The POESIA Decision Mechanism

Alberto Raggioli, Stefan Guerra

M.E.T.A. S.r.l.

POESIA Final Workshop – Pisa 21-22/01/2004

POESIA

What a Decision Mechanism (DM) is?

- A system that, given some input values, returns a response which summarizes input values
- Many different decision strategies are known, based on a lot of technologies, as:
  - Neural networks
  - Fuzzy logic
  - Case Based Reasoning
  - Rule based
  - Probability

  A lot of variants and algorithms for each of these technologies are known

Decision strategies

- Based on filters (communication protocol is very important)
- Semantic domains (based on context: e.g. porn, violence)
- Filtering levels (based on preferences: e.g. age)
- Strategies:
  - Based on a training set
  - Based on human experience

Why is a DM needed?

- To recover a bad filter result, using other filters results data (especially for requests which are to be rejected)
- To filter pages for which the filters gives fragmented information (some filters are not able to understand, but all filters together are able to)
- Possibility of using together traditional filtering techniques (URL, PICS) and content based techniques (text, image)

A DM tries to obtain the best of filters results, but the main role is always played by the filters results

POESIA

POESIA approach

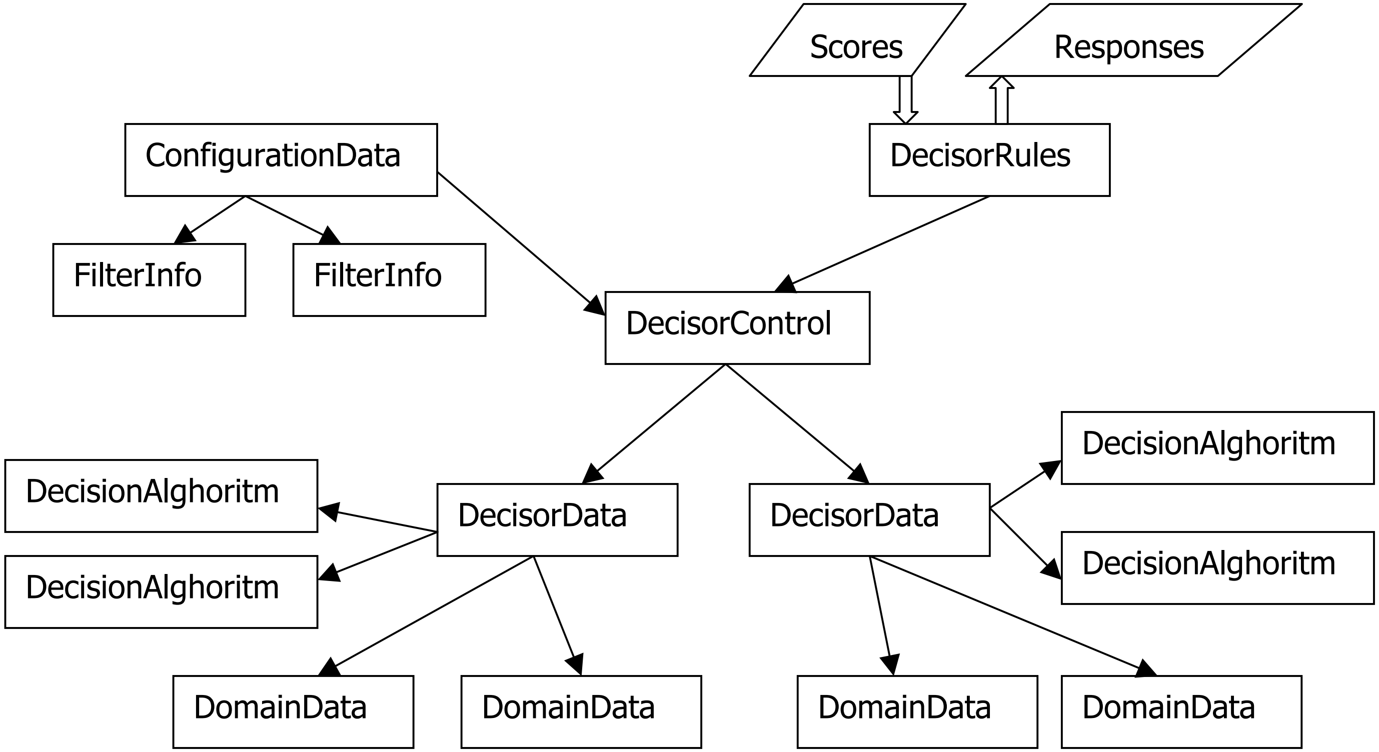
- Input values are the SCORES of the filters
- Only simple information used (just scores) because to produce a score each filter already made a decision
- Use of different:
  - contents,
  - domains,
  - filters for domain,
  - algorithms for domain
- Time consume is very important:
  - Use of light and heavy text filters
  - DM tries to guess a decision each time a score arrive for each domain of each request, so it should be as fast as possible

General characteristics

- Flexibility: it can be easily adapted in various contexts (e.g. to filter some domain only using traditional techniques, URL, PICS)
- Extendibility: it can be easily extended (e.g. to implement a new decision algorithm or to support a new kind of filter)
- Object Oriented Design
- Java as source code language

POESIA is an Open Source project so we foresee that it will be enriched in future, so architectural aspects are important

DM architecture



Special features

- Use of the ‘unknown’ attribute
- Use of the ‘refer’ attribute
- Simple level decision
- Timeout for a request: forced decision
- Score garbage collection

Algorithms

- Class Factory for domains
- Interface (methods: tryASimpleDecision, tryADecision, forceADecision)
- Rule based algorithm:
  - High value -> reject
  - Low values for each domain and filter -> accept
  - Intermediate values -> 'level of filtering' regulates the percentage of values necessary to reject/accept a request
- Neural network and Bayesian DM are under test (they use the Weka environment)

DM Configuration

- XML file
  - Parameter Level of filtering
  - Parameter Default response
  - Parameter Timeout
  - Domains and Filter Configuration
- Graphical configuration
  - POESIA as a server side system
  - Web server presence

Sample Configuration file

```xml
<?xml version="1.0" encoding="UTF-8"?>
<DecisorConfig>
		<DefaultDecision value="accept"/>
		<MaxFiltersForDomain value="15"/>
		<Timeout value="10"/>
		<SimpleDecision value="1"/>
		<LevelOfFiltering value="50"/>
		<InitialHashDimForReqId value="1024"/>
		<FilteringDomains>
				<Domain name="porn"/>
				<Domain name="violence"/>
		</FilteringDomains>
		<FilterActive domain="porn">
				<Filter name="urlfilter" type="std"/>
				<Filter name="javascript" type="std"/>
				<Filter name="picsfilter" type="std"/>
				<Filter name="imagefilter" type="std"/>
				<Filter name="langidentif" type="lang"/>
				<Filter name="englishlight" type="text" refer="englishheavy" lang="english"/>
				<Filter name="italianlight" type="text" refer="italianheavy" lang="italian"/>
				<Filter name="spanishlight" type="text" refer="spanishheavy" lang="spanish"/>
		</FilterActive>
		<FilterActive domain="violence">
				<Filter name="urlfilter" type="std"/>
				<Filter name="javascript" type="std"/>
				<Filter name="picsfilter" type="std"/>
				<Filter name="imagefilter" type="std"/>
		</FilterActive>
</DecisorConfig>
```

Conclusions

- Open Source project importance
- Flexibility
- Extendibility
- Configurability

Easy to adapt and extend for actual and future use