Proceedings of the 9th World Congress on Electrical Engineering and Computer Systems and Sciences (EECSS'23)
Brunel University, London, United Kingdom - August 03-05, 2023
Paper No. MHCI 103
DOI: 10.11159/mhci23.103

A New Approach to Processing Semantic Heterogeneity in Adapted Multimedia Documents Based on Ontology Alignment

Farida Bettou [1]
[1]Higher Normal School El Katiba Assia Djebar (ENSC)
Constantine, Algeria
[1]bettou.farida@ensc.dz

Extended Abstract

One of the challenging aspects of any mobile multimedia application is the adaptation of multimedia documents so that their last can be displayed on multiple platforms (laptops, smartphones, tablets, etc.). Ontologies are increasingly used in several fields, particularly in knowledge representation and the Semantic Web. In the recent work, a semantic framework for multimedia document adaptation was proposed [1-2-3-4]. Ontologies make the heterogeneity problems of multimedia quality services easier, faster, and more automatic. The cause of the heterogeneity problems in the adapted multimedia document ontology is the constraints on the context and the user preferences. In the literature, many propositions of specific ontology for the adaptation of multimedia documents. The proposed ontologies have the great advantage of offering users a flexible infrastructure to easily govern the response time and the quality assembly of their applications at runtime.

In the process, the construction of the global ontology adaptation of the multimedia document corresponds to the application of a succession of operations of change (add new mappings). This is a critical task because the new implementation of changes can make the global ontology incoherent. To handle these contradictions, the authors propose in this study using the ontology alignment process is a big challenge, especially in open environments like the semantic web. The approach consists of trees phases: abstracting the original content format to find the conflicts, followed by the semantic enrichment phase, which consists in adding or modifying the concepts and relations of the original document ontology, and the mapping phase. The enrichment phase is based on the analysis of the information developed by the ontologies to adapt the multimedia document, which consists in adding or modifying the concepts and relations of the original document ontology. Our intuition is that this information as well as the relations that can exist between them is used in semantic enrichment between the concepts. At the end of the enrichment phase, the ontology contains more semantic relations between its concepts that will be exploited in the third phase. The phase of mapping takes two enriched ontologies and calculates the similarity between the couples of concepts; we define new similarity calculation rules for the adapted multimedia document ontology. A process of filtering enables us to automatically reduce the number of false relations. The validation of the correspondences is a direct interactive process (with an expert) or indirect (by measuring the satisfaction level of the user). To evaluate users' satisfaction levelmance of their proposal, an experimental study has been made on some real scenarios. When tested and compared with some existing approaches.

References

[1] Khallouki H., Bahaj M., Roose P., Laborie S. SMPMA: Semantic multimodal Profile for Multimedia documents adaptation, In Proceedings of the 5th IEEE International Workshop on Codes, Cryptography and Communication Systems (IWCCCS'14), 27-28 Nov 2014, 142-147, ElJadida, Morocco.

[2] Lemlouma T. and Layaïda N., "The Negotiation of Multimedia Content Services in Heterogeneous Environments," in Proceedings of the 8 International Conference on Multimedia Modeling, Amsterdam, pp. 187-206, 2001.

[3] J. Euzenat, N. Layaïda, and V. Dias. A semantic framework for multimedia document adaptation. In Proceedings of the 18th International Joint Conference on Artificial Intelligence (IJCAI), pages 31–36, 2003

[4] Asma Saighi, Zakaria Laboudi, Philippe Roose, Sébastien Laborie, Nassira Ghoualmi-Zine. On Using Multiple Disabilities Profiles to Adapt Multimedia Documents. International Journal of Information Technology and Web Engineering, Idea group publishing, 2020, 15 (3), pp.34-60.