Building an Agent Methodology from Fragments: the MEnSA experience

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1. The MEnSA Process Requirements

2. The New MEnSA Process

3. Results Assessment

4. Conclusions and Future Works
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  - assemble fragments for creating a new methodology
Situational method engineering

- Each methodology can be decomposed into reusable method fragments
- A designer can re-use and re-assemble fragments in order to create a new methodology [Cossentino et al., 2007]
- First step: extraction and storing of method fragments in the method base
- Second step: selection of the suitable fragments from the method base
- Third step: fragments assembly
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   - a support for traceability
   - the abstractions adopted in the design phase should be
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4. To enable an easy transition towards the new methodology to designers fluent with one or more of the “source” methodologies
Extended requirements

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14 Non functional requirements should be explicitly modelled (req. 2)
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The ME\text{NSA}'s process composition

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We proposed some improvements during the fragments selection phase...

Our version combines the possibility of retrieving fragments directly on the basis of the
- process requirements
- metamodel as prescribed by PRoDe
The MEnSA’s process composition

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- Therefore a proper process model had to be chosen
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- An initial version of the process had been available: this could be complete or not according to the refinements of the initial process requirements
The process component diagram
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Looking at the created methodology,

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- in the Design phase all the abstractions that are more "infrastructure-like" (e.g. artifacts) have been adopted.
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## Comparison regarding process-related criteria [Tran and Low, 2005]

<table>
<thead>
<tr>
<th></th>
<th>MEEnSA</th>
<th>Gaia</th>
<th>PASSI</th>
<th>Tropos</th>
<th>SODA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development lifecycle</strong></td>
<td>Iterative and incremental</td>
<td>Iterative within each phase but sequential between phases</td>
<td>Iterative across and within all phases (except for coding and deployment)</td>
<td>Iterative and incremental</td>
<td>Iterative and incremental</td>
</tr>
<tr>
<td><strong>Coverage of lifecycle</strong></td>
<td>Analysis and Design (and Implementation)</td>
<td>Analysis and Design</td>
<td>Analysis, Design and Implementation</td>
<td>Analysis and Design</td>
<td>Analysis and Design</td>
</tr>
<tr>
<td><strong>Development perspective</strong></td>
<td>Middle-out</td>
<td>Top-down</td>
<td>Top-Down/Bottom-up (for pattern reuse)</td>
<td>Top-down</td>
<td>Middle-out</td>
</tr>
<tr>
<td><strong>Application domain</strong></td>
<td>Independent</td>
<td>Independent</td>
<td>Independent</td>
<td>Independent</td>
<td>Independent</td>
</tr>
<tr>
<td><strong>Size of MAS</strong></td>
<td>Not specified</td>
<td>≤ 100 agent classes</td>
<td>Not specified</td>
<td>Not specified</td>
<td>Not specified</td>
</tr>
<tr>
<td><strong>Agent nature</strong></td>
<td>Heterogeneous</td>
<td>Heterogeneous</td>
<td>Heterogeneous</td>
<td>BDI-like agents</td>
<td>Heterogeneous</td>
</tr>
<tr>
<td><strong>Support for verification-validation</strong></td>
<td>Ongoing work</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Ease of understanding of the process steps</strong></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Usability of the methodology</strong></td>
<td>Medium (guidelines not complete)</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Refinability</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Approach towards MAS development</strong></td>
<td>a. i* framework and OO b. RO (GO)</td>
<td>a. OO b. RO (OrO)</td>
<td>a. OO b. RO</td>
<td>a. i* framework b. NRO</td>
<td>a. NOO b. RO</td>
</tr>
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</table>
Lessons learned

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- It proved that several research groups can:
  - converge in defining a common project that aims at the definition of a unique new methodology.
  - realise this project with a good degree of success by means of a novel approach.
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- Such a “meta-tool” could also produce some “development tool” for the created methodology.
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- In the paper we reported also how the created methodology meets the proposed requirements.
- We compared it with other methodologies, pointing out the advantages of the proposed new process in connection with the requirements.
Future works

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▶ completing our evaluation of the methodology
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▶ continuing the test and evaluation of the methodology by using a case study: the Bioinformatic Framework


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