UNIVERSITI TEKNOLOGI MARA

FLEXIBLE ROLE TRANSITION MANAGEMENT IN SCRIPTING LANGUAGE

ZAINURA BINTI IDRUS

Thesis submitted in fulfillment
of the requirements for the degree of
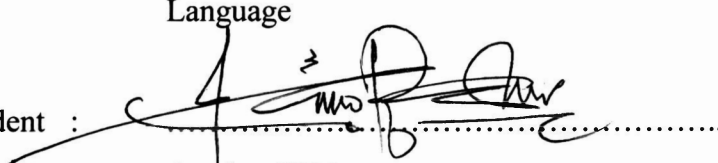**Doctor of Philosophy**

Faculty of Computer and Mathematical Sciences

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Zainura Hj Idrus

Student I.D. No. : 2009736453

Program : PhD of Computer Science (CS990)

Faculty : Computer and Mathematical Sciences

Thesis Tittle : Flexible Role Transition Management in Scripting Language

Signature of Student :

Date : October 2015

ABSTRACT

Networked collaborative virtual environment (NCVE) allows users from diverse locations to work together via virtual workspaces. It is a complex environment requiring coordination amongst team members who are physically invisible and have loose-tie team relationships. To enhance team coordination, roles have been utilized to manage the segregation of tasks among users. Research shows that role transition is a key factor in a successful business process. It acts as a medium for a team to resolve conflict amongst its members. If the changes in roles are not managed effectively, the collaborative works can be disrupted and impose undue pressure on users. However, most studies in managing dynamic groups for NCVE are more inclined to resolve domain specific role transition issues. Furthermore, most existing role-transitions in NCVE must be dealt with manually by external entities to the NCVE system, which are solely done through human intervention. As a result, role transitions are hardly matched or coped with. Hence, this research explores the feasibility of having a socio-technical approach in managing role transitions that can be embedded in NCVE systems to assist both users and computer automation in managing role-transition. This research begins by conducting a case study, which is aimed at observing real-life scenarios in a call center environment. Using a goal directed approach; the real-life scenarios are illustrated through four personas in eleven scenarios where they are further analyzed with abstract scenes analysis method to produce early findings. The findings are used as a basis to identify the dynamic behavior of roles and provisions of role transition through observation and exploration of the extensive possibilities of a Monopoly game. As a result, a new role transition structure is modeled. Next, the model is transformed into a set of language constructs via Baun-naun-form (BNF) to become a major extension to an existing scripting language named JACIE. Lastly, the language constructs are applied to a call center application to test their functionalities. This research has contributed to a flexible role transition management in the socio-technical approach in two ways: modeling and language constructs. The model supports a range of role transition management designs that are not bound by any specific domain. The language constructs enable programmers to develop prototypes of NCVE applications rapidly whilst hiding the complexity of technical details. In summary, this research shows that it is feasible to embed a role-transition manager into NCVE systems and it is applicable to a wider domain of applications as opposed to the current domain specific approach.

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CHAPTER ONE

INTRODUCTION

1.1   NETWORKED COLLABORATIVE VIRTUAL ENVIRONMENTS

In a *Networked Collaborative Virtual Environment* (NCVE), users from diverse locations work together on shared resources via the Internet on various types of collaborative work. NCVE has been acknowledged, and applied, in various areas such as: computer support collaborative learning (CSCL), virtual enterprise (VE), virtual office (VO), virtual world (VW), supply chain management (SCM), collaborative networked organizations (CNOs), collaborative virtual laboratories (VLs) and massive multiplayer online games (MMOGs) (Abidin, 2006). Due to the huge potential of the virtual environment, many established business organizations have taken one step ahead by moving into the virtual environment by formulating their business strategies to connect distributed workforces, building space, increase productivity and increase revenue, as well as to save costs (Collins & Tuque, 2008).

1.2   COLLABORATIVE ACTIVITIES IN VIRTUAL ENVIRONMENT

Collaborating virtually means that people from various locations engage in common activities interactively and remotely via computer networks as though they are working in a face-to-face environment (Abidin et al., 2006). Unlike the real world, users are represented by text, colorful graphics and avatars in different forms and appearances. They are also dynamic in nature and change more often in NCVE rather than co-located environments (Helquist, Santanen, & Kruse, 2007). As a result, the team composition and team members differ from time to time. Since collaborative systems consist of interdependent users, technologies and works, the change of users affects the whole collaborative systems. For example, a newly joined user has to get accustomed to the new environment. Similarly, current users have to adapt to the new users who might be accustomed to a different working culture. In addition, work must be rearranged to suit the changing team structure. Thus, managing users who are