An Approach for Defining Actions in Rules of the CaSenSa Application

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Introduction

Using the CaSenSa [1,2] application, elderly people and their caregivers are able to define rules such as “when I have walked 100 steps, send me an SMS with congratulations”. These rules can then be used to support elderly people with early dementia, which is the focus of the Belgian consortium within AmIE [3]. The concepts and their interrelations are represented with an ontology, which is a formal explicit specification of a shared conceptualization [4]. While defining rules, which are often of the form “if condition THEN consequence”, two types of problems can arise, and will occur:

• Whenever a concept does not exist and needs to be introduced, different people will come up with different results, e.g., different definitions of coffee machine (see Fig. 1a).
• Different persons will have a different way of approaching certain concepts to achieve a certain result, i.e., for sending an SMS: do you refer to the person who has a portable phone or do you refer to an SMS in which you specify the receiver (Fig. 1b)?

To reduce this heterogeneity, an appropriate methodology needs to be adopted.

The Proposed Solution

Problems of the first type were easily solved with DOGMA-MESS [5], e.g., agreeing that the coffee machines to which the participants refer are of the type “Coffee Machine” that are in turn of the type “Household Tools”. By creating a taxonomic relation where common behavior is grouped by a more abstract concept enables a system to comprehend action such as “turn all Household Tools off”. Problems of the second type were a bit more challenging. Here, DOGMA-MESS was used to find a solution that satisfies all needs.

The DOGMA Approach

DOGMA is an ontology approach and framework that is not restricted to a particular representation language. This approach has some distinguishing characteristics that make it different from traditional ontology approaches such as its groundings in the linguistic representations of knowledge and the methodological separation of the domain- and application-conceptualization, commonly known as the ontology double articulation principle. The idea is to enhance the potential for re-use and design scalability.

Conceptualizations are stored as lexons, which are 5-tuples declaring a relationship in some context G, e.g., <G, Person, currently at, has, Location>. Another distinguishing characteristic of DOGMA is the explicit duality in interpretation between the language level and conceptual level. The goal of this separation is primarily to disambiguate the lexical representation of terms in a lexon (on the language level) into concept definitions (on the conceptual level), thus tackling the problem of synonyms and homonyms.

Results and Discussion

Interestingly, modeling rules with cards as proposed by the experiment held at Alcatel Lucent (Fig. 1) or used by the CAEMP Instantiation and Rule Editor [1] is made difficult by not only the problem encountered during the experiment, but also by placing all the information in one card. Letting users define actions corresponding to the relations found in the UCO might aid the user in defining actions.

So instead of one card, users will have three cards: “Agent”, “Action”, “Object”. Taking an “Agent” will show all the actions involved, which in turn shows all the objects. Taking an “Action” might let the system retrieve all possible objects and agents; specifying one would result in filtering the list from the other.

References

3. Ambient Intelligence for the Elderly (AmIE) http://www.amieproject.com/