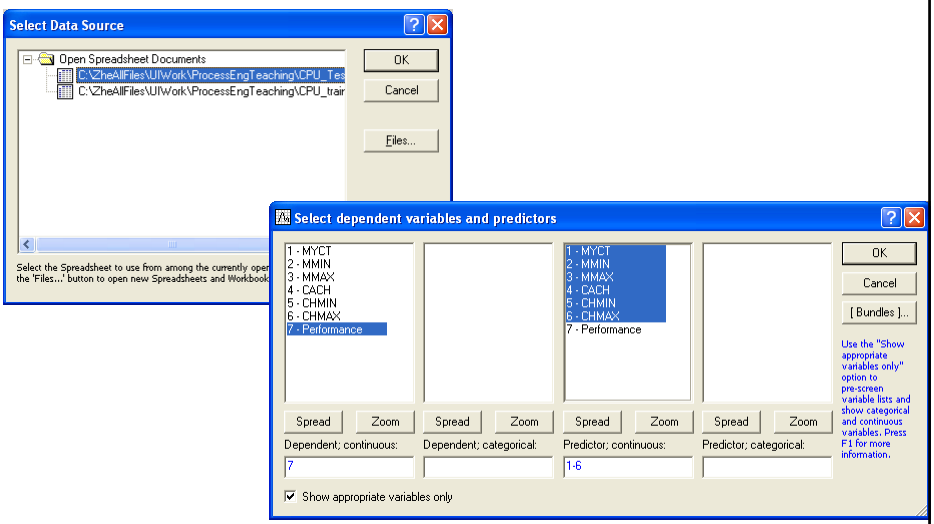
Graphic User Interface

- Insert the selected data mining algorithms into workspace



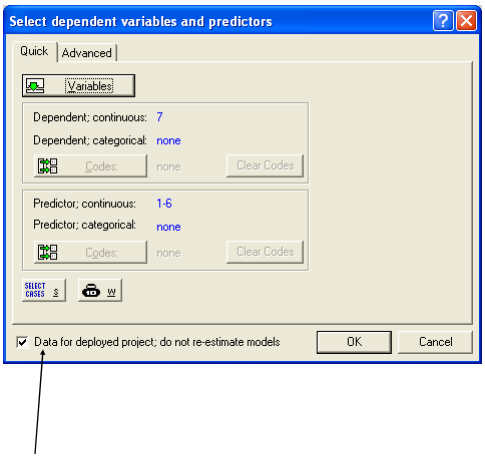
Graphic User Interface

- Select data sources



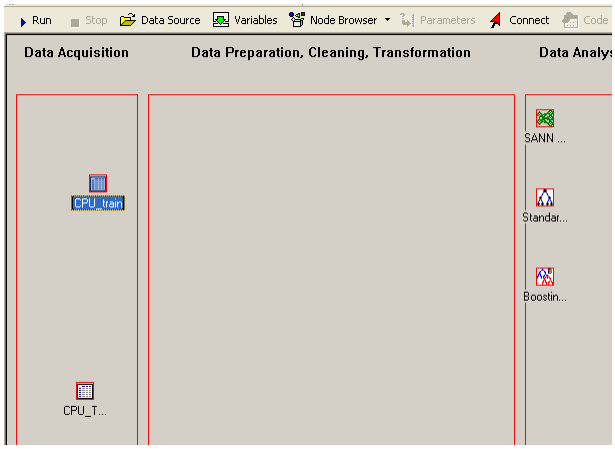
Graphic User Interface

- Specify whether the data is used to build the model or used as a testing set



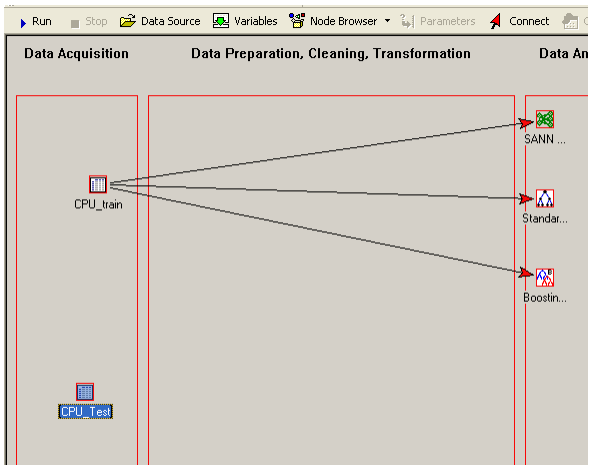
Graphic User Interface

- Connect the data with data mining algorithms



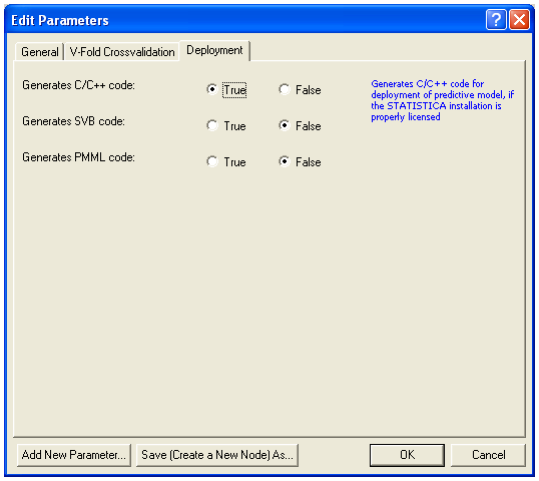
Graphic User Interface

- Connect the data with data mining algorithms



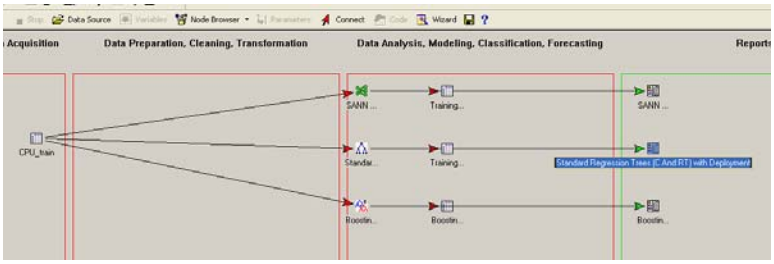
Graphic User Interface

- Set up deployment, double click the data mining algorithm icon



Graphic User Interface

- Click “Run” button



Graphic User Interface

- See the deployment code by double click the icons in “Reports” section

C code

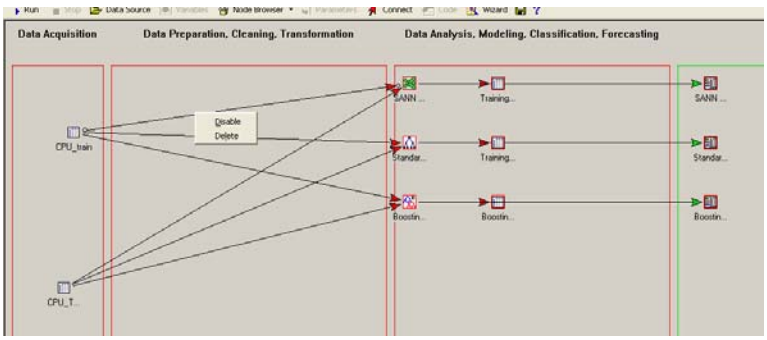
```
double ret;
if( Rnr[3] <= 2.8000000000000e+004 ) {
        if( Rnr[4] <= 2.7000000000000e+001 ) {
                if( Rnr[3] <= 1.0000000000000e+004 ) {
                        if( Rnr[3] <= 5.5000000000000e+003 ) {
                                if( Rnr[3] <= 3.7500000000000e+003 ) {
                                        if( Rnr[3] <= 1.7500000000000e+003 ) {
                                                if( Rnr[2] <= 1.4400000000000e+002 ) {
                                                        ret = 1.5000000000000e+001;
                                                }
                                                else {
                                                        if( Rnr[1] <= 2.7000000000000e+002
) {
                                                                ret = 1.8750000000000e+
001;
                                                        }
                                                        else {
                                                                if( Rnr[6] <=
1.5000000000000e+000 ) {
                                                                        ret =
1.8000000000000e+001;
                                                                }
                                                                else {
                                                                        ret =
1.7666666666667e+001;
                                                                }
                                                        }
                                                }
                                        }
                                        else {
                                                if( Rnr[3] <= 2.5000000000000e+003 ) {
                                                        if( Rnr[4] <= 6.0000000000000e+000
) {
                                                                if( Rnr[2] <=
8.8400000000000e+002 ) {
                                                                        if( Rnr[4] <=
3.0000000000000e+000 ) {
```

Graphic User Interface

- Test the learnt models by testing data set
- First disable the connections between training data set and the data mining algorithms
- Connect the testing data set with the data mining algorithms

Graphic User Interface

- Test the learnt models



Graphic User Interface

- See the prediction results