ELECTRE TRI plug-in in Quantum GIS and ElectreTriBM webservice
What's new?

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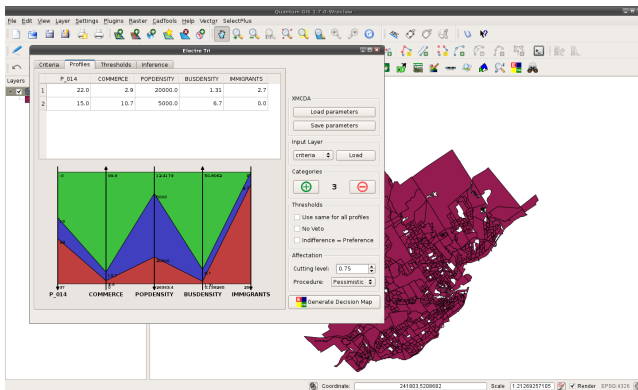
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Quantum GIS ELECTRE TRI plug-in

ELECTRE TRI model representation

Representation of the ELECTRE TRI model inside the plug-in
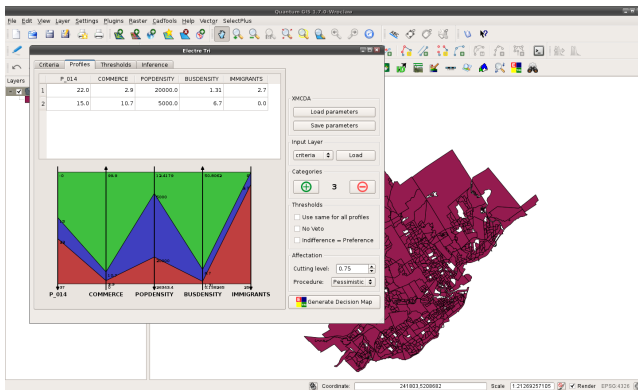
- ▶ Demo

ELECTRE TRI model representation

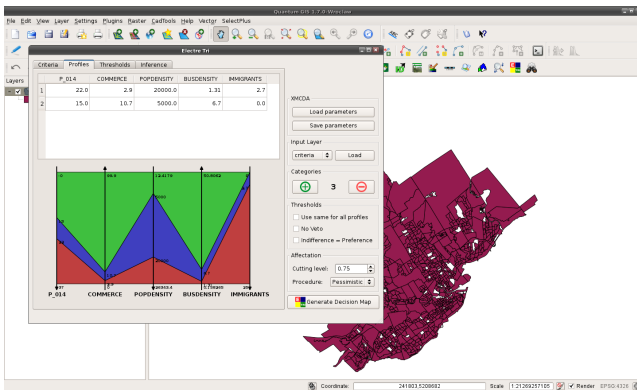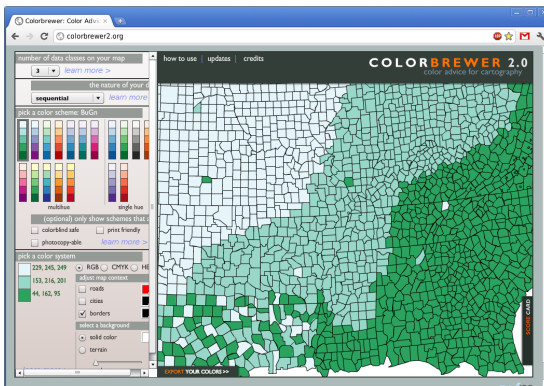## Representation of the ELECTRE TRI model inside the plug-in

- ▶ Demo
- ▶ Good colors to represent the model ?

ELECTRE TRI model representation

Representation of the ELECTRE TRI model inside the plug-in

- Demo
- Good colors to represent the model? $\rightarrow$ No!

ELECTRE TRI model representation

Solution

- ELECTRE TRI plug-in will be adapted as soon as possible

New python SOAP library

Problem with ZSI :

- ▶ Difficult to install it on Windows
- ▶ Unmaintained

New python SOAP library

Problem with ZSI :

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Solution : pysimplesoap

► Available at http://code.google.com/p/pysimplesoap

► Easy to embbed in a python application

New python SOAP library

Problem with ZSI :

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Solution : pysimplesoap

- ▶ Available at http://code.google.com/p/pysimplesoap
- ▶ Easy to embbed in a python application

Thus...

- ▶ Update of the Quantum GIS ELECTRE TRI plug-in
- ▶ Update of the sample code provided in Decision Deck repository

Improve modularity of the plug-in

Old implementation

► 3 big blocks
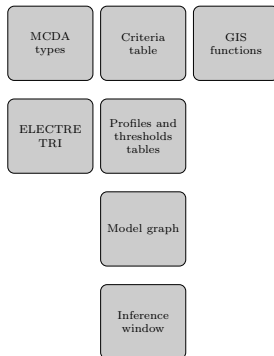
Improve modularity of the plug-in

Old implementation

- ▶ 3 big blocks

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- ▶ Split of the 3 blocks
- ▶ Cleaner code
- ▶ Re-use of the code
- ▶ Ongoing...

New implementation

MCDA library

Goals :

- ▶ Have basic objects of MCDA (criterion, alternative, ...)
- ▶ Include methods to convert objects into XMCDA

Criteria
list of criteria
to_xmcda()
from_xmcda()

Alternatives
list of alternatives
to_xmcda()
from_xmcda()

Categories
list of categories
to_xmcda()
from_xmcda()

Criterion
id
name
disabled
weight
to_xmcda()
from_xmcda()

Alternative
id
name
disabled
performances
to_xmcda()
from_xmcda()

Category
id
name
disabled
lower_prof
upper_prof
to_xmcda()
from_xmcda()

Still in progress...

XMCDA questions

Two possibilities to define criterion weight

Within `criterionValue` tag

```xml
<criteria>
  <criterion id="prix" name="prix">
    <active>true</active>
    <scale>
      <quantitative>
        <preferenceDirection>
          min
        </preferenceDirection>
      </quantitative>
    </scale>
  </criterion>
  ...
</criteria>

<criteriaValues>
  <criterionValue>
    <criterionID>0</criterionID>
    <value><real>25.0</real></value>
  </criterionValue>
  ...
</criteriaValues>
```

Within `criterion` tag

```xml
<criteria>
  <criterion id="prix" name="prix">
    <active>true</active>
    <scale>
      <quantitative>
        <preferenceDirection>
          min
        </preferenceDirection>
      </quantitative>
    </scale>
    <criterionValue>
      <value>
        <integer>25</integer>
      </value>
    </criterionValue>
  </criterion>
  ...
</criteria>
```

XMCDA questions

Not the same for the alternative performances... why ?

Within `alternativePerformances` tag : OK

```xml
<alternatives>
  <alternative id="b1">
    <active>true</active>
  </alternative>
  ...
<alternatives>

<performanceTable>
  <alternativePerformances>
    <alternativeID>a1</alternativeID>
    <performance>
      <criterionID>0</criterionID>
      <value><real>100.0</real></value>
    </performance>
    <performance>
      <criterionID>1</criterionID>
      <value><real>1000.0</real></value>
    </performance>
    ...
  </alternativePerformances>
...
</performanceTable>
```

Within `alternative` tag : NOK

```xml
<alternatives>
  <alternative id="b1">
    <active>true</active>
    <performance>
      <criterionID>0</criterionID>
      <value><real>100.0</real></value>
    </performance>
    <performance>
      <criterionID>1</criterionID>
      <value><real>1000.0</real></value>
    </performance>
    ...
  </alternative>
  ...
<alternatives>
```

XMCDA questions

ELECTRE TRI model with indifference preference and veto thresholds differents for each profile

Encoding in XMCDA...

```
<criterion id="0">
  <scale>
    <quantitative>
      <preferenceDirection>min</preferenceDirection>
    </quantitative>
  </scale>
  <thresholds>
    <threshold id="q1" name="indifference" mcdaConcept="indifference">
      <constant><real>15.000000</real></constant>
    </threshold>
    <threshold id="q2" name="indifference" mcdaConcept="indifference">
      <constant><real>15.000000</real></constant>
    </threshold>
    <threshold id="p1" name="preference" mcdaConcept="preference">
      <constant><real>40.000000</real></constant>
    </threshold>
    <threshold id="p2" name="preference" mcdaConcept="preference">
      <constant><real>40.000000</real></constant>
    </threshold>
  <thresholds>
</criterion>
```
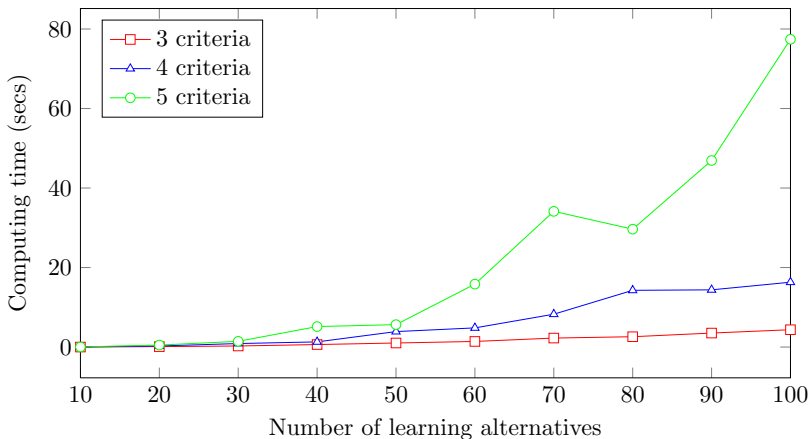
Re-use of some blocks

Demonstration

EtriBMInference webservice

GLPK solver

Issue = performance

Computing time for a model with 2 categories

SCIP

Solver overview

(source : http: // http: // scip. zib. de)
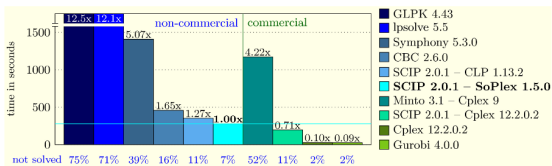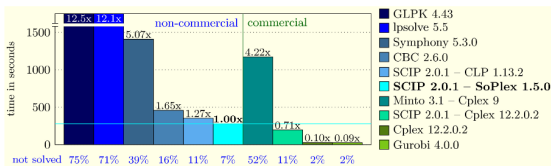
- ▶ CPLEX is the best one... but is not free
- ▶ SCIP is the fastest non-commercial MIP solver

SCIP

Solver overview

(source : http://http://scip.zib.de)

- ▶ CPLEX is the best one... but is not free
- ▶ SCIP is the fastest non-commercial MIP solver

Conditions to use SCIP in our webservices

- ▶ SCIP is only used binary in a webservice, i.e. it is not distribuited.
- ▶ The webservice is free of charge
- ▶ There is a notification that SCIP is used and a link to SCIP website.

Conclusion

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Lot of things to do :

- Change colors of decision map in the ELECTRE TRI plug-in
- Finish code refactoring of ELECTRE TRI plug-in
- Complete MCDA library in python
- Change solver of the webservice
- ...

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Questions/Remarks ?