Ontology-based Information Management for Data and Task Migration in Collaborative Work

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Abstract

Now-a-days, data and task migration in collaborative work provides enormous facilities to users. Here, we propose an ontology-based information management scheme to facilitate data and task migration in collaborative work. This ontology-based model will help us to organize huge information (e.g. device status, runtime state etc.) efficiently.

1. Introduction

In this paper, we propose an ontology-based information management scheme to facilitate data and task migration in collaborative work. For migrating data and task to one device to another, we need to transfer runtime state of the current application, the source device status, and current environment and so on. Using ontology we can easily manage this huge information in a hierarchical manner that leads us to migrate data and tasks efficiently. This paper provides the outline of ontology modeling for managing information related to migration of data and tasks.

2. Related Work

Run-time adaptation of user interfaces to different device capabilities raises many issues. Aura [1] is a project whose goal is to provide an infrastructure that configures itself automatically for the mobile user. The RAO room [2] at EDF R&D, Clamart, France is an augmented meeting-room useable for seminars, creativity, meetings, and distributed collaborative work. The domain of CAMELEON [3] is located at the intersection between software engineering and human-computer interaction. It implies attention to systematic methods to support the design of usable systems, tools supporting such methods, representations able to formalize the information that the methods require and runtime support. In this paper, we provide an ontology-based approach which organizes information related to data and task migration. In our modeling, the complete ontology is held by the migration server to determine the source device status, to select target device as well as to track each device status. A partial snapshot of the complete ontology is stored on user devices so that it can efficiently send runtime status of current application to server, track device status (e.g. power, memory) and store environmental information. We discuss on aforementioned issues in the next section which is followed by concluding remarks.

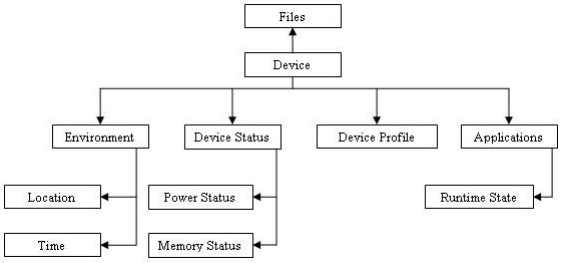
3. Ontology-based Information Management Scheme

Each user device holds its own device information. This information can be roughly categorized into the following major concepts.

a) Device Profile: Profile holds the information like device name, type, processor capability, storage capability etc. This information is essential at the time of selecting target device.
b) Device Status: It stores the information like device power and memory status. It may be a very common scenario that devices have limited resources. So it is badly necessary to track these limited resources.
c) Applications: The information on applications run on the user device is important to migrate data and task to proper target device.

d) Files: This is another major concept. Files concept organizes the local file in a hierarchical manner so that the required file can be retrieved efficiently at the time of urgency.
e) Environment: It is natural to migrate data and task to another device which is located near to the source device. Environment concept helps us to determine the target device in same location and environment.

These concepts stored in user device helps in migration activities. In the case of user-issued migration, source device can look for a suitable target device that has the capability to run same applications, has same environment. Moreover, source device can track its current power and memory resources to determine whether to migrate to the target device or not. Here our discussion only covers these concepts; not each concept's properties due to space limitation. Figure 1 shows the hierarchical organization of these concepts.

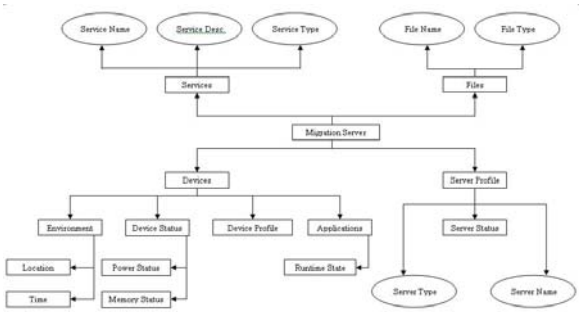


(Figure 1) Ontology in user device

In the migration server, the complete ontology is stored assuming that it has enough resources like storage and processing capabilities. This ontology includes the ontology in each device those are registered with the server as well as services concept have been introduced which hold the services description provided by the migration server. For fast data migration, the server can store some frequently accessed files in its memory. These files can be also managed by using files concept. By managing this huge information using ontology, the server can easily determine the suitable target device; can track the runtime state of currently executed application in user devices as well as can update any change in state easily. Figure 2 depicts the concepts stored in migration server to accomplish these tasks.

4. Conclusion

With the passage of time, data and task migration in collaborative work becomes a promising research issue. To provide the seamless connectivity to the user to a collaborative work, data and tasks need to be migrated from one device to another. To facilitate these migrations, we need an efficient information management scheme.



(Figure 2) Ontology in Migration Server

In this paper, we propose an ontology-based information management for data and task migration. A partial ontology is stored on each user device to hold necessary information. The migration server holds the complete ontology which includes each device's ontology as well as services and files concepts. Our proposed ontology-based information management scheme can contribute in some extent for efficient and effective collaborative work.

References

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