SUMMARY OF Ph.D. DISSERTATION

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Title

Studies on a Location Sensitive Information Service for Mobile Users

Abstract

Recent technological advances in mobile computing such as communication environment, mobile devices, and position information have enabled development of location sensitive information services for mobile users. Especially, location sensitive information such as restaurants, theaters, bus stops, and more is needed for her/him to decide where she/he to go in mobile computing environment. The purpose of this dissertation is to develop a providing method for location sensitive information services for mobile users to plan activities in the real world. To achieve this purpose, two original techniques are proposed. One is an information retrieval mechanism based on spatial regions of elements, and the other is a reconfigurable framework for data processing.

First, this dissertation proposes an information retrieval mechanism called Baum. Baum is a methodology that evaluates the worth of an element based on overlaps of spatial regions of elements.

Next, the method based on Baum is applied to a location sensitive information service for mobile users. Appling Baum enables to evaluate both importance level and spatial distance of each target. A Baum-based application is implemented as a MIDP application on Palm OS-based PDA.

Furthermore, a novel framework for data processing under mobile computing environment is proposed. The framework called AgentStack enables components to be dynamically reconfigured to suit the requirements of applications and changes in the environments. AgentStack provides a middleware system with an architecture that is structured as a collection of components organized in a hierarchy of five layers. Since these components are implemented as mobile agents and offer common interfaces in their layers, we can deploy the components at remote nodes and dynamically replace them by other components designed for the same layer, without affecting the rest of the nodes.

Experimental results show that the proposed methods can be useful for realizing location sensitive information services for mobile users.