Annotated Bibliography on Ontology Matching

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Evaluation of two heuristic approaches to solve the ontology meta-matching problem

Nowadays many techniques and tools are available for addressing the ontology matching problem, however, the complex nature of this problem causes existing solutions to be unsatisfactory. This work aims to shed some light on a more flexible way of matching ontologies. Ontology meta-matching, which is a set of techniques to configure optimum ontology matching functions. In this sense, we propose two approaches to automatically solve the ontology meta-matching problem. The first one is called maximum similarity measure, which is based on a greedy strategy to compute efficiently the parameters which configure a composite matching algorithm. The second approach is called genetics for ontology alignments and is based on a genetic algorithm which scales better for a large number of atomic matching algorithms in the composite algorithm and is able to optimize the results of the matching process (Martinez-Gil & Aldana-Montes, 2011).

Optimizing Ontology Alignments by Using Genetic Algorithms

In this work we present GOAL (Genetics for Ontology Alignments) a new approach to compute the optimal ontology alignment function for a given ontology input set. Although this problem could be solved by an exhaustive search when the number of similarity measures is low, our method is expected to scale better for a high number of measures. Our approach is a genetic algorithm which is able to work with several goals: maximizing the alignment precision, maximizing the alignment recall, maximizing the f-measure or reducing the number of false positives. Moreover, we test it here by combining some cutting-edge similarity measures over a standard benchmark, and the results obtained show several advantages in relation to other techniques (Martinez-Gil et al., 2008).

Reverse ontology matching

Ontology Matching aims to find the semantic correspondences between ontologies that belong to a single domain but that have been developed separately. However, there are still some problem areas to be solved, because experts are still needed to supervise the matching processes and an efficient way to reuse the alignments has not yet been found. We propose a novel technique named Reverse Ontology Matching, which aims to find the matching functions that were used in the original process. The use of these functions is very useful for aspects such as modeling behavior from experts, performing matching-by-example, reverse engineering existing ontology matching tools or compressing ontology alignment repositories. Moreover, the results obtained from a widely used benchmark dataset provide evidence of the effectiveness of this approach (Martinez-Gil & Aldana-Montes, 2010).

An overview of current ontology meta-matching solutions

Nowadays, there are a lot of techniques and tools for addressing the ontology matching problem; however, the complex nature of this problem means that the existing solutions are unsatisfactory. This work intends to shed some light on a more flexible way of matching ontologies using ontology meta-matching. This emerging technique selects appropriate algorithms and their associated weights and thresholds in scenarios where accurate ontology matching is necessary. We think that an overview of the problem and an analysis of the existing state-of-the-art solutions will help researchers and practitioners to identify the most appropriate specific features and global strategies in order to build more accurate and dynamic systems following this paradigm (Martinez-Gil & Aldana-Montes, 2012).

MaF: An Ontology Matching Framework

In this work, we present our experience when developing the Matching Framework (MaF), a framework for matching ontologies that allows users to configure their own ontology matching algorithms and it allows developers to perform research on new complex algorithms. MaF provides numerical results instead of logic results provided by other kinds of algorithms. The framework can be configured by selecting the simple algorithms which will be used from a set of 136 basic algorithms, indicating exactly how many and how these algorithms will be composed and selecting the thresholds for retrieving the most promising mappings. Output results are provided in a standard format so that they can

be used in many existing tools (evaluators, mediators, viewers, and so on) which follow this standard. The main goal of our work is not to better the existing solutions for ontology matching, but to help research new ways of combining algorithms in order to meet specific needs. In fact, the system can test more than 6 * 136! possible combinations of algorithms, but the graphical interface is designed to simplify the matching process (Martinez-Gil et al., 2012).

References

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