The Need for a Role Ontology

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Abstract

The importance of employees as knowledge workers acting in the correct roles is not a new phenomenon, but as work itself becomes less tangible, concerns with understanding, describing, and managing roles becomes an increasingly complex, challenging, and important subject. In the knowledge economy, where the employees are in the centre of the industrial revolution and digitalization, there is now a greater need to enable meaningful and well-described roles that set out well-defined tasks that each actor will perform within the enterprise. Also within the extended enterprise, which is the collaboration with its partners, service suppliers, the wholesalers, retailers etc. and the attendant complexity, the need for well-described roles is rapidly increasing. Therefore, it is of critical importance for our frameworks, methods, approaches and practices to answer the need for roles. Consequently, this paper focuses on the missing concepts exemplifying the need for a role ontology with a role taxonomy, clear defined objects, descriptions, class types, stereotypes and subtypes as well as semantic role relationships. It does so by firstly defining the requirements in terms of the scope, objective as well as which challenges,

issues and problems should the role ontology as an application ontology address. Secondly, we describe the integration and relationship between the role ontology with domain, core and foundational ontologies. Followed by the description of the design components of the role ontology, this includes its objects, class types, descriptors, shapes i.e. notations, attributes, and relations. We than conclude by discussing lessons learned by applying and thereby testing the ontology in practice.

Introduction

Requirements to the Role ontology

Approaches to developing and engineering ontologies begins with defining an ontology's requirements; this is in the form of questions that an ontology must be able to answer. We call this the competency of the ontology. For any task in which the ontology is to be employed, the task imposes a set of requirements on the ontology. These requirements can best be specified as a set of queries that the ontology should be able to answer, if it contains the relevant information. The competency questions are the basis for a rigorous characterization of the information that the ontology is able to provide to the task (Gruninger & Fox 94). Competency questions are used to evaluate an ontology in the sense that the ontology must be necessary and sufficient to represent the tasks specified by the competency questions and their solution. These are also the tasks for which the ontology finds all and only the correct solutions. Tasks such as these can serve to drive the development of new ontologies and also to justify and characterize the capabilities of existing ontologies (Gruninger, 1997). After the requirements have been identified, both in terms of the scope, objective as well as which challenges, issues and problems should the ontology address. The next phase in the development of an ontology, is to outline its objects, types of objects, descriptors, shapes i.e. notations, attributes, and relations. It is followed by testing the ontology in practice. This is done by applying the role ontology in a real-world engineering, modelling and or architecture situations. In this section, we will discuss the requirements in terms of scope, objectives, challenges, issues, problems the role ontology should address in its completeness.

Scope of the Role Ontology

In order to elaborate on the scope and focus of the role ontology, we will describe the various definitions and use of the word role and then specify how it is used in the context of the role ontology. This permits the reader to comprehend the explicit scope and focus explanation.

When we refer to the name of a place, person, or thing in the abstract level we can refer to it by its proper name, identifying it as a proper noun. When we name things involved in an act and describe them in the context of that act, and therefore as a role, we use an appellative noun, or descriptive name or other designation. It is possible to think about roles in many different contexts. For example, we can think about the role different strategies might play in the evolution or transformation of a business, the roles of resources within the enterprise, the differing roles a specific object may play in an enterprise, the role of a service, or of locations in the context of their relationships. While these views are valid, the most common view of role is the one that applies to enterprise engineering, enterprise modelling and enterprise architecture, where a person i.e. actor has one or more roles in for example a business function, process, services, information system, etc. An Actor may have several roles. The concentration of the role that actors have, is the scope and focus of the role ontology.

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