XML proposal for automata description

The VAUCANSON group

June 27, 2005

Context

Objectives:

- provide an unified communication tool,
- represent various kinds of automata and transducers,
- keep declarations simple for widely used structure,
- provide ability to specify complex types.

This proposal is an evolution of the one we made at CIAA'04

Context

Objectives:

- provide an unified communication tool,
- represent various kinds of automata and transducers,
- keep declarations simple for widely used structure,
- provide ability to specify complex types.

This proposal is an evolution of the one we made at CIAA'04

Overview of the proposal

About the format definition:

- need to provide default types,
- default types must be context-sensitive,
- some attributes must be context-sensitive.

→ Can be achievable with an XSD.

Overview of the proposal

About the format definition:

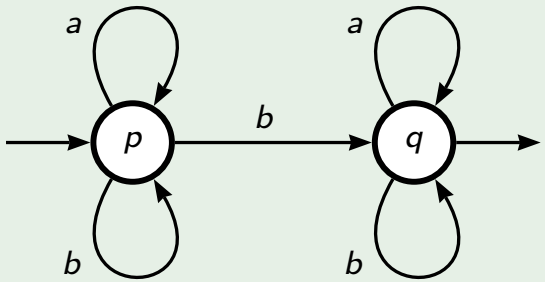
- need to provide default types,
- default types must be context-sensitive,
- some attributes must be context-sensitive.

→ Can be achievable with an XSD.

The content tag

Example

```
<automaton>
  <content>
    <states>
       <state name="s0" label="p"/>
       <state name="s1" label="q"/>
    </states>
    <transitions>
       <transition src="s0" dst="s0" label="a"/>
       <transition src="s0" dst="s0" label="b"/>
       <transition src="s0" dst="s1" label="b"/>
       <transition src="s0" dst="s1" label="a"/>
       <transition src="s0" dst="s1" label="b"/>
       <initial state="s0"/>
       <final state="s1"/>
    </transitions>
  </content>
</automaton>
```



The content tag

- `label` attribute is a non-restricted string,
- `<transition>`, `<initial>` and `<final>` are context sensitive.

Example

Transducer declaration:

```
<transducer>
  <content>
    <states>
       <state name="s0"/>
    </states>
    <transitions>
       <transition src="s0" dst="s0" in="a" out="b"/>
       <initial state="s0" out="a"/>
    </transitions>
  </content>
</transducer>
```

The type tag

Example

Set automaton type to $\mathbb{Z}$:

```
<automaton>
  <type>
     <semiring set="Z"/>
  </type>
  <content>
  ...
  </content>
</automaton>
```

- Need to override only the inappropriate tag,
- can define weight and alphabet structure.

The geometry tag

Example

Set a global offset, then a state position:

```
<transducer>
  <geometry x="-5" y="0"/>
  <content>
     <states>
        <state name="s0">
           <geometry x="10" y="10"/>
        </state>
      ...
</transducer>
```

- Contains embedding informations of the graph,
- can be defined at any level of the document,
- is context-sensitive.

The drawing tag

Example

Set some drawing properties:

```
<transducer>
  <geometry x="-5" y="0"/>
  <drawing stateFillColor="black" edgeStyle="dashed"/>
  <content>
     <states>
        <state name="s0">
            <drawing stateFillColor="red"/>
        </state>
      ...
</transducer>
```

- Contains drawing informations,
- can be defined at any level of the document,
- can be extented thanks to `anyAttribute`.

The complexity of the type tag

Some features:

- can be recursively defined,
- can express a wide set of structures (various alphabets, various weight set and related operations, etc.),
- can be declared only where needed.

$\rightarrow$ The type tag offers a full description of the automaton type.

The complexity of the type tag

Some features:

- can be recursively defined,
- can express a wide set of structures (various alphabets, various weight set and related operations, etc.),
- can be declared only where needed.

→ The type tag offers a full description of the automaton type.

The complexity of the type tag

Some features:

- can be recursively defined,
- can express a wide set of structures (various alphabets, various weight set and related operations, etc.),
- can be declared only where needed.

→ The type tag offers a full description of the automaton type.

The complexity of the type tag

Some features:

- can be recursively defined,
- can express a wide set of structures (various alphabets, various weight set and related operations, etc.),
- can be declared only where needed.

$\rightarrow$ The type tag offers a full description of the automaton type.

Default types

Default types are:

- for `<automaton>`, Boolean automaton,
- for `<transducer>`, automaton with a direct product of free monoids.

The session tag

Example

Combine many automata in a single document:

```
<session>
  <automaton name="a1">...</automaton>
  <transducer name="t1">...</transducer>
  <transducer name="t2">...</transducer>
</session>
```

Conclusion

The proposal offers:

- full description of the content of the automaton,
- full description of the type of the automaton,
- geometry and drawing facilities,
- a set of predefined types to ease declaration.

Conclusion

The proposal offers:

- full description of the content of the automaton,
- full description of the type of the automaton,
- geometry and drawing facilities,
- a set of predefined types to ease declaration.

Conclusion

The proposal offers:

- full description of the content of the automaton,
- full description of the type of the automaton,
- geometry and drawing facilities,
- a set of predefined types to ease declaration.

Conclusion

The proposal offers:

- full description of the content of the automaton,
- full description of the type of the automaton,
- geometry and drawing facilities,
- a set of predefined types to ease declaration.

Questions