

The SWRC Ontology – Semantic Web for Research Communities

York Sure, Stephan Bloehdorn, Peter Haase,
Jens Hartmann, and Daniel Oberle

University of Karlsruhe, Institute AIFB, D-76128 Karlsruhe, Germany
{sure, bloehdorn, haase, hartmann, oberle}@aifb.uni-karlsruhe.de
<http://www.aifb.uni-karlsruhe.de/WBS>

Abstract. Representing knowledge about researchers and research communities is a prime use case for distributed, locally maintained, interlinked and highly structured information in the spirit of the Semantic Web. In this paper we describe the publicly available ‘Semantic Web for Research Communities’ (SWRC) ontology, in which research communities and relevant related concepts are modelled. We describe the design decisions that underlie the ontology and report on both experiences with and known usages of the SWRC Ontology. We believe that for making the Semantic Web reality the re-usage of ontologies and their continuous improvement by user communities is crucial. Our contribution aims to provide a description and usage guidelines to make the value of the SWRC explicit and to facilitate its re-use.

1 Introduction

One of the driving forces of the Semantic Web is the need of many communities to put machine-understandable data on the Web which can be shared and processed by automated tools as well as by people. Representing knowledge about researchers, research communities, their publications and activities as well as about their mutual interrelations is a prime use case for distributed, locally maintained, interlinked and highly structured information in the spirit of the Semantic Web.

The SWRC ontology – initially phrased *Semantic Web Research Community Ontology* – which we will describe in this paper, generically models key entities in a typical research community and reflects one of the earliest attempts to put this usage of Semantic Web Technologies in academia into practice.

The SWRC ontology initially grew out of the activities in the KA² project [1]. By then it was already used in the context of Semantic Community Web Portals [2] and has been ported to various knowledge representation languages including both Semantic Web Standards like RDF(S) or DAML+OIL and other languages like F-Logic consecutively. In the most recent versions, the SWRC ontology has been released in OWL format¹. Since its initial versions it has

¹ The SWRC ontology itself and some of its extensions are available via <http://ontoware.org/projects/swrc/>

been used and adapted in a number of different settings, most prominently for providing structured metadata for web portals. These include the web portal of the authors' institute AIFB and for the portals in the research projects OntoWeb and SemIPort. These and other usages of the ontology in different settings will be described later on.

In this paper, we will focus on describing the SWRC ontology and on making the design considerations explicit that have led to a particular modelling approach. We show a number of typical modelling problems and report on their solutions. While some of the issues that arose in modelling the SWRC ontology are domain specific – sometimes also specific to the chosen modelling language, e.g. OWL – others appear to be more general and may thus serve as a handy reference for knowledge engineers. At the same time this paper aims at providing usage guidelines for the SWRC ontology.

The remainder of this paper is structured as follows. Section 2 gives an initial overview over the ontology itself and the modelled domain. Section 3 reviews the critical design considerations made and discusses alternatives. Section 4 lists a number of guidelines for users and systems working with the SWRC ontology while Section 5 reports on three prototypical usages of the ontology. Finally, Section 6 reviews related schemas and discusses their relation to the SWRC ontology. We conclude in Section 7.

2 Overview of the Ontology

The SWRC ontology generically models key entities relevant for typical research communities and the relations between them. The current version of the ontology comprises a total of 53 concepts in a taxonomy and 42 object properties, 20 of which are participating in 10 pairs of inverse object properties. All entities are enriched with additional annotation information.

SWRC comprises a total of six top level concepts, namely the **Person**, **Publication**, **Event**, **Organization**, **Topic** and **Project** concepts. Figure 1 shows a small portion of the SWRC ontology with its main top-level concepts and relations. The **Person** concept models any kind of human person and a large number of properties restrict their domain or range to individuals of this concept like **studiesAt** or **author**, respectively. The **Person** concept is specialized by a large number of – not necessarily disjoint – subconcepts, e.g. **Employee**, **Student** and the like. The **Event** concept is meant to model different types of events and is thus specialized by a wide range of concepts including events like **Lecture** or **Conference**. The **Publication** concept subsumes all different types of research publications modelled in close correspondence with the well known **BIBTEX** publication types like **Article** or **InProceedings**. The **Organization** and **Project** concepts model more abstract concepts like the subconcepts **Department** or **SoftwareProject**, respectively. Both concepts can participate in a large number of relations like for example to the **Person** concept via the **employs** or **member** relations. The **Topic** captures arbitrary topics of interest which are arranged on the instance level via the **subTopic** relation.