Dynamic User-Oriented Role Based Access Control Model (DUO-RBAC)

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Abstract. Most researchers use role mining to generate role-based access control model from the existing user-permission assignments. User-oriented role-based access control model is a type of role-based access control model, which aims to use role mining from an end-user perspective to generate an RBAC model. This research is the first for generating a dynamic user-oriented role-based access control model for inserting a new user-permission assignments to the existing model re-generating roles, with a constraint that there are no changes in the number of role assignments for each user in the system after the insertion process, since the user will be conflicted if he has different number of roles from time to time. Also, we have developed a new algorithm, which based on user-oriented role mining to find the way to insert the new UPA to the existing model. Our experiments applied on benchmark "Access Control" real datasets to evaluate the results.

1 Introduction

Role Based Access Control (RBAC) is a type of access control models (permission models) that allows authorized users to do their tasks and perform their actions while they are browsing their system. The permissions of users in the RBAC model are fetched through role mining to generate roles based on existing user permission assignments. Then, the permissions are assigned to corresponding roles and roles are mapped to the users of the system.

The key idea of role mining is to utilize the data mining technologies to discover a good role set of permissions which are existing in user-permission assignments of the old access control system. The discovered roles are then applied to the system through the activities of the corresponding users (Lu et al. (2015)). In short, the existing studies investigate the concept of role mining in different objectives, such as minimization the administrative cost, minimization of the number of roles, minimization of the complexity of the role hierarchy structure introduced by Molloy et al. (2008), security administration like (Kuhlmann et al. (2003)), and user-oriented role mining.

There are different algorithms that use role mining to generate user-oriented role-based access control model (UO-RBAC) from existing user-permission assignments in the system.