# Data Modeling and Interoperability

##### Session 1.2 (SEMANTiCS)

#### Time: Wednesday, September 18, 2024 - 10:40 to 12:00

#### Chair: Marco Brattinga

## **Talks**

### From Law to data and back - implementing and customizing a method

An insight into how the Tax Authorities of the Netherlands uses semantic knowledge models. Lawyers and IT professionals often do not speak the same language, but they must still understand each other well. Knowledge and meaning from legislation and regulations needs to be described in such a way that it can be used in implementation. Think about models of concepts, definitions, object types with properties, data and rules, all linked together. We developed a method to make models and we publish our models in a model library (RDF, platform and tool independed). These models are used as input for the development of software. Our story is not about software. Software is about automation. Our story is about what precedes it.

| L. van Bergen | Nicole Groot-Nibbelink |
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### Semantic Coupling of Digital Twins to derive Greenhouse Control Strategies

In the Dutch CODIT (Coupling Digital Twins) project, we combine and couple these digital twins in a semantically unambiguous manner using the Common Greenhouse Ontology (CGO), the standard for greenhouse data sharing. The value for greenhouse growers and advisors lies in better predictions on required climate, energy consumption, and production by combining the digital twins and enabling new business models. Our semantic solution makes it possible to exchange information with a commonly agreed meaning and format. In addition, our approach enables easy integration of other digital twins to be coupled and connected in the future, driving innovation. In this presentation, we will discuss the lessons learned in this use case when using a common ontology for coupling digital twins.

| David de Best | Klaas Andries de Graaf | Jack Verhoosel | Paolo de Heer |
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| Yvon Gankema | Seymour Lubbers | Marcel van Vliet |  |

### ModelDesk: Build and connect information models in any modeling language [SP]

Introducing ModelDesk, a platform to build and interconnect data and metadata models in any modeling language. We will present how we envision connected data modeling and how we enable interoperability between different modeling languages and metadata standards like RDFS/OWL/SHACL, SKOS, ER, MIM, OntoUML, DCAT, and more, with functionalities like model mappings. Furthermore, we will discuss how we aim to bridge the gap to achieve semantic interoperability between the business, information and knowledge professionals, data teams and developers.

| Pano MariaModelDesk |
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### Semantically Describing Predictive Models for Interpretable Insights into Lung Cancer Relapse

Machine learning (ML) is becoming increasingly important in healthcare decision-making, requiring highly interpretable insights from predictive models. Although integrating ML models with knowledge graphs (KGs) holds promise, conveying model outcomes to domain experts remains challenging, hindering usability despite accuracy. We propose semantically describing predictive model insights to overcome communication barriers. Our pipeline predicts lung cancer relapse likelihood, providing oncologists with patient-centric explanations based on input characteristics. Consequently, domain experts gain insights into both the characteristics of classified lung cancer patients and their relevant population. These insights, along with model decisions, are semantically described in natural language to enhance understanding, particularly for interpretable models like LIME and SHAP. Our approach, SemDesLC, documents ML model pipelines into KGs, and fulfills the needs of three types of users: KG builders, analysts, and consumers. Experts’ opinions indicate that semantic descriptions are effective for elucidating relapse determinants. SemDesLC is openly accessible on Figshare, promoting transparency and collaboration in leveraging ML for healthcare decision support.

| Yashrajsinh Chudasama | Disha Purohit | Philipp D. Rohde |
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| Enrique Iglesias | Maria Torrente | Maria-Esther Vidal |

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