Towards Tailored Domain Ontologies

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Introduction. The goal of domain ontology is to provide a common conceptual vocabulary to members of a virtual community of users who need to share their information in a particular domain (such as medical, tourism, banking, agricultural). The identification and definition of concepts that describe the domain knowledge requires a certain consensus. Generally, each member or subcommunity holds some knowledge, he has its own view on the domain, and he describes it with his own vocabulary. Thus, to reach a consensus allowing to reflect a common view of the domain can be a difficult task and even more harder if members are geographically dispersed. One way very widely used is to start from pre-existent elements in the domain: text corpus, taxonomies, ontology fragments, and to exploit them as a basis for gradually defining the domain ontology [2][7].

In this short paper, we present an approach using Ontology Matching techniques [1][5][6][3] for building a tailored domain ontology, starting from a general domain taxonomy and several pieces of knowledge given by different partners.

Our strategy is to design a mediator, firstly to reach an agreement with each partner on their knowledge fragments that will be part to the shared domain ontology, and secondly to conciliate these various fragments by linking and structuring the concepts that compose them. As a mediator ontology, in our case study we use a public taxonomy that exists for describing subject fields in agriculture, forestry, fisheries, food and related domains (e.g. environment), called AGROVOC[3]. The resulting domain ontology combines the following two features: (*i*) it is the portion of the general taxonomy that is relevant to the considered application domain as seen by each partner, (*ii*) it is completed and tailored by relations and properties coming from partner's data. Fig. 1 shows an example of a domain ontology *DO* built starting from two local ontologies LO_1 and LO_2. *DO*'s concepts prefixed with *ag* are from AGROVOC. One can see that in *DO Plan_products* and *Varieties* are related and also that they are related to attributes *price* and *surface*, which is not the case in AGROVOC.

Reaching an agreement with a partner. This is the first step of our general approach. Each partner's fragment knowledge is represented by a **Local Ontology**, denoted by *LO*. The agreement between the mediator and the partner is concluded based on a matching between *LO* and the mediator ontology *MO*. It is consented by the partner that each concept of *LO* which can be associated with a concept of *MO*, called its anchor, will be a concept of the tailored domain

[3] http ://www4.fao.org/agrovoc/

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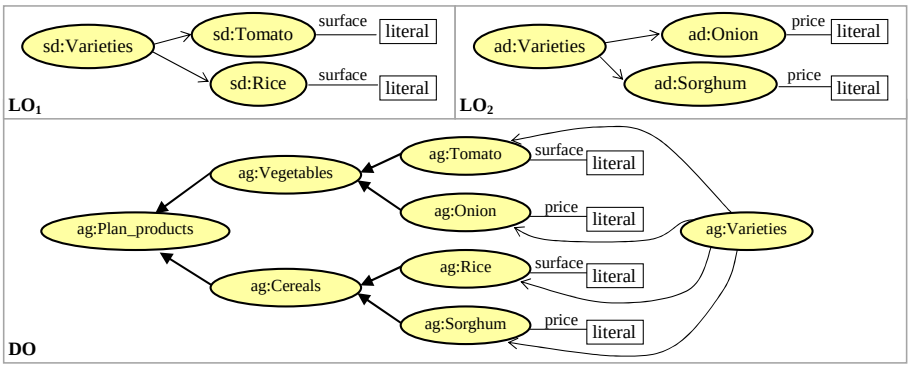

Fig. 1. Domain Ontology built starting from LO_1 and LO_2.

ontology DO. This agreement is also an ontology composed by the anchored concepts of LO with their anchor, as well as the local relationships between them.

Conciliation. Once the mediator has found an agreement with each partner on the concepts which must be part to the domain ontology, it applies a conciliation phase at the end of which the domain ontology is built. This is an incrementaly phase, the local ontologies are conciliated by integrating their agreement into the domain ontology DO, one after another. To achieve efficiently this phase, (i) the mediator ontology is partitioned into blocks, according to Falcon-AO method [4] and (ii) conflict resolution strategies are applied. Each block is a sub-ontology of MO containing semantically close concepts. Our algorithm relies on this classiffication in order to find links that exist between the concepts already present in the domain ontology and those of the new local ontology to conciliate.

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