

University of Macau

Abstract

INFERENCE ON HETEROGENEOUS E-MARKETPLACE
ACTIVITIES

by CHE CHIN PANG

Thesis Supervisor: Assistant Professor, Jingzhi Guo
Master of E-Commerce Technology

In recent years, e-marketplace technology has been utilized in real world extensively. The inference on heterogeneous e-marketplace activities has been advocated and also become an important topic of e-commerce technology in both practice and research. Generally, e-marketplace activities can be represented as complex sequences of e-trading actions of inquiry, offer, acceptance, etc. They could be inferred from one to another through inference engine thus to control the complicated business flows of e-marketplace. However, e-marketplace is distributed and autonomous, the participating systems from different domains do not recognize the operation information with each other and each of them acts and is regulated by its self-formulated domain rules. This imposes a serious cross-domain inference problem, which requires a cross-domain perspective on heterogeneous e-marketplace activities.

There are two aspects, which are discussed in this thesis, in solving the cross-domain inference problem. The first aspect is the semantic consistency maintenance between different domains when heterogeneous e-marketplace information is in exchange. This thesis resolves this problem by introducing a CPDASP model developed from the collaborative concept exchange technology and the XML Product Map (XPM). Particularly, it applies collaborative editing techniques to maintain semantic consistency between the exchanged e-trading documents. The second aspect of the cross-domain inference problem is the heterogeneous inference itself. The biggest difficulty here is the heterogeneous operations on the exchanged e-trading documents in different domains, which are often in the forms of executables (.exe) files against

different business processes in use. This thesis contributes a novel RuleXPM approach to solving the problem of the inference on heterogeneous operations. This approach is developed on an XPM data model, which presents the XPM documents in rule-based syntax called RuleXPM Schema. This schema can represent defeasible rules and preference relations and can separate the commonly understandable operation (action) concept from heterogeneous operation (action) execution. Particularly, this thesis adopts defeasible logic to reason with rules and preferences on heterogeneously transformed XPM e-trading documents, where the domain-specific linked rules directs and controls the domain-specific e-trading document operations. The approach is realized in a RuleXPM Inference Engine controlled by a RuleXPM Inference Algorithm, which infers the outbound activities from the inbound activities. It is further implemented and has been demonstrated in a prototype, of which the correctness of the approach has been proved by experiments.