

Analysis on Fragile States

**Data- Department of Computer
Science**

**University of North Carolina at
Charlotte,NC.**

Instructor Dr.Zbigniew W. Ras

By:

Md Hussain Musthaq - #801155825

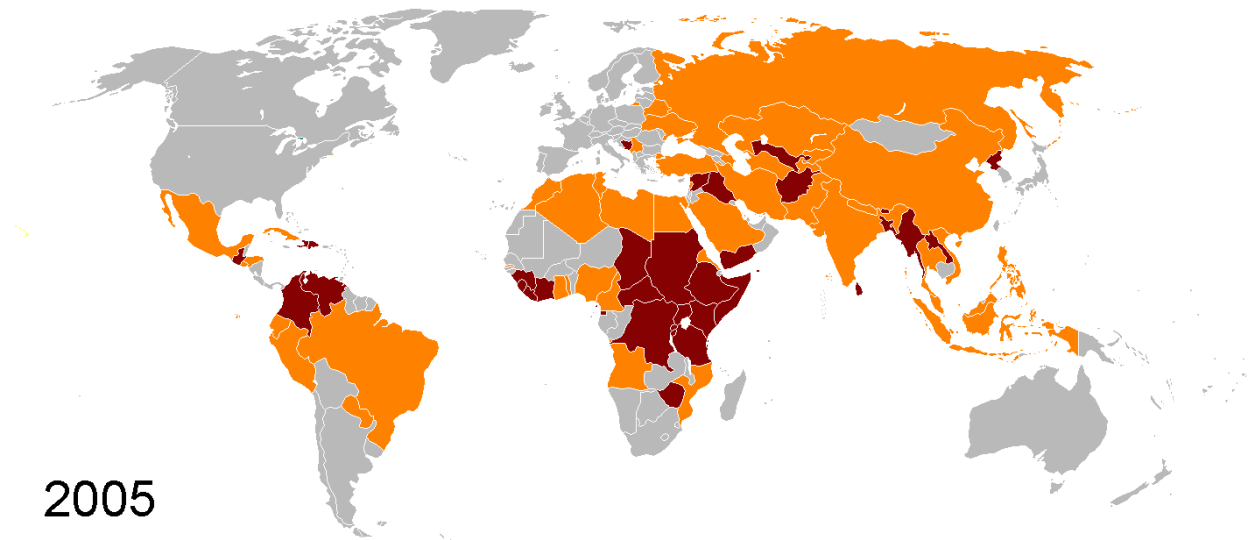
Gokul Mani - #801133944

Vaishali Krishnamurthy - #801077752

I. Introduction:

The thought process of this venture is to perform Action-Rule digging for given Fragile State Index Datasets with new stretched out highlights added to the informational index and further dissect how the activity rules change throughout the years. Utilizing activity rules, we survey how a Country can move from the province of Alert to Stable State. This report additionally talks about the significance of each quality in informational index and how they are answerable for choosing the state for the nation. Discretization and Classification of information is additionally accomplished for additional investigation.

II. Fragile State Index



The Fragile States Index (FSI) is a yearly positioning of 178 nations dependent on the various weights they face that sway their degrees of delicacy. The Index depends on The Fund for Peace's exclusive Conflict Assessment System Tool (CAST) expository methodology. In view of thorough sociology approach, three essential floods of information quantitative, subjective, and master approval - are triangulated and exposed to basic audit to acquire last scores for the FSI. A large number of archives are investigated each year, and by applying profoundly particular hunt parameters, scores are allotted for each nation dependent on twelve key political, social and monetary pointers and more than 100 sub-markers that are the aftereffect of long stretches of master sociology inquire about.

The FSI is the entirety of scores of twelve particular highlights (to be specific, Demographic weights, Refugees and IDPs, Group Grievance, Human Flight, Uneven Development,

Neediness and Economic Decline, State Legitimacy, Public Services, Human Rights, Security Apparatus, Factionalized Elites, External Intervention) demonstrative of state's soundness. These highlights are extensively classified into social, monetary and political gatherings. Each element has its worth characterized inside the range of 0 and 10, with a higher worth showing a higher

level of delicacy, in this manner making a scale going 0–120. Every one of these highlights is clarified beneath:

III. Data Set:

a) Dataset Features:

- **Social Indicators**

1. Demographic Pressures (DP): Characterized by the overall proportion of high populace thickness and other life sustaining assets like nourishment, water and so forth.
2. Refugees and IDP: Characterized by the movement of all-inclusive community that can influence security and different assets.
3. Group Grievance: Characterized by the current viciousness between networks that can compromise the nation's security.
4. Human Flight: Characterized by relocation per capita particularly migration of instructed individuals who moves out of nations for better chance.

- **Economic Indicators**

5. Poverty and Economic Decline: Characterized by the monetary decay of the general public all in all that consequently influences the nation's capacity to give better result.
6. Uneven Development: Characterized by the imbalance in various classifications like work, instruction, monetary that sway contrarily on the implicit understanding of a nation.

- **Political Indicators**

7. State Legitimacy: Characterized by the defilement in the more significant level of a state's locale.
8. Public Services: Characterized by the absence of significant administrations like medicinal services, instruction, tidiness, transportation that influences the exhibition of a state.
9. Human Rights: Characterized by the frail assurance of fundamental rights demonstrates the disappointment of a state to play out its essential duty.
10. Security Apparatus: A rise of first class or praetorian monitors that work without risk of punishment challenges the security mechanical assembly's imposing business model on the utilization of power, 4 debilitating the implicit understanding. Estimations incorporate inward clash, riots/fights, military overthrows, rebel action.

11. Factionalized Elites: Measured by power input from elite groups and corrupted elections.

12. External Intervention: Estimated by outside help, nearness of peacekeepers or UN missions, remote military mediation, authorizes, and FICO assessments.

b) Extended Data

13. Literacy Rate Adult: This feature counts the literacy rate among the adults in the given country.

14. Export and Imports: This feature allows to monitor the exports and imports done by the country with outer states.

15. Foreign Direct Investment Net inflows: Here we are defining net investment on a country. The range is defined between 0-100

16. Life Expectancy at Birth: The mortality rate of the infants is taken in account here. i.e. Probability of infant that dies within one year of birth. Which is expressed as thousand live births.

17. Unemployment Total: This feature tracks the unemployment factor in the country.

18. Life Expectancy Index: Number of years a newborn infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth.

c) Data Extraction

The values for these extended features have been extracted from various websites and added to the original FSI dataset. The data from the year 2010 is compiled and stored as an Excel sheet for further processing & analysis.

Values for the extended features were gathered from various websites which are listed below:

- <http://hdr.undp.org/en/>
- <https://data.worldbank.org/>

IV. Data Cleaning and Preprocessing

The data obtained from the FSI website was not clean and hence some pre-processing was done before using it for classification. Following were the steps taken for Data Cleaning.

1. Special Characters like !,% etc. were removed so that the sheets can be parsed by WEKA tool.
2. Missing numeric values were filled by their mean values.
3. Outliers were removed and replaced by mean values.
4. Rows having lot of empty values were removed from the analysis.
5. Converting each numeric column value in the range of 0 to 10.
6. Numeric values of Decision Variable Total were replaced by Nominal Values based on the following table values.

DISCRETIZATION:

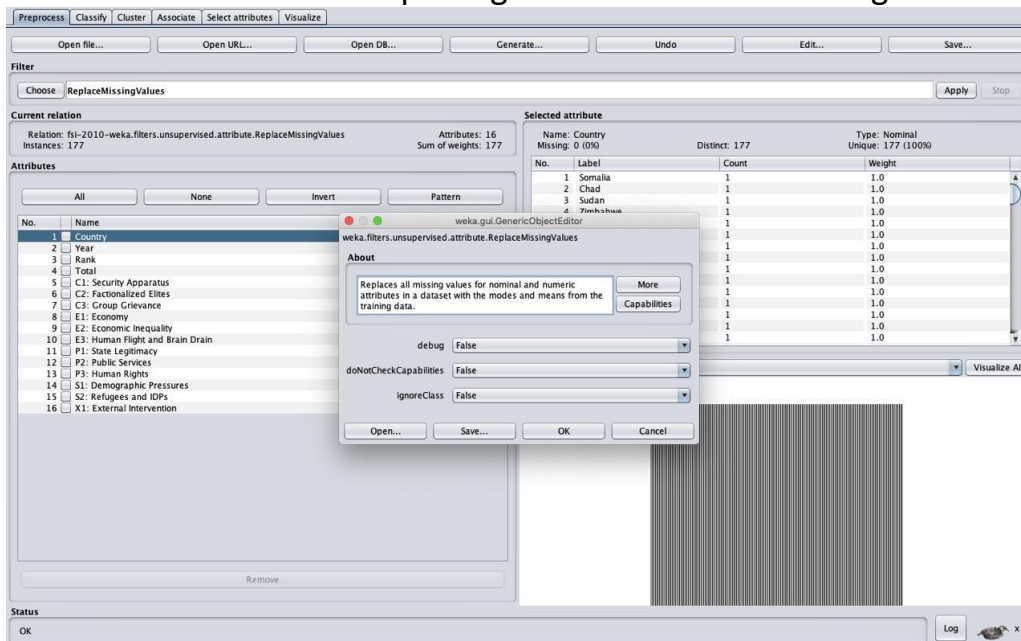
Discretization refers to the process of converting or partitioning continuous attributes, features or variables to discretized or nominal attributes/features/variables. The decision attribute TOTAL has various values throughout the dataset, we have used discretization to replace numeric values of TOTAL by the following concepts.

1. Alert (union of Very High Alert, High Alert, Alert)
2. Warning (union of High Warning, Elevated Warning, Warning).
3. Stable (union of Stable, More Stable, Very Stable).
4. Sustainable (union of Sustainable, Very Sustainable).

Year-2010

Missing Values:

Filter- Replacing Missing Values



OUTLIERREMOVAL: Filter-InterQuartileRange

Preprocess | Classify | Cluster | Associate | Select attributes | Visualize

Open file... Open URL... Open DB... Generate... Undo Edit... Save...

Filter: Choose InterQuartileRange -R first-last -O 3.0 -E 6.0 Apply Stop

Current relation: Relation: fs1-2010-weka.filters.unsupervised.attribute.ReplaceMissingValues
Instances: 177
Attributes: 16
Name: Total
Sum of weights: 177
Missing: 0 (0%)
weka.gui.GenericObjectEditor

Selected attribute: Name: Total
Distinct: 157
Type: Numeric
Unique: 138 (78%)

Attributes: All None Invert

No. Name

- 1 Country
- 2 Year
- 3 Rank
- 4 Total
- 5 C1: Security Apparatus
- 6 C2: Factionalized Elites
- 7 C3: Group Grievance
- 8 E1: Economy
- 9 E2: Economic Inequality
- 10 E3: Human Flight and Brain Drain
- 11 P1: State Legitimacy
- 12 P2: Public Services
- 13 P3: Human Rights
- 14 S1: Demographic Pressures
- 15 S2: Refugees and IDPs
- 16 X1: External Intervention

Remove

Status: OK

weka.filters.unsupervised.attribute.InterQuartileRange

About: A filter for detecting outliers and extreme values based on interquartile ranges.

More Capabilities

attributeIndices: first-last

debug: False

detectionPerAttribute: False

doNotCheckCapabilities: False

extremeValuesAsOutliers: False

extremeValuesFactor: 6.0

outlierFactor: 3.0

outputOffsetMultiplier: False

Open... Save... OK Cancel

Visualize All

18.7 16 17 66.5 114.3

11 16 17 18 11

Log x 0

DISCRETIZATION FILTER -DISCRETIZE

Preprocess | Classify | Cluster | Associate | Select attributes | Visualize

Open file... Open URL... Open DB... Generate... Undo Edit... Save...

Filter: Choose Discretize -B 4 -M -1.0 -R 4-4 -precision 6 Apply Stop

Current relation: Relation: fs1-2010-weka.filters.unsupervised.attribute.ReplaceMissingValues-weka.filter...
Instances: 177
Attributes: 16
Sum of weights: 177

Selected attribute: Name: Total
Missing: 0 (0%)
Distinct: 4
Type: Nominal
Unique: 0 (0%)

Attributes: All None Invert Pattern

No. Name

- 1 Country
- 2 Year
- 3 Rank
- 4 Total
- 5 C1: Security Apparatus
- 6 C2: Factionalized Elites
- 7 C3: Group Grievance
- 8 E1: Economy
- 9 E2: Economic Inequality
- 10 E3: Human Flight and Brain Drain
- 11 P1: State Legitimacy
- 12 P2: Public Services
- 13 P3: Human Rights
- 14 S1: Demographic Pressures
- 15 S2: Refugees and IDPs
- 16 X1: External Intervention

Remove

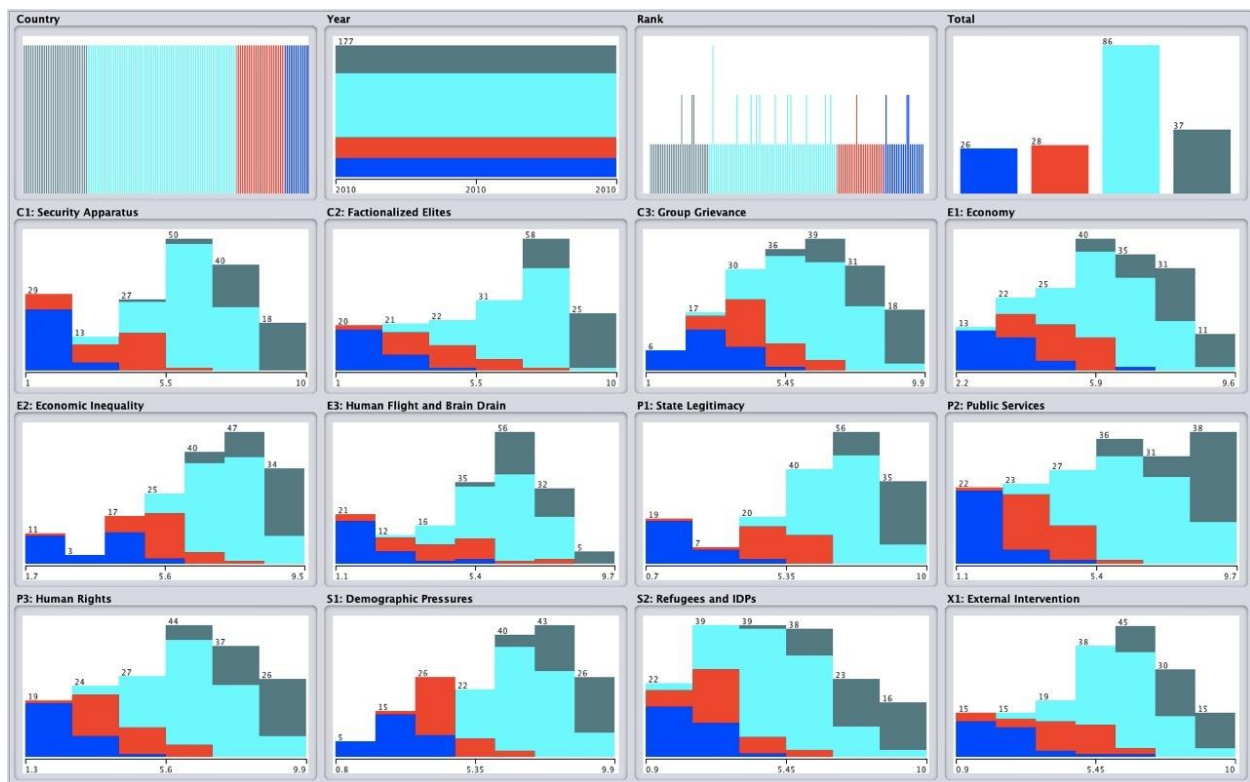
Status: OK

Class: Total (Nom)

Visualize All

26 28 86 37

Log x 0



Final Save to CSV

Preprocess | Classify | Cluster | Associate | Select attributes | Visualize

Open file... | Open URL... | Open DB... | Generate... | Undo | Edit... | Save...

Filter: Choose Discretize -B 4 -M -1.0 -R 4-4 -precision 6 Apply Stop

Current relation: fsi-2010-weka.filters.unsupervised.attribute Instances: 177

Selected attribute: Save

Attributes:

No.	Name
1	Country
2	Year
3	Rank
4	Total
5	C1: Security Apparatus
6	C2: Factionalized Elites
7	C3: Group Grievance
8	E1: Economy
9	E2: Economic Inequality
10	E3: Human Flight and Brain Drain
11	P1: State Legitimacy
12	P2: Public Services
13	P3: Human Rights
14	S1: Demographic Pressures
15	S2: Refugees and IDPs
16	X1: External Intervention

Look in: KDD

2010-fsi

File Name: 2010-fsi.arff

Files of Type: CSV file: comma separated files (*.csv)

Save Cancel

Status: OK Log x 0

V Classification

For Classification, we have utilized the accompanying classifiers. Every classifier is run for the dataset year 2010. Also, we have calculated the accuracy for classifier for the datasets before adding the extra-features and after adding the extra-features to compare the efficiency of both types of datasets. Following are the Algorithms used for Classification:

1) Naïve Bayes: Class for a Naive Bayes classifier using estimator classes. Numeric estimator precision values are chosen based on analysis of the training data. For this reason, the classifier is not an Updateable Classifier (which in typical usage are initialized with zero training instances) -- if you need the Updateable Classifier functionality, use the NaiveBayes Updateable classifier. The NaiveBayes Updateable classifier will use a default precision of 0.1 for numeric attributes when buildClassifier is called with zero training instances.

2) J48: The C4.5 algorithm for building decision trees is implemented in Weka as a classifier called J48. Classifiers, like filters, are organized in a hierarchy: J48 has the full name `weka.classifiers.trees.J48`. 10

3) JRip: 1.1. Grow phase: This class implements a propositional rule learner, Repeated Incremental Pruning to Produce Error Reduction (RIPPER), which was proposed by William W. Cohen as an optimized version of IREP.

The algorithm is briefly described as follows:

Initialize $RS = \{\}$, and for each class from the less prevalent one to the more frequent one, DO:

a). Building stage:

Repeat 1.1 and 1.2 until the description length (DL) of the ruleset and examples is 64 bits greater than the smallest DL met so far, or there are no positive examples, or the error rate $\geq 50\%$.

Grow one rule by greedily adding antecedents (or conditions) to the rule until the rule is perfect (i.e. 100% accurate). The procedure tries every possible value of each attribute and selects the condition with highest information gain: $p(\log(p/t) - \log(P/T))$.

1.2. Prune phase:

Incrementally prune each rule and allow the pruning of any final sequences of the antecedents; The pruning metric is $(p-n)/(p+n)$ -- but it's actually $2p/(p+n) - 1$, so in this implementation we simply use $p/(p+n)$ (actually $(p+1)/(p+n+2)$, thus if $p+n$ is 0, it's 0.5).

b). Optimization stage:

After generating the initial ruleset $\{R_i\}$, generate and prune two variants of each rule R_i from randomized data using procedure 1.1 and 1.2. But one variant is generated from an empty rule while the other is generated by greedily adding antecedents to the original rule. Moreover, the pruning metric used here is $(TP+TN)/(P+N)$. Then the smallest possible DL for 11 each variant and the original rule is computed. The variant with the minimal DL is selected as the final representative of R_i in the ruleset. After all the rules in $\{R_i\}$ have been examined and if there are still residual positives, more rules are generated based on the residual positives using Building Stage again.

c). Delete the rules from the ruleset that would increase the DL of the whole ruleset if it were in it. and add resultant ruleset to RS.

1. Naïve Bayes:

The screenshot shows the Weka Explorer interface with the Naive Bayes classifier selected. The 'Test options' panel on the left shows 'Use training set' selected. The 'Classifier output' panel on the right displays the following results:

```
=== Evaluation on training set ===  
Time taken to test model on training data: 0 seconds  
  
=== Summary ===  
Correctly Classified Instances      176      99.435 %  
Incorrectly Classified Instances      1      0.565 %  
Fappa statistic      0.9916  
Mean absolute error      0.007  
Root mean squared error      0.0494  
Relative absolute error      2.074 %  
Root relative squared error      12.0302 %  
Total Number of Instances      177  
  
=== Detailed Accuracy By Class ===  


|               | TP Rate | FP Rate | Precision | Recall | F-Measure | MCC   | ROC Area | PRC Area | Class       |
|---------------|---------|---------|-----------|--------|-----------|-------|----------|----------|-------------|
|               | 1.000   | 0.007   | 0.974     | 1.000  | 0.987     | 0.983 | 1.000    | 1.000    | Alert       |
|               | 0.988   | 0.000   | 1.000     | 0.988  | 0.994     | 0.989 | 1.000    | 1.000    | Warning     |
|               | 1.000   | 0.000   | 1.000     | 1.000  | 1.000     | 1.000 | 1.000    | 1.000    | Stable      |
|               | 1.000   | 0.000   | 1.000     | 1.000  | 1.000     | 1.000 | 1.000    | 1.000    | Sustainable |
| Weighted Avg. | 0.994   | 0.001   | 0.994     | 0.994  | 0.994     | 0.991 | 1.000    | 1.000    |             |

  
=== Confusion Matrix ===  


|    | a  | b  | c  | d | <-- classified as |
|----|----|----|----|---|-------------------|
| 37 | 0  | 0  | 0  | 0 | a = Alert         |
| 1  | 85 | 0  | 0  | 0 | b = Warning       |
| 0  | 0  | 28 | 0  | 0 | c = Stable        |
| 0  | 0  | 0  | 26 | 0 | d = Sustainable   |


```

The 'Result list' on the left shows a single entry: '01 07 33 - bayes NaiveBayes'. The 'Status' bar at the bottom indicates 'OK'.

2. JRIP

The screenshot shows the Weka Explorer interface with the JRIP classifier selected. The 'Test options' panel on the left shows 'Use training set' selected. The 'Classifier output' panel on the right displays the evaluation results for the JRIP classifier.

Test options:

- Use training set (selected)
- Supplied test set: Set...
- Cross-validation: Folds: 10
- Percentage split: % 66
- More options...

Result list (right-click for options):

- 01:07:33 - bayes.NaiveBayes
- 01:08:36 - rules.JRip (selected)

Classifier output:

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Metric	Value
Correctly Classified Instances	176
Incorrectly Classified Instances	1
Fappa statistic	0.9916
Mean absolute error	0.0054
Root mean squared error	0.0521
Relative absolute error	1.6063 %
Root relative squared error	12.6895 %
Total Number of Instances	177

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	Alert
0.964	0.000	1.000	0.964	0.982	0.978	0.997	0.994	Warning
1.000	0.007	0.963	1.000	0.981	0.978	0.997	0.966	Sustainable
Weighted Avg.	0.994	0.001	0.955	0.994	0.994	0.999	0.992	

=== Confusion Matrix ===

a	b	c	d	<-- classified as
37	0	0	0	a = Alert
0	86	0	0	b = Warning
0	0	27	1	c = Sustainable
0	0	0	26	d = Sustainable

3. JR8

The screenshot shows the Weka Explorer interface with the JR8 classifier selected. The 'Test options' panel on the left shows 'Use training set' selected. The 'Classifier output' panel on the right displays the evaluation results for the JR8 classifier.

Test options:

- Use training set (selected)
- Supplied test set: Set...
- Cross-validation: Folds: 10
- Percentage split: % 66
- More options...

Result list (right-click for options):

- 01:07:33 - bayes.NaiveBayes
- 01:08:36 - rules.JRip
- 01:09:19 - trees.J48 (selected)

Classifier output:

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Metric	Value
Correctly Classified Instances	172
Incorrectly Classified Instances	5
Fappa statistic	0.9583
Mean absolute error	0.0266
Root mean squared error	0.1153
Relative absolute error	7.8712 %
Root relative squared error	28.09 %
Total Number of Instances	177

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1.000	0.014	0.949	1.000	0.974	0.967	0.994	0.957	Alert
0.965	0.011	0.988	0.965	0.976	0.955	0.989	0.984	Warning
0.929	0.007	0.963	0.929	0.945	0.936	0.982	0.946	Sustainable
1.000	0.007	0.963	1.000	0.981	0.978	0.997	0.966	Sustainable
Weighted Avg.	0.972	0.010	0.972	0.972	0.972	0.998	0.970	

=== Confusion Matrix ===

a	b	c	d	<-- classified as
37	0	0	0	a = Alert
2	83	1	0	b = Warning
0	1	26	1	c = Sustainable
0	0	0	26	d = Sustainable

V. Generation of Action Rules using LISP Miner

Attributes:

We have classified our attributes into 3 categories

1. Stable
2. Flexible
3. Decision

Stable Attributes:

1. Country
2. Rank
3. Year

Flexible Attributes:

1. Exports and Imports
2. Security Apparatus
3. Economy
4. State Legitimacy
5. Life Expectancy at Birth
6. Demographic Pressures
7. Unemployment Total

Decision Attributes(Total)

Category

1. Sustainable
2. Stable
3. Warning
4. Alert

Antecedent Stable Part:

We assign all the stable attributes to this set.

Antecedent Variable Part:

We assign all the flexible attributes to this set.

Succedent Variable Part:

We assign the decision variable to this set.

Attribute type = Nominal

Coefficient type = one category

Quantifiers:

A(BASE)Before: 2

A(BASE)After : 2

Action Rules Alert-> Stable

LM final_preprocess MB - USp-Miner Workspace module - 27.18.07

File Data Introduction Preprocessing Interactive Analysis Data-mining Tasks Domain Knowledge Window Help

Tab Tree: A. Data Introduction, B. Data Preprocessing, C. Interactive Analysis, D. Data-mining Tasks (Overview, KDDProject, Task Results, Task Settings), E. Domain knowledge, W. Workspace

Tables Attributes Tasks Overview KDDProject KDDProject

-Data-mining Task basic parameters
Name: KDDProject ID: 1
Comment: -
Taskgroup: Default group of tasks
Task type: Ac4t-Miner Data matrix: final_preprocess Edit

ANTECEDENT STABLE PART		QUANTIFIERS		SUCCEEDENT STABLE PART	
Default Partial Cedent	Con, 0 - 5	Type	Ref. Value Units	Default Partial Cedent	Con, 0 - 5
» Country (subset), 1 - 1	B, pos	a (BASE) Before	>= 2.00 Abs		
» Rank_ (subset), 1 - 1	B, pos	a (BASE) After	>= 2.00 Abs		
» Year_ (subset), 1 - 1	B, pos				
Total length: 0 - 5 [0 - 3]				Total length: 0	

(1) ANTECEDENT VARIABLE PART		CONDITION		(2) SUCCEEDENT VARIABLE PART	
Default Partial Cedent	Con, 1 - 5	Default Partial Cedent	Con, 0 - 5	Default Partial Cedent	Con, 0 - 5
» x_A1_Exports_and_imports_ (subset), 1 - 1	B, pos			» Total (Alert -> Stable)	B, pos
» x_C1_Security_Apparatus_ (subset), 1 - 1	B, pos				
» x_E1_Economy_ (subset), 1 - 1	B, pos				
» x_P1_State_Legitimacy_ (subset), 1 - 1	B, pos				
Total length: 0 - 5 [1 - 5]		Total length: 0		Total length: 0 - 5 [0 - 1]	

-Task parameters
Strict action: States must be represented by the same sets of attributes which differ in coefficients only (the strict meaning of an action)
Sets overlapping: Sets must differ in all rows (i.e. not overlapping sets)
Maximal number of hypotheses: 1000

Params Switch Validate Task Clone
Run Bkgnd Run Grid Run Show Results

Ready Type here to search 1:22 AM 5/1/2020

LM final_preprocess MB - LSP-Miner Workspace module - 27.18.07

File Data Introduction Preprocessing Interactive Analysis Data-mining Tasks Domain Knowledge Window Help

Tab Tree: A. Data Introduction, B. Data Preprocessing, C. Interactive Analysis, D. Data-mining Tasks, E. Domain knowledge, W. Workspace

Task: KDDProject
 Comment:
 Taskgroup: Default group of tasks
 Data matrix: final_preprocess
 Task type: Ac4R-Miner

Task run:
 Start: 1.5.2020 01:22:32 Total time: 0h 0m 37s
 Number of verifications: 23760
 Number of hypotheses: 490 Mode: Standard

Actual group of hypotheses: All hypotheses
 Hypotheses in group: 490 Shown hypotheses: 490 Highlighted: 0

Nr.	Id	Df-Conf	B-Conf	A-Conf	Hypothesis
1	194	0.500	1.000	0.500	(empty) : (x_S1_Demographic_Pressures_(8.3) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
2	112	0.500	1.000	0.500	(empty) : (x_S1_Demographic_Pressures_(8.4) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
3	187	0.500	1.000	0.500	(empty) : (x_S1_Demographic_Pressures_(8.6) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
4	181	0.500	1.000	0.500	(empty) : (x_U1_Unemployment_total_(4.2) -> x_U1_Unemployment_total_(3.7)) >+< (empty) : (Total(Alert) -> Total(Stable))
5	439	0.500	1.000	0.500	Year_(2010) : (x_S1_Demographic_Pressures_(8.3) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
6	357	0.500	1.000	0.500	Year_(2010) : (x_S1_Demographic_Pressures_(8.4) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
7	432	0.500	1.000	0.500	Year_(2010) : (x_S1_Demographic_Pressures_(8.6) -> x_S1_Demographic_Pressures_(5.6)) >+< (empty) : (Total(Alert) -> Total(Stable))
8	426	0.500	1.000	0.500	Year_(2010) : (x_U1_Unemployment_total_(4.2) -> x_U1_Unemployment_total_(3.7)) >+< (empty) : (Total(Alert) -> Total(Stable))
9	159	0.429	1.000	0.571	(empty) : (x_E1_Economy_(8.3) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
10	223	0.429	1.000	0.571	(empty) : (x_E1_Economy_(8.4) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
11	218	0.429	1.000	0.571	(empty) : (x_E1_Economy_(8.6) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
12	154	0.429	1.000	0.571	(empty) : (x_E1_Economy_(9.2) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
13	149	0.429	1.000	0.571	(empty) : (x_E1_Economy_(9.6) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
14	404	0.429	1.000	0.571	Year_(2010) : (x_E1_Economy_(8.3) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
15	468	0.429	1.000	0.571	Year_(2010) : (x_E1_Economy_(8.4) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
16	463	0.429	1.000	0.571	Year_(2010) : (x_E1_Economy_(8.6) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
17	399	0.429	1.000	0.571	Year_(2010) : (x_E1_Economy_(9.2) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
18	394	0.429	1.000	0.571	Year_(2010) : (x_E1_Economy_(9.6) -> x_E1_Economy_(5)) >+< (empty) : (Total(Alert) -> Total(Stable))
19	193	0.400	1.000	0.600	(empty) : (x_S1_Demographic_Pressures_(9.3) -> x_S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Stable))
20	111	0.400	1.000	0.600	(empty) : (x_S1_Demographic_Pressures_(9.4) -> x_S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Stable))
21	186	0.400	1.000	0.600	(empty) : (x_S1_Demographic_Pressures_(9.6) -> x_S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Stable))

Buttons: Detail, Goto ID, Copy, Remove, Filter, Sorting, Export

Hypothesis and State Before:

LM final_preprocess MB - LSP-Miner Workspace module - 27.18.07

File Data Introduction Preprocessing Interactive Analysis Data-mining Tasks Domain Knowledge Window Help

Tab Tree: A. Data Introduction, B. Data Preprocessing, C. Interactive Analysis, D. Data-mining Tasks, E. Domain knowledge, W. Workspace

Antecedent: (x_C1_Security_Apparatus_(9.8) -> x_C1_Security_Apparatus_(2.2))
 Succedent: (Total(Alert) -> Total(Stable))
 State before: x_C1_Security_Apparatus_(9.8) >+< Total(Alert)
 State after: x_C1_Security_Apparatus_(2.2) >+< Total(Stable)
 Condition: (empty)

TEXT DATA STATE BEFORE STATE AFTER B+A DIFF ABS DIFF REL

Succedent

	Antecedent	~Antecedent
Succedent	2	0
~Succedent	35	140

2: Antecedent / Succedent

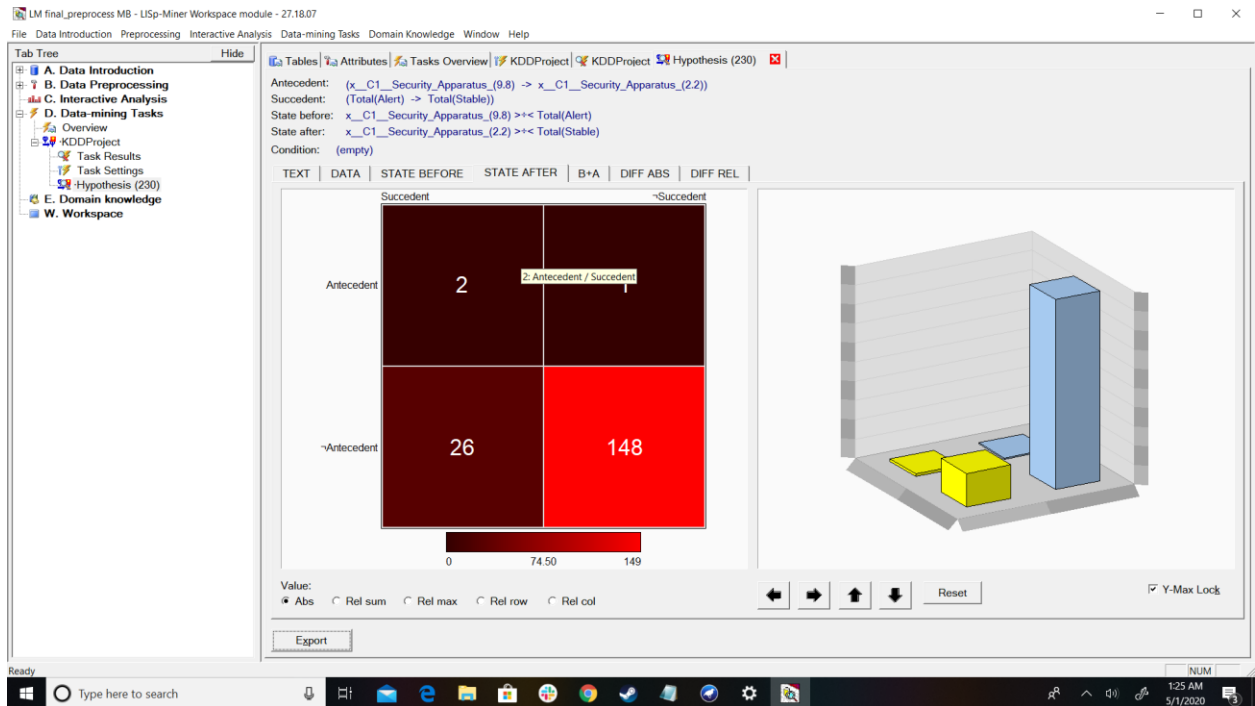
0 74.50 149

Value: Abs Rel sum Rel max Rel row Rel col

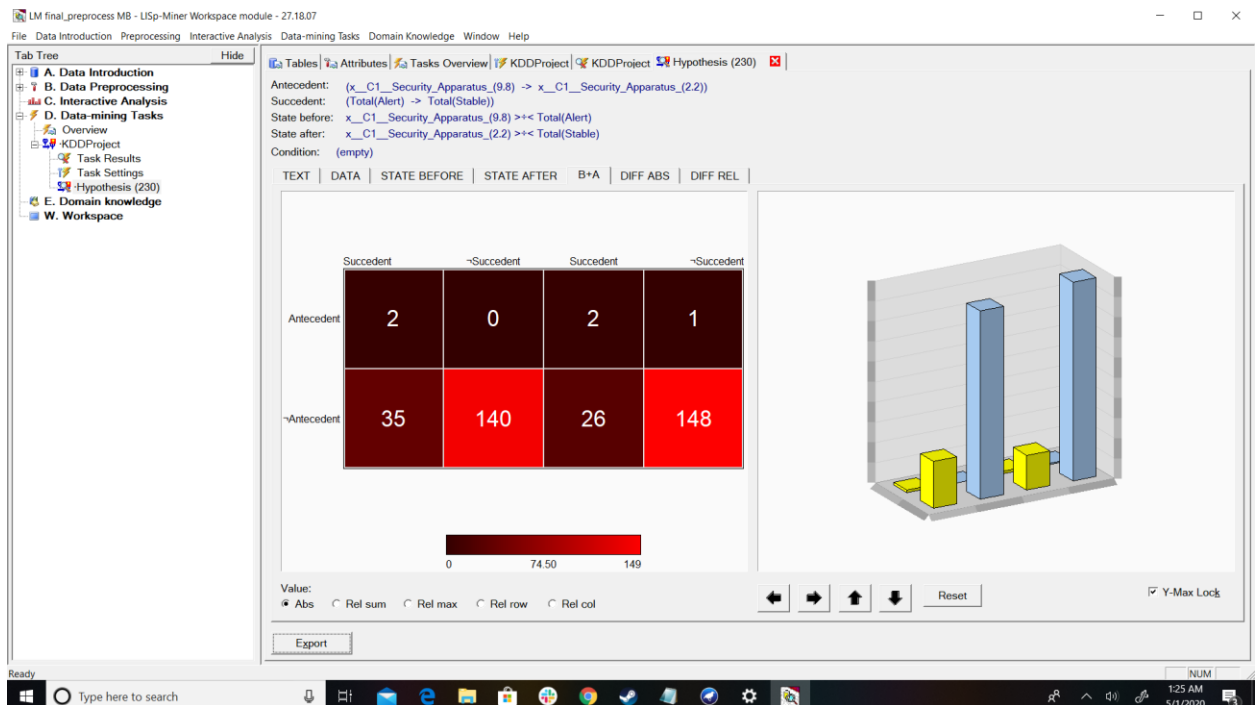
Export

Buttons: Left, Right, Up, Down, Reset, Y-Max Lock

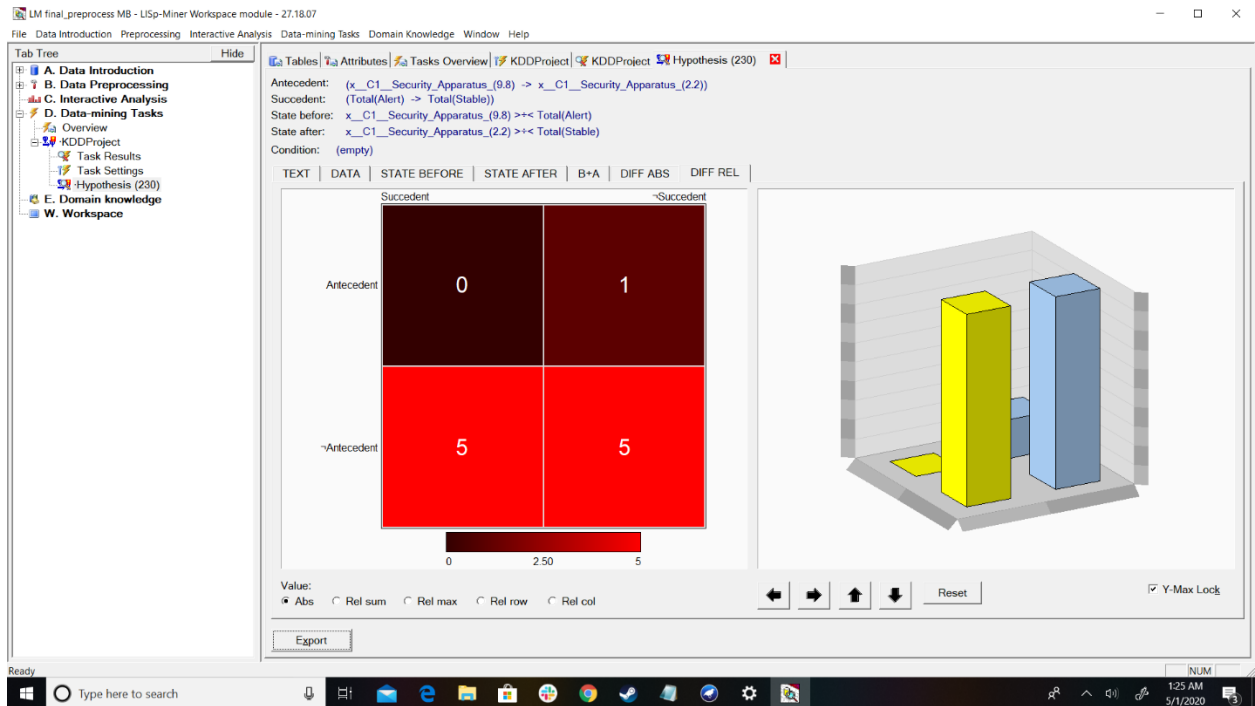
Hypothesis and State After:



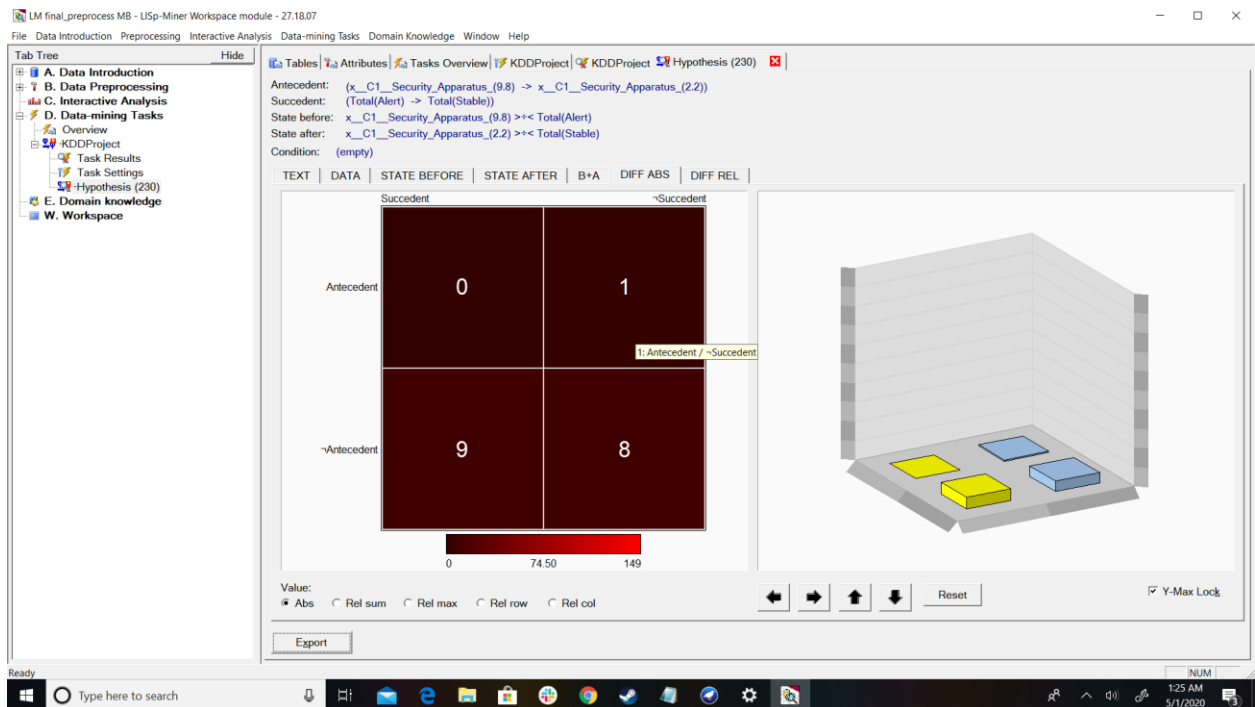
B+A:



Diff Rel:



Diff Abs:



Alert -> Sustainable

LM final_preprocess MB - LISP-Miner Workspace module - 27.18.07

File Data Introduction Preprocessing Interactive Analysis Data-mining Tasks Domain Knowledge Window Help

Tab Tree

- A. Data Introduction
- B. Data Preprocessing
 - Attributes
- C. Interactive Analysis
- D. Data-mining Tasks
 - Overview
 - KDDProject
 - Task Results
 - Task Settings
- E. Domain knowledge
- W. Workspace

Tables Attributes Tasks Overview KDDProject KDDProject

Task: KDDProject

Comment: -

Taskgroup: Default group of tasks

Data matrix: final_preprocess

Task type: Ac4ft-Miner

Task run

Start: 1.5.2020 01:15:37 Total time: 0h 0m 37s

Number of verifications: 23780

Number of hypotheses: 462 Mode: Standard

Show all Show not in group Highlight

Show hypotheses just from group:

Add group Del group Edit group

Actual group of hypotheses: All hypotheses

Hypotheses in group: 462 Shown hypotheses: 462 Highlighted: 0

Delete hypotheses

Nr.	Id	Df-Conf	B-Conf	A-Conf	Hypothesis
1	230	0.842	1.000	0.158	(empty) : (x_ A1_Exports_and_imports_(75.6) -> x_ A1_Exports_and_imports_(89.315029)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
2	461	0.842	1.000	0.158	Year_(2010) : (x_ A1_Exports_and_imports_(75.6) -> x_ A1_Exports_and_imports_(89.315029)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
3	118	0.778	1.000	0.222	(empty) : (x_ R1_Life_expectancy_at_birth_(73.1) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
4	180	0.778	1.000	0.222	(empty) : (x_ R1_Life_expectancy_at_birth_(78.8) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
5	169	0.778	1.000	0.222	(empty) : (x_ U1_Unemployment_total_(4.2) -> x_ U1_Unemployment_total_(?)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
6	349	0.778	1.000	0.222	Year_(2010) : (x_ R1_Life_expectancy_at_birth_(73.1) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
7	411	0.778	1.000	0.222	Year_(2010) : (x_ R1_Life_expectancy_at_birth_(78.8) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
8	400	0.778	1.000	0.222	Year_(2010) : (x_ U1_Unemployment_total_(4.2) -> x_ U1_Unemployment_total_(?)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
9	175	0.600	1.000	0.400	(empty) : (x_ S1_Demographic_Pressures_(8.3) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
10	91	0.600	1.000	0.400	(empty) : (x_ S1_Demographic_Pressures_(8.4) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
11	170	0.600	1.000	0.400	(empty) : (x_ S1_Demographic_Pressures_(8.6) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
12	406	0.600	1.000	0.400	Year_(2010) : (x_ S1_Demographic_Pressures_(8.3) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
13	322	0.600	1.000	0.400	Year_(2010) : (x_ S1_Demographic_Pressures_(8.4) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
14	401	0.600	1.000	0.400	Year_(2010) : (x_ S1_Demographic_Pressures_(8.6) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
15	114	0.444	0.667	0.222	(empty) : (x_ R1_Life_expectancy_at_birth_(74.4) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
16	110	0.444	0.667	0.222	(empty) : (x_ R1_Life_expectancy_at_birth_(74.5) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
17	106	0.444	0.667	0.222	(empty) : (x_ R1_Life_expectancy_at_birth_(81.5) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
18	345	0.444	0.667	0.222	Year_(2010) : (x_ R1_Life_expectancy_at_birth_(74.4) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
19	341	0.444	0.667	0.222	Year_(2010) : (x_ R1_Life_expectancy_at_birth_(74.5) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
20	337	0.444	0.667	0.222	Year_(2010) : (x_ R1_Life_expectancy_at_birth_(81.5) -> x_ R1_Life_expectancy_at_birth_(69.933333)) >+< (empty) : (Total(Alert) -> Total(Sustainable))
21	42	0.400	0.800	0.400	(empty) : (x_ S1_Demographic_Pressures_(8.5) -> x_ S1_Demographic_Pressures_(3.7)) >+< (empty) : (Total(Alert) -> Total(Sustainable))

Detail Goto ID Copy Remove Filter Sorting Export

LM final_preprocess MB - LISP-Miner Workspace module - 27.18.07

File Data Introduction Preprocessing Interactive Analysis Data-mining Tasks Domain Knowledge Window Help

Tab Tree

- A. Data Introduction
- B. Data Preprocessing
 - Attributes
- C. Interactive Analysis
- D. Data-mining Tasks
 - Overview
 - KDDProject
 - Task Results
 - Task Settings
- E. Domain knowledge
- W. Workspace

Tables Attributes Tasks Overview KDDProject KDDProject

Data-mining Task basic parameters

Name: KDDProject ID: 1

Comment: -

Taskgroup: Default group of tasks

Task type: Ac4ft-Miner

Data matrix: final_preprocess

Edit

ANTECEDENT STABLE PART

Default Partial Cedent

Country (subset), 1 - 1

Rank_ (subset), 1 - 1

Year_ (subset), 1 - 1

Con, 0 - 5

Con, 0 - 5

Quantifiers

Type

Rel. Value Units

a (BASE) Before >= 2.00 Abs

a (BASE) After >= 2.00 Abs

Generation information

Status: Not generated

Mode: -

SUCCEEDENT STABLE PART

Default Partial Cedent

Con, 0 - 5

Con, 0 - 5

(1) ANTECEDENT VARIABLE PART

Default Partial Cedent

x_ A1_Exports_and_imports_ (subset), 1 - 1

x_ C1_Security_Apparatus_ (subset), 1 - 1

x_ E1_Economy_ (subset), 1 - 1

x_ P1_State_Legitimacy_ (subset), 1 - 1

Con, 1 - 5

Con, 1 - 5

Con, 0 - 5

Con, 0 - 5

CONDITION

Default Partial Cedent

Con, 0 - 5

Con, 0 - 5

(2) SUCCEEDENT VARIABLE PART

Default Partial Cedent

Total(Alert -> Sustainable)

Con, 0 - 5

Con, 0 - 5

Task parameters

Strict action: States must be represented by the same sets of attributes which differ in coefficients only (the strict meaning of an action)

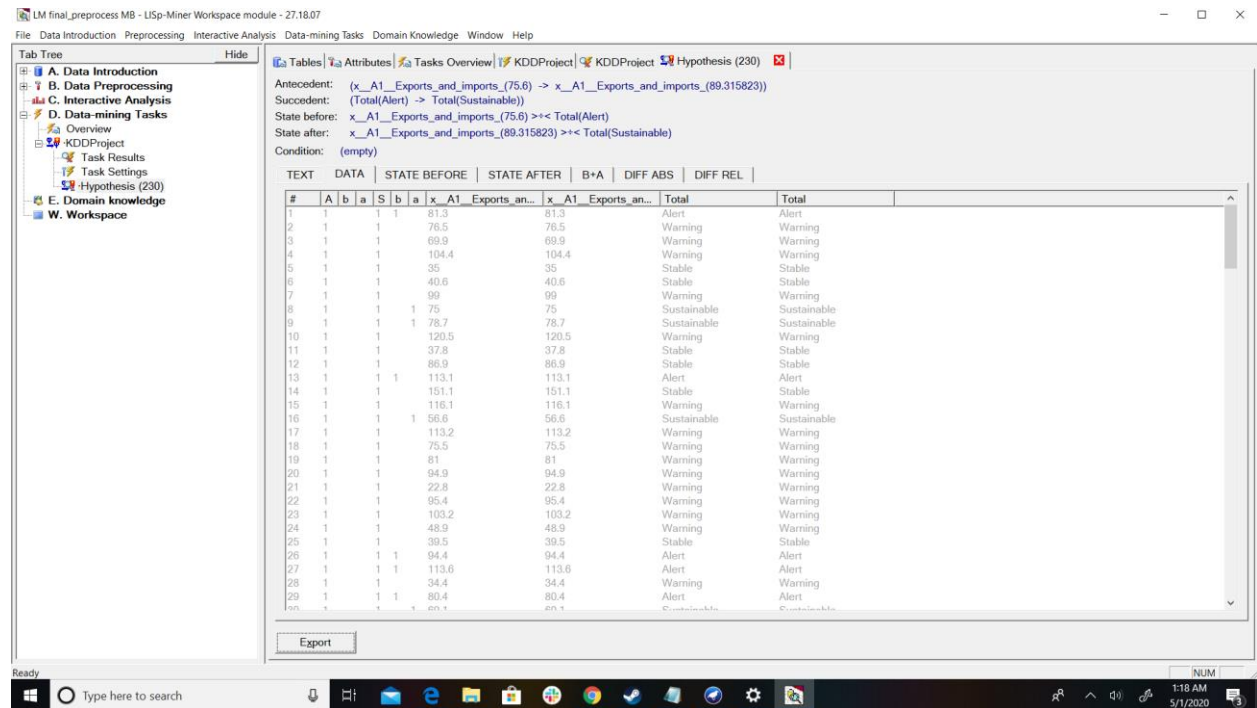
Sets overlapping: Sets must differ in all rows (i.e. not overlapping sets)

Maximal number of hypotheses: 1000

Params Switch Validate Task Clone

Run Bkgnd Run Grid Run Show Results

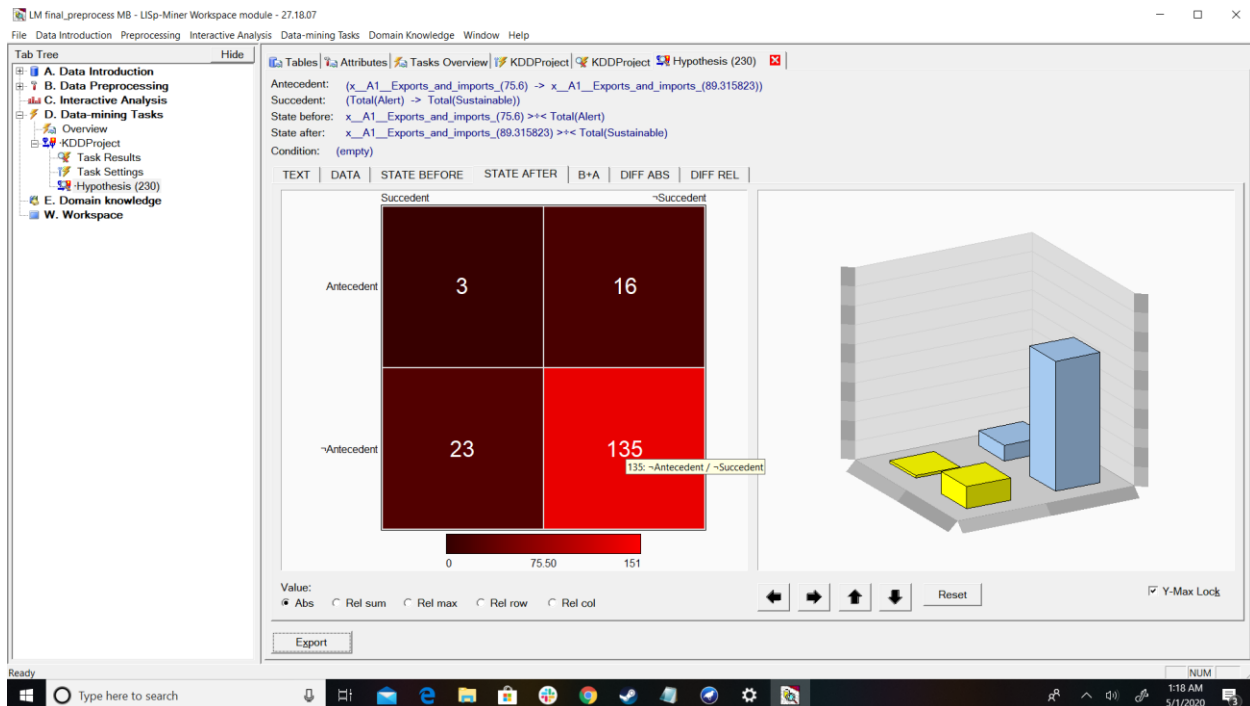
Data:



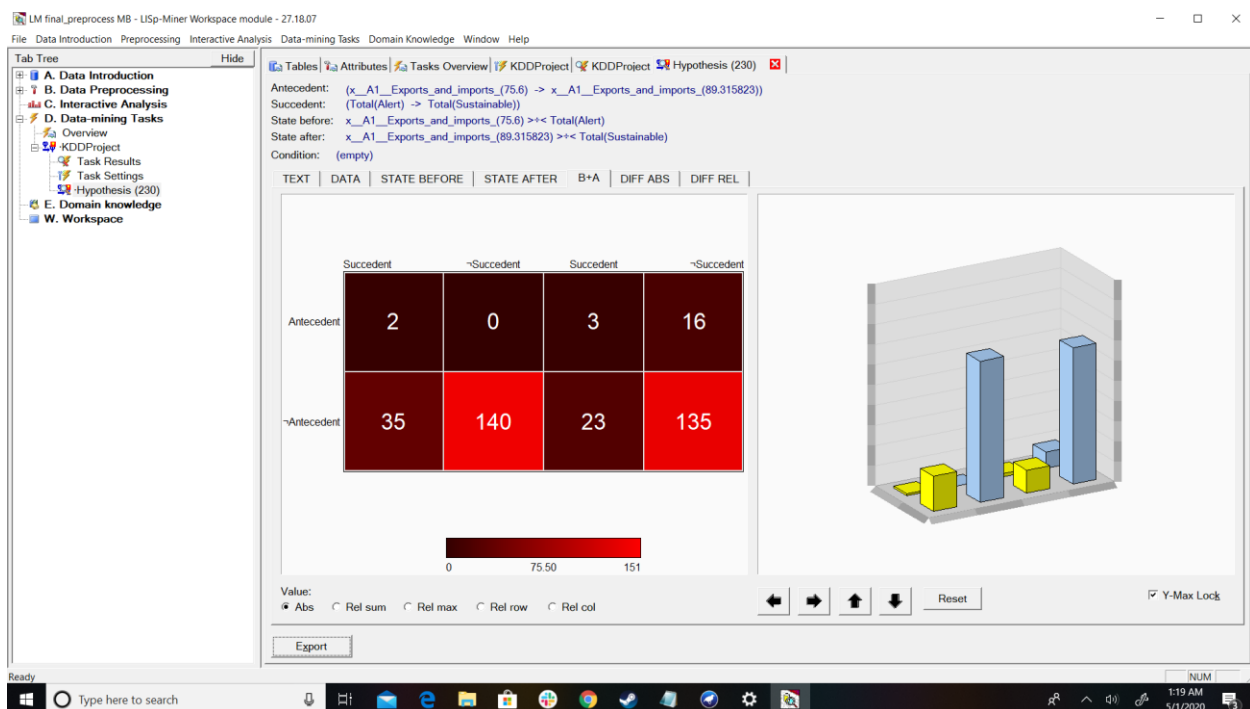
State Before:



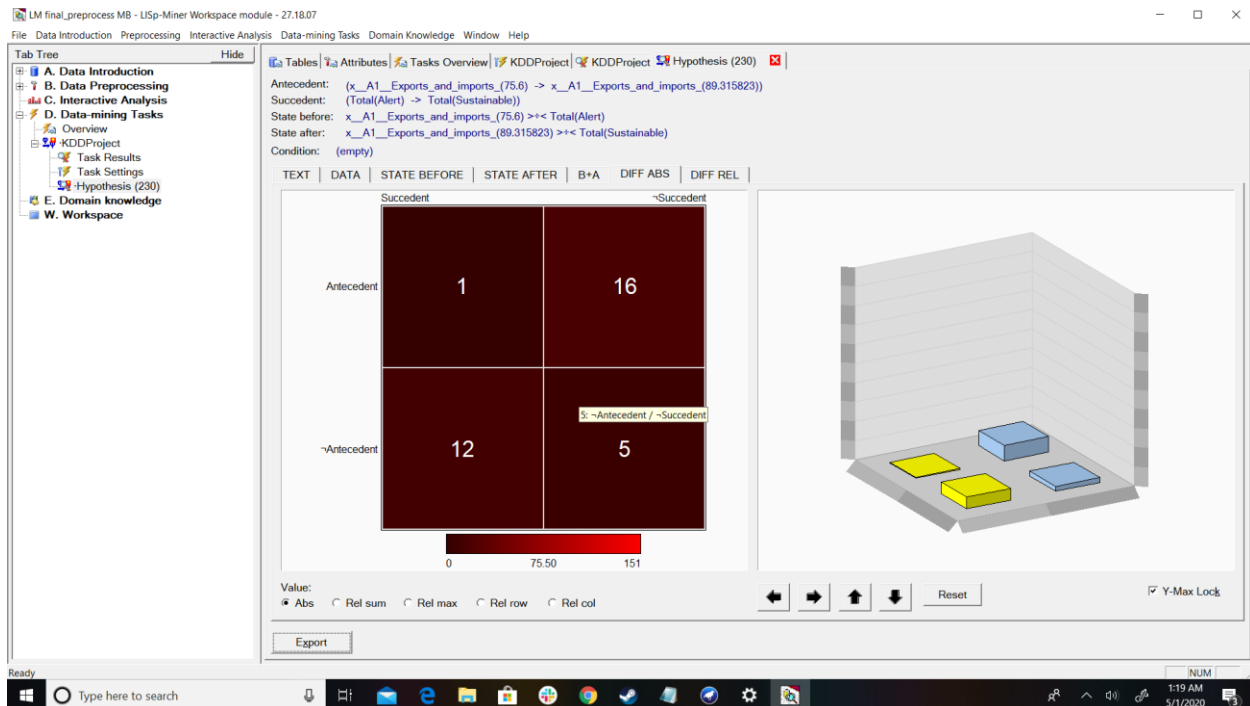
State After:



B+A



Diff ABS:



Diff Rel:

