

AN AGENT-BASED ELECTRONIC MARKET SIMULATOR ENHANCED WITH ONTOLOGY MATCHING SERVICES AND EMERGENT SOCIAL NETWORKS

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ABSTRACT

AEMOS is a simulator which aims to support the development of agent-based electronic markets capable of dealing with the natural semantic heterogeneity existent in this kind of environment. AEMOS simulates a marketplace which provides ontology matching services, enhanced with the exploitation of emergent social networks, enabling an efficient and transparent communication between agents, even when they use different ontologies. The system recommends possible alignments between the agent's ontologies, and lets them negotiate and decide which alignment should be used to translate the exchanged messages. In this paper we propose a new ontology alignment negotiation process, which promotes the reutilization and combination of already existent alignments, as well as the involvement of the business agents in the alignment composition process. With this new model, we aim to achieve a higher adequacy of the used alignments, as well as a more accurate and trustful evaluation of the alignments.

Keywords: agent mediated e-commerce, agent-based simulation, ontology alignment negotiation, emergent social networks

1. INTRODUCTION

E-commerce is a widely used technology which presents several advantages when compared to the traditional commerce (Du et al., 2005). Among these advantages is the availability and accessibility of information. However, the amount of available information also becomes a problem, being difficult for a human user to compare all possible deals in order to achieve the best one.

The rapid growth of e-commerce has increased the demand for automated processes to support both customers and suppliers in buying and selling products (Huang et al., 2010). In this context, the use of software agents as mediators in e-commerce has been receiving an increasing attention (Zhang et al., 2011). However, in e-commerce, the involved entities may possess different conceptualizations about their needs and capabilities, giving rise to a semantic heterogeneity

problem that is seen as a corner stone for agents' interoperability (Nascimento et al., 2013b).

In order to provide a solution for this problem we developed the AEMOS system (Nascimento et al., 2013a, Nascimento et al., 2013b, Viamonte et al., 2012, Viamonte et al., 2011). AEMOS is an agent mediated e-commerce (AMEC) simulator which simulates a marketplace that provides ontology services in order to facilitate the interoperability between agents that have different conceptualizations, i.e., use different ontologies. The system follows an ontology-based information integration approach, exploiting the ontology matching paradigm (Euzenat and Shvaiko, 2007), selecting and suggesting possible alignments between the agents' ontologies and letting them choose which ones to use to translate the subsequent exchanged messages.

Conversely to other similar approaches for AMEC (Malucelli et al., 2006), AEMOS is not restricted to the use of a determined ontology matching technique, nor does it include such a complex and time consuming process as the discovery of correspondences between ontologies (i.e. ontology matching process) within the business negotiation process itself. In our system, this process is performed by specialized matching agents in parallel to the market activities as new ontologies are registered. Moreover, considering that agents may use publicly shared ontologies, our approach also allows collecting already existent ontology alignments from web repositories, promoting their reutilization.

Nevertheless, this approach raises the possibility of multiple alignments between a pair of ontologies. Each alignment might be more or less adequate depending on the context of the negotiation and therefore affect its efficiency and result. To overcome this issue, we developed a simulator where we can explore relationships that emerge as the agents interact with each other, applying social network analysis (SNA) techniques (Wasserman and Faust, 1994), in order to improve ontology alignment recommendations as well as supporting agents in their decisions.

Despite being successful in providing an efficient and transparent negotiation between agents, even when they use different ontologies for the same domain, we

consider that this process can be further improved by ensuring a higher quality/adequacy of the used alignments. This can be achieved by combining the results of different specialized matching agents, i.e. combining parts of different ontology alignments. For that, we propose a new model for the ontology services where agents can negotiate the composition of the ontology alignment to be used to translate the subsequent exchanged messages, instead of selecting an existing one. This new model promotes not only the reutilization of existent ontology alignments, but also their combination, allowing achieving more adequate or complete alignments. Involving the business agents in the ontology alignment composition process allows excluding irrelevant correspondences, achieving a more adequate alignment as well as a more accurate and trustful evaluation.

In this paper we present a detailed description of the new ontology services model proposal. We start by presenting a brief overview of AEMOS (Section 2). Then we detail the new ontology alignment negotiation process (Section 3) and present the required adaption of the social network based support model (Section 4). Then we present a brief comparison with our previous model (Section 5). Finally we draw some conclusions and suggest follow-up research efforts (Section 6).

2. AEMOS SYSTEM OVERVIEW

AEMOS (Agent-based Electronic Market with Ontology Services) is an innovative project (PTDC/EIA-EIA/104752/2008) supported by the Portuguese Agency for Scientific Research (FCT). In this system, agents representing consumers and suppliers negotiate with each other autonomously in order to satisfy the business goals of the entity each represents. The agents customize their behaviour adaptively by learning each user's preference model and business strategies (Viamonte et al., 2007).

The system simulates a marketplace which provides ontology matching services in order to enable communication between agents that use different ontologies. In order to overcome issues related to how the used ontology alignment may influence the business negotiation efficiency, the system includes a component based in emergent social networks (SN), capable of improving the ontology alignments recommendations and supporting the agents' decisions about which alignment to choose.

In this section we present only the key aspects in understanding the functioning of the system. This description is based in (Nascimento et al., 2013a), which presents a recent overview of the AEMOS project. A more detailed description of the ontology services model and SN-based support component can also be found in (Nascimento et al., 2013b).

2.1. Multi-Agent Model

The multi-agent model includes several types of agents divided into two main groups namely, business agents and supporting agents.

The business agents are those representing real world entities with business goals to satisfy. The main types of business agents are: Buyers (B) – representing consumers; and Sellers (S) – representing suppliers.

The supporting agents are those supporting the communication and negotiation between business agents, being responsible for the market's correct functioning. The most relevant supporting agents in the interaction protocol are: Market Facilitator (MF) – an intermediary to the negotiation process, responsible for the establishing communication between potential business partners and ensure they are able to understand each other; Ontology Matching intermediary (OM-i) – agent responsible for the ontology matching services; and Social Network intermediary (SN-i) – agent responsible for the SN-based support.

2.2. Interaction Protocol

To participate in the market, the business agents must register first. During the registration they provide information about the ontologies they use and share (parts of) the profile of the entity they represent. This information is stored by MF and SN-i agents. Once registered, the agents are allowed to negotiate. For that, B agents start announcing their buying products and wait for S agents to formulate proposals. Figure 1 illustrates the interactions between the main actors during a business negotiation.

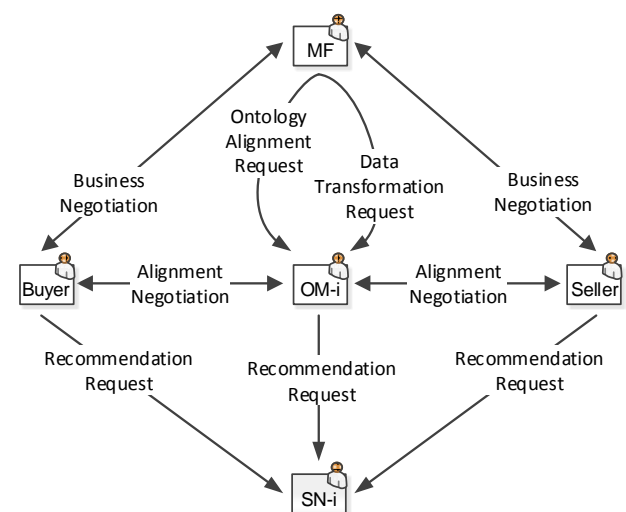


Figure 1: Main Interactions between Agents during a Business Negotiation (Nascimento et al., 2013a)

When the negotiation starts, the responsible MF selects the S agents that might be able to satisfy the B agent's request. For that it follows an ontology-based approach, selecting: (i) the S agents that use the same ontology as the B; and, (ii) supported by an OM-i, the ones that use ontologies that can be aligned with it. Therefore, the business negotiations may occur in two different scenarios: (i) a scenario where both agents use the same ontology; and (ii) a scenario where the agents use different ontologies.

In the first scenario the MF acts as a proxy between B and S, simply receiving and forwarding

messages. While in the second, it is necessary to find an agreement about the alignment between the respective ontologies. For that the MF requests an OM-i to mediate an ontology alignment negotiation between B and S. If an agreement is achieved, the subsequent exchanged messages are sent to the OM-i, which translates their content according to the agreed alignment, ensuring that the message receiver will be able to understand it.

During the business negotiation the involved agents, B and S, exchange proposals and counterproposals, following a protocol based on the FIPA's "Iterated Contract Net Interaction Protocol Specification" (FIPA, 2002). The negotiation terminates when an agreement is achieved or when the agents have no more proposals to formulate. When a business agent satisfies all its business goals, or its deadlines are reached, it must terminate its activity, notifying the market and declaring the achieved results.

2.3. Ontology Alignment Negotiation

The ontology alignment negotiation initiates when a MF sends a request to an OM-i identifying (i) both business agents, (ii) the respective ontologies and (iii) providing information about the B agent's request.

The OM-i selects, from its repository, all the possible alignments between the indicated ontologies. Then, it performs sorting and filtering actions, following its internal criteria and/or requesting a SN-i to rank the alignments, obtaining a list of possible alignments and their respective score. Both B and S, analyze the recommended alignments taking into account their preferences, replying to the OM-i with the list of the alignments which they consider acceptable.

The OM-i analyzes both replies and checks if there is an agreement, i.e., if some alignment was selected by both agents. If there is no agreement, depending on the system configuration, the negotiation may terminate, or proceed, with the OM-i refining its list of recommended alignments and asking agents to reconsider their options and criteria. Otherwise, if there is an agreement, the OM-i notifies both agents and the MF about the agreement and proceeds with the transformation of the B agent's request. From that moment on, all the subsequent exchanged messages between the agents are forward to the OM-i for transformation.

2.4. Ontology Matching Services

When two agents that use different ontologies wish to exchange messages, a set of intermediary steps are necessary, namely: (i) discovering the correspondences between both ontologies – ontology matching process; (ii) represent the discovered correspondences so they can be applied in data transformation – ontology alignment document specification; and (iii) transform the content of the message according to the ontology alignment – ontology's instances transformation process.

In order to improve performance, in AEMOS, the ontology matching process is performed by specialized

matching agents, in parallel to the market activity. When a new ontology is registered (e.g. during a business agent's registration), the specialized matching agents are notified. These then try to find correspondences between this new ontology and the already existing ones, using different techniques. The discovered alignments are reported to the OM-i which stores them in a repository. These alignments are then recommended during the ontology alignment negotiation process.

2.5. Social Network based Support

During the market activity, the SN-i collects information about its participants and their interactions. The SN-i then builds and maintains a relationship graph, applying SNA techniques (Wasserman and Faust, 1994) in order to capture proximity relations between agents, and adequacy relations from alignments to agents, which emerge during the agents' activities in the market. By combining this information, the SN-i is able to evaluate the adequacy of the alignments to each business negotiation.

3. ONTOLOGY ALIGNMENT NEGOTIATION PROCESS PROPOSAL

The results achieved following the approach described in the previous section, shown that by selecting more adequate alignments the agents normally achieve a higher business satisfaction, as the negotiation efficiency is improved (Nascimento et al., 2013b).

In this paper we propose a new ontology alignment negotiation process in order to increase the adequacy of the used alignments. We support the idea that, since the alignments are discovered using different techniques, each may include correspondences that are not included in the others. Therefore, more adequate/complete alignments may be achieved by combining parts of the already existing ones.

In this new ontology alignment negotiation model, we propose to reduce the granularity in the negotiation in order to achieve more adequate alignments. The agents negotiate each correspondence between ontology entities (i.e. classes, properties) separately from the original ontology alignment document.

Figure 2 (below) illustrates the main tasks which compose the new ontology alignment negotiation process, each one performed by a determined agent or group of agents. As illustrated, in order to achieve an ontology alignment agreement between two business agents, a set of steps is followed. In the first step the OM-i selects and proposes a set of possible correspondences to both B and S agents. The business agents then analyze the proposed correspondences deciding for each one if it should be included in the alignment or if it should be rejected (Step 2). When the OM-i receives the responses of both agents (Step 3) it checks if there is an agreement or if there are conflicting correspondences (Step 4). In the latter case, the OM-i decides if it is worth to continue negotiating, i.e. checks if an agreement seems probable (Step 5). If so, the OM-i

formulates a request to both agents indicating the mutual agreed correspondences and the ones in conflict (Step 6).

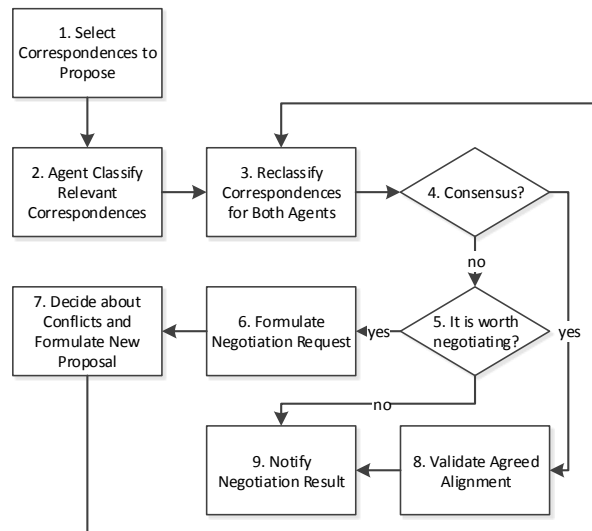


Figure 2: Ontology Alignment Negotiation Process

The agents analyze the negotiation request evaluating the conflicting correspondences and deciding if they can concede on their restrictions (Step 7). The responses are returned to the OM-i and the process (from Step 3) is repeated. If an agreement is achieved, the OM-i checks the final alignment for inconsistencies (Step 8). Finally, when an alignment is found, or the negotiation is terminated, the OM-i notifies both B and S, as well as the MF, about the negotiation result (Step 9).

The following subsections present further details about each step in this process.

3.1. Selecting Correspondences to Propose (Step 1)

The OM-i starts by selecting all possible correspondences between the indicated ontologies. For each ontology entity, the agent verifies if the amount of possible correspondences is considered elevated (i.e. it is above a defined threshold). If it is, the OM-i should reduce the amount of correspondences to propose. For that, the agent may simply consider the confidence value attributed by the matcher responsible for the correspondence's discovery. Or, in alternative, it may request an SN-i to indicate its confidence on each correspondence's correctness/adequacy to the business negotiation in question.

OM-i then sends to both B and S, the set of possible correspondences, including, for each one, the SN-i agent's evaluation (if it was performed) along with other additional information.

3.2. Analyzing Correspondences by Business Agents (Step 2)

Each business agent analyses the received set of correspondences taking into account its own preferences. The agent starts by selecting only the

correspondences related to ontology entities considered relevant (i.e. the ones that are used by the agent to describe business goals/restrictions). For each selected correspondence the agent evaluates its confidence on the correspondence's adequacy taking into account the information provided by the OM-i or, alternatively, requesting an SN-i to support this evaluation. The agent then classifies each correspondence as: (i) mandatory, must be included in the final alignment, (ii) acceptable, might be included if the other agent agrees, and (iii) rejected, should not be included in the final alignment. In order to perform this classification the agent considers two types of threshold, namely: (i) mandatory threshold, above which the correspondence is classified as mandatory; and (ii) rejection threshold, below which the correspondences are rejected, the remaining are classified as acceptable. The agents respond to the OM-i indicating the correspondences' classification.

3.3. Analyzing the Business Agents' Responses (Steps 3 and 4)

The OM-i checks the agents' responses classifying the correspondences as: (i) mutually accepted, if it is mandatory for both agents, mandatory for one and acceptable for the other, or acceptable for both; (ii) mutually rejected, if it is rejected by both agents or rejected by one and not mandatory for the other; and conflicting, if it is mandatory for one and rejected by the other. Following this classification the OM-i verifies if there is a consensus, i.e. if there are no conflicting correspondences.

3.4. Deciding if the Negotiation Should Continue (Step 5)

If there are conflicting correspondences, the agent verifies if it is worth continuing the negotiation, i.e., it verifies if an agreement seems probable. For that we adopted a simplified approach, where the agent verifies the level of agreement between the agents (i.e. checks if the number of conflicting correspondences is reduced in relation to the number of agreements) and then analysis the interest of the agents in continuing negotiating. The result of this evaluation is a value from the range [0,1] which the agent compares with its defined threshold for negotiation.

3.5. Formulating a Negotiation Request (Step 6)

If the OM-i decides to proceed with the negotiation it will formulate a new request to the agents indicating the agreed correspondences and the conflicting ones. In order to provide an additional incentive to the agents, the OM-i might request an SN-i to evaluate the adequacy of the alignments which would result if the agents concede on their restrictions, and include this information in the request. For example, the OM-i could include in the request for each agent the adequacy of the alignment which results from (i) including the correspondences that it rejected originally and that are mandatory for the other agent, and (ii) not including

correspondences that it classified as mandatory and that were rejected by the other agent.

3.6. Deciding about Conflicts (Step 7)

Each agent then decides upon the conflicting correspondences. Here, three situations may arise: (i) the correspondence was rejected by the agent and was classified as mandatory by the other; (ii) the correspondence was not evaluated by the agent (was not considered relevant) and was classified as mandatory by the other; and (iii) the correspondence was classified as mandatory by the agent and rejected by the other;

In the first two scenarios the agent may simply evaluate the impact that including the correspondences might have in the final alignment's adequacy. For that it may request support of a SN-i agent. In the last situation the agent has to decide if the correspondence can be conceded. This decision will depend on different factors, other than the impact in the alignment's adequacy. An important factor considered is the usage of the correspondent ontology entity in the definition of restrictions. Other important factor is the proximity of the deadline the agent has to accomplish its business goals. These factors are also important in deciding the level of interest of the agent in continuing negotiating when conflicts remain unresolved.

The agents respond to the OM-i indicating the correspondences which they find acceptable along with the correspondences that remain in conflict and their level of interest in continuing negotiating.

3.7. Validating the Final Alignment and Notifying the Negotiation Result (Steps 8 and 9)

The OM-i checks the final alignment for inconsistencies (e.g. redundant correspondences) resolving the ones it finds.

Finally, when an agreed alignment is found, or when the OM-i decides to terminate the negotiation, the result is reported to both B and S as well as the MF which initiated the process.

4. SOCIAL NETWORK BASED SUPPORT COMPONENT

During the alignment negotiation process, the agents may resort to SN-i agents in order to receive additional support for their decisions (cf. sections 3.1, 3.2, 3.5 and 3.6). In our previous models, SN-i agents would evaluate the adequacy of alignments essentially taking into account their previous usage, without giving much relevance to its content (although it was considered to evaluate its coverage).

In our current model, all the previous features of SN-i agents are maintained. However, these agents will now be capable of evaluating correspondences separately from the original ontology alignment documents, as well as evaluating new ontology alignments taking into account the included correspondences. Therefore, two new types of evaluation are added to SN-i agents' model, namely: (i) evaluating correctness/adequacy of a correspondence to

an agent or business negotiation; (ii) evaluating the correctness/adequacy of a new ontology alignment to an agent or business negotiation;

When requested, the SN-i evaluates its confidence in the adequacy of a correspondence or alignment to an agent or a business negotiation (i.e. to a pair of agents). For that, it follows similar principles to the ones considered in our previous model for the alignment's adequacy to business negotiation evaluation (Nascimento et al., 2013b).

In each evaluation the agent considers a series of factors. For instance, to determine the adequacy of a correspondence the SN-i evaluates: (i) the confidence in the correspondence's correctness; (ii) the correspondence's adequacy to the agent (or pair of agents); and (iii) the correspondence's adequacy to the related agents (i.e. agents with high proximity relations to the agent). To determine a new alignment's adequacy, among other factors, the SN-i evaluates its coverage of the agents' relevant ontology entities.

In the following subsections we describe how each of the considered factors is evaluated. Then, in the final two subsections we describe how the SN-i combines these factors in order to determine its confidence values.

4.1. Correspondences Correctness

In this evaluation the agent considers information provided by its source, as well as its previous usage in business negotiations. More specifically, the agent considers: the confidence value attributed by the matcher (*cv*); the confidence/trust in the matcher (*cm*); the success rate in business negotiations where the correspondence was included (*src*); and the satisfaction in deals where the correspondence was included (*sd*). The confidence in the correspondence's correctness (*cc*) is given by:

$$cc = \frac{w_1 \cdot cm \cdot cv + w_2 \cdot src + w_3 \cdot sd}{w_1 + w_2 + w_3} \quad (1)$$

where w_{1-3} are the weights attributed to each factor, which are defined in the SN-i agent's configuration.

The agent considers the matcher's confidence in the correctness of the correspondence (*cv*). However, since different matchers may determine their confidence in different manners, the agent should consider the confidence in the matcher itself (*cm*). This confidence is normally defined in the agent's configuration, and may evolve during the agent's activity as correspondences from the matchers are used and evaluated.

In order to determine the correspondence's success rate in business negotiations (*src*), the SN-i analyses the outcomes of negotiations where the correspondence was included in the used alignments (similarly to how the alignment's success rate is determined in our previous model's description). The correspondence's success rate is given by:

$$src = \begin{cases} \frac{sn - fn}{tn} : tn > 0 \\ 0 \text{ otherwise} \end{cases} \quad (2)$$

where tn is the total number of negotiations where the correspondence was included, sn is the number of successful ones and fn is the number of failed ones.

The satisfaction in deal is a value in the range [0,1] provided by the B at the end of a successful negotiation, indicating its level of satisfaction with the achieved deal. Normally, it is determined by analyzing the similarity between the purchased product and the desired one (Nascimento et al., 2013b). The correspondence's satisfaction in deals is obtained by simply averaging the satisfaction value of each deal where the correspondence was included in the used alignment (also similar to the evaluation of the alignment's satisfaction).

4.2. Correspondence's Adequacy to an Agent

The evaluation of a correspondence's adequacy to an agent ($cata$) is given by:

$$cata(a, c) = \frac{\sum (w_i \cdot f_i(a, c))}{\sum w_i} \quad (3)$$

where c is the evaluated correspondence, a is the agent, f_i is each evaluation factor and w_i is the weight associated to each factor. The considered factors: the success rate of the agent in negotiations where the correspondence was included ($srac$); the satisfaction in deals of the agent where the correspondence was included (sac); and the relevance the agent attributes to the ontology entity related to the correspondence (re).

The first two factors are determined in a similar way to the ones described in the previous subsection, only now the agent will evaluate only the negotiations where the agent participated.

The business agents attribute a relevance value (range [0,1]) to each of the used ontology entities, considering its usage frequency, as well as their use in specifying restrictions (Nascimento et al., 2013b). This information is provided by the agent during its registration, and can be used to evaluate the last factor.

4.3. Correspondence's Adequacy to the Closest Agents

The adequacy of the correspondence (c) to the agents closest to an agent (a) is given by:

$$catra(a, c) = \frac{\sum atar(a, c_i) \cdot cata(c_i, c)}{\sum atar(a, c_i)} \quad (4)$$

where c_i are the closest agents to a , i.e. those that have a high proximity relation with a , and $atar(a, c_i)$ gives the value of the proximity relation between agents c_i and a . Note that c_i can be related to a directly (there is a direct connection from a to c_i) or indirectly (there is a multi-steps path from a to c_i). In the latter case the value of

the relation from a to c_i is obtained by the accumulated product of each relation value in the path.

4.4. Alignment's Coverage

The alignment's coverage evaluation differs depending on if it is related to a specific agent or to a business negotiation. In the first case the agent evaluates the alignment's coverage in relation to the agent's used ontology entities, taking into account their respective relevance. While in the second case, the SN-i will evaluate the coverage in relation to the ontology entities used in the initial request. In this case the ontology entities are considered to have the same relevance. The alignment coverage is given by:

$$cov = \frac{\sum r_i \cdot ce_i - \sum r_j \cdot ne_j}{\sum r_i + \sum r_j} \quad (5)$$

where ce_i is an ontology entity that is both relevant to the agent (or used in the request) and contemplated in the alignment, ne_j is an ontology entity that is relevant to the agent but not covered by the alignment, r_i and r_j are the relevance values assigned to the respective ontology entities.

4.5. Confidence in Correspondence's Adequacy

The SN-i agent's confidence in the correspondence's adequacy is given by:

$$cca = \frac{w_1 \cdot cc + w_2 \cdot cata + w_3 \cdot catra}{w_1 + w_2 + w_3} \quad (6)$$

where $w_{1,3}$ are the weights assigned to each evaluation factor, and cc , $cata$, $catra$ are the considered factors previously described (cf. sections 4.1, 4.2, and 4.3 respectively). Note that, when the evaluation is performed considering a pair of agents (rather than a specific one), the evaluation of $cata$ and $catra$ will be obtained by averaging the results of this evaluation for each agent.

4.6. Confidence in New Alignment's Adequacy

The confidence of the SN-i agent in a new alignment's adequacy is given by:

$$caa = \frac{w_1 \cdot cov + w_2 \cdot acca}{w_1 + w_2} \quad (7)$$

where w_1 and w_2 are the weights assigned to each evaluation factor, cov is the evaluation of the alignment's coverage (cf. section 4.4) and $acca$ is the average confidence in the adequacy of each included correspondence to the agent (or pair of agents) (cf. previous subsection).

5. COMPARISON WITH PREVIOUS MODEL

Consider an e-commerce scenario such as the one detailed in (Nascimento et al., 2013b), where a B uses the MP3P ontology and a S uses the CEO ontology. Figure 3 depicts the considered correspondences

between these ontologies, some of which are incorrect (correspondences C9, C10 and C11).

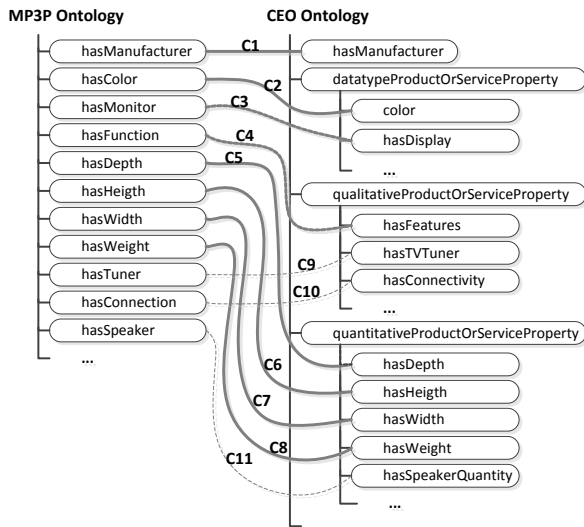


Figure 3: Considered Correspondences between MP3P and CEO Ontologies

Normally, in our previous model, we would consider two alignment possibilities: (i) one containing more correct correspondences, but with lower coverage (e.g. $a_1 = \{C1-C3, C5-C8\}$); and (ii) another with less correct correspondences, but with a higher coverage (e.g. $a_2 = \{C1, C4, C5-C11\}$). The alignments would then be evaluated by the SN-i as they were used, promoting the usage of the more adequate alignments.

However, in some cases, an inadequate alignment might include some correct correspondences which are not included elsewhere (e.g. a_2 includes C4 which is not included in a_1). In these cases, the process would benefit from evaluating each correspondence separately from the original alignment document.

Following the proposed approach, the OM-i would propose all possible correspondences (from C1 to C11) to both B and S agents. Since agents normally possess different classification thresholds, different combinations of correspondences may result from the ontology alignment negotiation process, being then used (tested) in business negotiations.

On the other hand, the agents normally classify the proposed correspondences resorting to an SN-i. The SN-i evaluates each correspondence taking into account, among other aspects, its previous usage in the marketplace, especially by the B and S agents and agents with high proximity relations to these (cf. section 4.5). As the correspondences are included in different alignments and used in business negotiations, their adequacy evaluation is refined, allowing the discovery of more complete/adequate alignments.

6. CONCLUSIONS AND FUTURE WORK

In this paper we propose a new model for the AEMOS' ontology services, which promotes the reuse and combination of already existent ontology alignments,

with the goal of improving the adequacy of the alignments used in business negotiations. In this new model, rather than simply selecting/negotiating the alignment that should be used, the agent will also negotiate its composition, allowing excluding irrelevant correspondences, and achieving more adequate alignments as well as more accurate and trustful evaluations.

At this stage, we were interested in improving the alignment negotiation model taking advantage of the already developed components and mechanisms. Following the results achieved with this approach, the process should be significantly improved by adopting more sophisticated models and negotiation protocols.

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