cDMN: Combining DMN with Constraint Reasoning

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Presentation summary

The Decision Model and Notation (DMN) standard is a notation for modeling decision processes, designed to be easy to read and interpret. While DMN succeeds in achieving these goals, we find that it is not expressive enough for modeling complex problems.

To address this problem, we propose a rich extension to DMN, which adds a number of additional concepts that facilitate the modelling of complex problems. The key feature of this extension is constraint modelling, hence its name: Constraint Decision Modelling and Notation (cDMN) [1]. It offers a number of tools to express or use knowledge in an intuitive way: constraint tables, data tables, quantification, built-in optimisation and new data concepts. Because it is an extension to DMN, simplicity and readability are key; even though expressivity is greatly improved, cDMN's notation closely resembles that of DMN.

After a general overview of cDMN and its key features, we perform a more in-depth analysis of our proposed notation, by discussing a concrete cDMN implementation. We use a real-life example for this, which we submitted to the DM community website: a doctor planning for a hospital[2]. Using cDMN, we constructed an implementation that is readable like DMN, but expressive enough to represent all the rules the challenge poses. We show how the autoconfig interface[3] can be used for easy interaction with the knowledge. We then compare our implementation to the other available solutions submitted to the website.

We find that cDMN is able to create models that are both more compact and more readable than models created in standard DMN. Moreover, it is able to model more complex problems.

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[1] https://cdmn.readthedocs.io/en/latest/

[2] https://dmcommunity.org/challenge/challenge-apr-2020

[3] Ingmar Dasseville et al., 2016, "Combining DMN and the knowledge base paradigm-for flexible decision enactment".

Key takeaway: Constraint reasoning works well together with the DMN standard. Using cDMN, more complex systems can be modeled, which increases viability of cDMN in industrial settings.

Audience: Technical: advanced and new, Business: advanced.

Industry sectors: all

Key technologies: DMN, Constraint Reasoning, Knowledge Representation, Hybrid Systems