THE SUMMARY OF Ph. D. DISSERTATION

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Title

A Study on Implementing User Requirements Using Policies and Standards - Applied on Network Management Systems -

Abstract

As software supports wider range of work, it has become more difficult to elicit requirements and design functions rapidly and precisely. This trend is noticeable in the design of systems that support business processes requiring a significant amount of expertise. In such domain, designers sometimes have to understand users' expertise to read requirements.

This thesis presents new methods for improving the situation. Key concepts are functions design led by users, adaptive functions, and customization of existing software with minimum influence. We focused on network management systems (NMS), whose domain includes the situation.

For the function design led by users, we have developed a technique in which users draw up use cases detailed by policies that are rules of network management. We have offered several types of policies to represent various rules. This method gives advantages to users and developers, because of its familiarity and semi-formal feature.

For the adaptive functions, we have developed a mechanism for policy selection. This mechanism has adopted a concept of artificial immune networks that can accept to change policies and recognize changes of conditions in networks or services. The results from the mechanism have been validated by the operators that work for real business.

If a function called by a selected policy does not exist, system designers may customize an existing function. Software components we propose can be used to add, change, or remove some features of a function provided by an existing component. It does not require changing source codes in the existing component. Partial Extension Package that is also proposed supports addition of new features to object classes with minimum influence. It provides a scheme for setting new processing, a new state, and additional data.

These techniques can be applied to other domains that have characteristics similar to the network management.