A Multifunctional, Interactive DMN Decision Modelling Tool

BNAIC 2020

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KU Leuven — EAVISE
19 & 20 November 2020
1. DMN

2. IDP & Interactive Consultant

3. DMN-IDP

4. Demo
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DMN
Decision Model and Notation

- Notation standard for decision logic
- Published by OMG Group
- Table-based representation of decisions
- Decision Requirements Diagram
- Main focus: readability, traceability
Decision Requirements Diagram

- Represents structure of decision model
- Inputs, decision tables, knowledge sources, ...
Decision Tables

- Decide outputs (blue) based on inputs (green)
- Rows represent rules
- Columns represent values
- Behaviour defined by Hit Policy
- (S-)Feel in inputs

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Years of Service</th>
<th>Eligible5</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>&lt; 18</td>
<td>—</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>[18, 60]</td>
<td>≤ 10</td>
<td>No</td>
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<td>3</td>
<td>[18, 60]</td>
<td>≥ 10</td>
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<tr>
<td>4</td>
<td>≥ 60</td>
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IDP & INTERACTIVE CONSULTANT
IDP: Interactive Declarative Programming

- Implementation of the Knowledge Base Paradigm
  - Knowledge is stored in a Knowledge Base
  - Inference methods to apply knowledge
  - Goal: clear separation between knowledge and use
• Knowledge in KB is encoded using FO(·)
  - Extension of First Order Logic
  - Adds types, aggregates, (inductive) definitions and more
• Imperative Lua shell around reasoning engine
• Pierre Carbonnelle, Marc Denecker
• Interactive Consultant is an IDP-based interface
• User-friendly interaction with KB’s
• Features:
  - Propagating information in all directions
  - Reasoning on incomplete data
  - Can explain decisions
  - Showing which decisions are irrelevant
  - Optimization of terms
3 DMN-IDP
DMN-IDP combines DMN editor and Interactive Consultant:

- The knowledge base is in the form of a DMN model
- User can upload or create DMN models
- Automatic translation to FO(·)
- DMN models become useable in more situations
  - because of propagation and reasoning on incomplete data
Eligible for 5 extra days

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//Eligible for 5 extra days
{
  extra5() <- Age() < 18.
  extra5() <- Age() ≥ 60.
  extra5() <- Years_of_Service() ≥ 30.
}
DEMO
• DMN: user-friendly encoding of knowledge
• Models can be used in multiple ways
• IDP + Interactive Consultant “unlock” these usages by:
  - Reasoning on incomplete data
  - Propagating decisions in all directions
  - Explaining decisions
  - Allowing optimization
Thank you for your attention.
For further questions or discussion:
s.vandevelde@kuleuven.be

Try the tool yourself: https://DMN-IDP.herokuapp.com/

For more information on IDP:
https://dtai.cs.kuleuven.be/software/idp

For more information on Interactive Consultant:
https://idp-z3.be/interactive_consultant.html