

Using an Ontology of Historical Events in Semantic Portals for Cultural Heritage

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1 Introduction

We argue that an ontology of historical events is needed in semantic portals for cultural heritage due to three reasons. First, ontological identifiers (URIs) of events, such as the World War II or the coronation of Napoleon, are needed in order to make collection metadata mutually interoperable in terms of related events—in the same vein as identifiers are needed for identifying artifact types, persons, and geographic locations when annotating collection items. Second, events are of central importance in creating semantic links between cultural contents in applications such as recommendation systems. Third, historical events are important as content items of their own, forming the backbone of chronological histories.

2 An Event Ontology of Finnish History

To test and verify these arguments, we are creating a historical event ontology focusing on Finnish history, based on the timeline created by the Agricola network¹ of Finnish historians. The ontology is being used in the semantic portal “CULTURESAMPO—Finnish Culture on the Semantic Web” [1, 2], a cross-domain follow-up system of MuseumFinland [3]. The ontology is based on a temporal classification of events on a temporal timeline. This hierarchy is used for organizing different events, as customary in history. The events can also be classified along other dimensions, such as event type (e.g., war, coronation etc.) or branch of history (e.g., political history, history of science etc.).

For the first prototype, we annotated manually 220 events between the years 1850–1920 using the SAHA annotation tool [4] coupled with ONKI ontology library servers² for using shared domain ontologies. The resulting history ontology defines URIs for events of historical importance and can be used in annotating other cultural objects (e.g., a crown used in a particular coronation event), and relating them with each other. In addition, each historical event was annotated by 1) a set of instances of concepts of the general Finnish upper ontology YSO³

¹ <http://agricola.utu.fi/hist/kronologia/index.php>

² <http://www.seco.tkk.fi/services/onki/>

³ <http://www.yso.fi/>

of some 20,000 concepts and relations between them. The event-based approach of CULTURESAMPO was used in annotations for interoperability [5] with emphasis on perduring concepts, such as “fighting”, that have thematic roles with fillers attached (agent, goal, place, time, etc.) [6]. In addition, events can have mutual part-of, next-event, and consequence relations. In this way, historical events can be used—based on their metadata and literal descriptions in natural language—as search objects of their own in the portal. At the same time, event-based metadata makes it possible to provide the end-user with insightful semantic recommendations with explanations, e.g., links to artifacts, documents, or persons related to the same event in different roles [7].

The ontology with related events is being embedded in the CULTURESAMPO knowledge base. In addition, the event timeline will be used as a view for the end-users for accessing and recommending cultural contents through historical events.

Acknowledgements

This research is part of the National Finnish Ontology Project (FinnONTO) 2003-2007⁴, funded mainly by The National Technology Agency (Tekes) and a consortium of 36 companies and public organizations.

References

1. Hyvönen, E., Ruotsalo, T., Häggström, T., Salminen, M., Junnila, M., Virkkilä, M., Haaramo, M., Kauppinen, T., Mäkelä, E., Viljanen, K.: CultureSampo—Finnish culture on the semantic web. The vision and first results. In: *Semantic Web at Work—Proceedings of STeP 2006*. To appear in: Klaus Robering (Ed.), *Information Technology for the Virtual Museum*. LIT Verlag. (2007)
2. Junnila, M., Hyvönen, E., Salminen, M.: Describing and linking cultural semantic content by using situations and actions. In: *Semantic Web at Work—Proceedings of STeP 2006*. To appear in: Klaus Robering (Ed.), *Information Technology for the Virtual Museum*. LIT Verlag. (2007)
3. Hyvönen, E., Mäkelä, E., Salminen, M., Valo, A., Viljanen, K., Saarela, S., Junnila, M., Kettula, S.: MuseumFinland—Finnish museums on the semantic web. *Journal of Web Semantics* **3**(2) (2005) 224–241
4. Valkeapää, O., Alm, O., Hyvönen, E.: Efficient content creation on the semantic web using metadata schemas with domain ontology services. In: *Proceedings of ESWC 2007*, Innsbruck, Austria, Springer (2007)
5. Ruotsalo, T., Hyvönen, E.: An event-based approach for semantic metadata interoperability. In: *Proceedings of ISWC 2007*, Busan, Korea, Springer (2007)
6. Sowa, J.: *Knowledge Representation. Logical, Philosophical, and Computational Foundations*. Brooks/Cole (2000)
7. Ruotsalo, T., Hyvönen, E.: A method for determining ontology-based semantic relevance. In: *Proceedings of the International Conference on Database and Expert Systems Applications DEXA 2007*, Regensburg, Germany, Springer (2007)

⁴ <http://www.seco.tkk.fi/projects/finnonto/>