Annotated Bibliography on Knowledge Bases

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Accurate and efficient profile matching in knowledge bases

A profile describes a set of properties, e.g. a set of skills a person may have, a set of skills required for a particular job, or a set of abilities a football player may have with respect to a particular team strategy. Profile matching aims to determine how well a given profile fits to a requested profile and vice versa. The approach taken in this article is grounded in a matching theory that uses filters in lattices to represent profiles, and matching values in the interval [0,1]: the higher the matching value the better is the fit. Such lattices can be derived from knowledge bases to represent the knowledge about profiles. An interesting question is, how human expertise concerning the matching can be exploited to obtain most accurate matchings. It will be shown that if a set of filters together with matching values by some human expert is given, then under some mild plausibility assumptions a matching measure can be determined such that the computed matching values preserve the relevant rankings given by the expert. A second question concerns the efficient querying of databases of profile instances. For matching queries that result in a ranked list of profile instances matching a given one it will be shown how corresponding top-k queries can be evaluated on grounds of pre-computed matching values. In addition, it will be shown how the matching queries can be exploited for gap queries that determine how profile instances need to be extended in order to improve in the rankings (Martinez-Gil et al., 2018).

Automated knowledge base management: A survey

A fundamental challenge in the intersection of Artificial Intelligence and Databases consists of developing methods to automatically manage Knowledge Bases which can serve as a knowledge source

for computer systems trying to replicate the decision-making ability of human experts. Despite of most of the tasks involved in the building, exploitation and maintenance of KBs are far from being trivial, and significant progress has been made during the last years. However, there are still a number of challenges that remain open. In fact, there are some issues to be addressed in order to empirically prove the technology for systems of this kind to be mature and reliable (Martinez-Gil, 2015).

Top-k Matching Queries for Filter-Based Profile Matching in Knowledge Bases

Finding the best matching job offers for a candidate profile or, the best candidates profiles for a particular job offer, respectively constitutes the most common and most relevant type of queries in the Human Resources (HR) sector. This technically requires to investigate top-k queries on top of knowledge bases and relational databases. We propose in this paper a top-k query algorithm on relational databases able to produce effective and efficient results. The approach is to consider the partial order of matching relations between jobs and candidates profiles together with an efficient design of the data involved. In particular, the focus on a single relation, the matching relation, is crucial to achieve the expectations (Paoletti et al., 2016).

Extending Knowledge-Based Profile Matching in the Human Resources Domain

In the Human Resources domain the accurate matching between job positions and job applicants profiles is crucial for job seekers and recruiters. The use of recruitment taxonomies has proven to be of significant advantage in the area by enabling semantic matching and reasoning. Hence, the development of Knowledge Bases (KB) where curricula vitae and job offers can be uploaded and queried in order to obtain the best matches by both, applicants and recruiters is highly important. We introduce an approach to improve matching of profiles, starting by expressing jobs and applicants profiles by filters representing skills and competencies. Filters are used to calculate the similarity between concepts in the subsumption hierarchy of a KB. This is enhanced by adding weights and aggregates on filters. Moreover, we present an approach to evaluate over-qualification and introduce blow-up operators that transform certain role relations such that matching of filters can be applied (Paoletti et al., 2015).

Maintenance of Profile Matchings in Knowledge Bases

A profile describes a set of properties, e.g. a set of skills a person may have or a set of skills required for a particular job. Profile matching aims to determine how well a given profile fits to a requested profile. Profiles can be defined by filters in a lattice of concepts derived from a knowledge base that is grounded in description logic, and matching can be realized by assigning values in [0,1] to pairs of such filters: the higher the matching value the better is the fit. In this paper the problem is investigated, whether given a set of filters together with matching values determined by some human expert a matching measure can be determined such that the computed matching values preserve the rankings given by the expert. In the paper plausibility constraints for the values given by an expert are formulated. If these plausibility constraints are satisfied, the problem of determining a ranking-preserving matching measure can be solved (Martinez-Gil et al., 2016).

References

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