TECHNISCHE UNIVERSITÄT DRESDEN

Faculty of Computer Science, Institute for Software- and Multimediatechnology

VISO

A Shared, Formal Knowledge Base as a Foundation for Semi-automatic InfoVis Systems

The Visualization Ontology (VISO) aims at formalizing knowledge from the domain of visualization. This supports the interoperability of visualization systems, allows for reusing existing knowledge and helps users to talk about common concepts.

MODULES

VISO is modularized into seven ontologies (Fig. 1). The most important parts are **GRAPHIC** (formalizing terms such as Graphic Attribute and Graphic Representation, **DATA** (allowing to characterize data variables and structures), and **ACTIVITY** (being concerned with the human aspects of visualization, i.e. Tasks, Actions and Operations). The **FACTS** module formalizes constraints and rankings (e.g. of graphic relations) that have been described in literature and makes this knowledge available to tools. **SYSTEM**, **USER** and **DOMAIN** allow for describing the visualization context and domain-specific facts. An example use case that illustrates how these modules are used in combination is shown below.

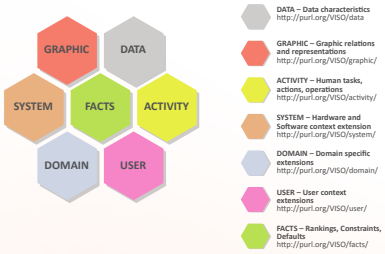


Fig. 1 - Modularization: VISO is a composite of seven ontologies, each focusing on a different field of visualization

CALL FOR PARTICIPATION

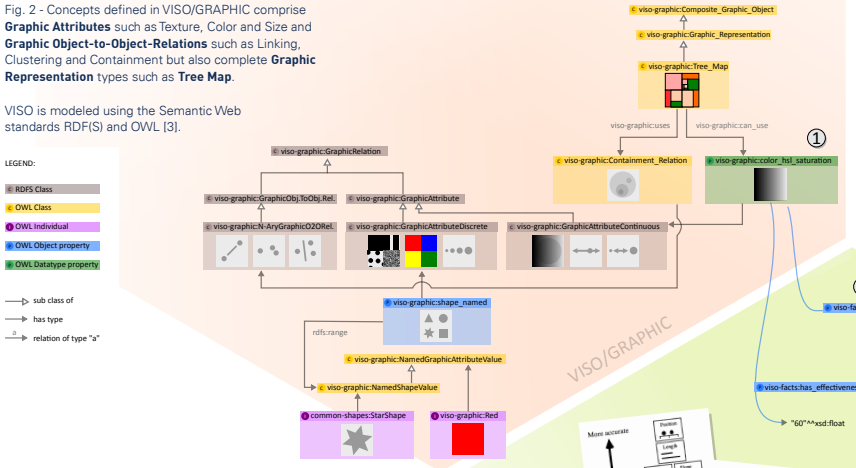
As ontologies represent shared knowledge, we encourage other researchers from the field of visualization and human computer interaction to discuss the terms we chose for the initial version of the ontology, in order to yield a both broadly accepted and logically consistent knowledge base. You are welcome to contribute to the VISO development process by critizising, suggesting new extensions or joining the developers.

An beta version of VISO and our blog can be found at:

http://purl.org/viso/

Fig. 2 - Concepts defined in VISO/GRAPHIC comprise **Graphic Attributes** such as Texture, Color and Size and **Graphic Object-to-Object-Relations** such as Linking, Clustering and Containment but also complete **Graphic Representation** types such as **Tree Map**.

VISO is modeled using the Semantic Web standards RDF(S) and OWL [3].



The numbers ① - ③ point to a concrete example showing how the three modules GRAPHIC, DATA and FACTS are related: For the graphic attribute **Saturation** ① (viso-graphic:color_hsl_saturation) it is stated in the FACTS module ② that saturation can **express** data with an **Ordinal scale of measurement** ③.

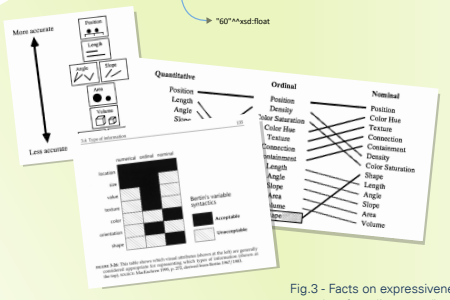


Fig.3 - Facts on expressiveness and effectiveness are taken from literature (here shown: rankings given by Mackinlay [2] and Engelhardt [1], in turns based on Bertin, Cleveland and McGill).

VISO USE CASES

Classify visualizations
- support the search for visualizations and papers
- discover neglected research areas

Offer knowledge for semi-automatic visualization design systems
- machine-readable and -"understandable"
- shareable and based on Semantic Web standards

Consolidate visualization vocabulary
- clarify synonyms, homonyms and term overlap

References: [1] Engelhardt, J. : The Language of Graphics. PhD thesis, Institute for Logic, Language & Computation, University of Amsterdam., 2002. ; [2] Mackinlay, J.: Automating the design of graphical presentations of relational information. ACM Trans. Graph. 5, 1986. ; [3] Bechhofer, S., Van Harmelen, F., Hendler, J., Horrocks, I., McGuinness, D. L., Patel-Schneider, P. F., and Stein, L. A.: OWL web ontology language reference. W3C recommendation, 2004.

Jan Polowinski and Martin Voigt
E-Mail: {jan.polowinski, martin.voigt}@tu-dresden.de
Web: http://purl.org/viso/

TU Dresden, Faculty of Computer Science
Institute for Software- and Multimediatechnology
D-01062 Dresden

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