The Design and Implementation of Intelligent Home Service Agent Federation Architecture

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ABSTRACT

The objective of this thesis is to construct an intelligent home service agent federation, the IH-SAF, using the cooperation distributed problem solving (CDPS) plan and the multi-agent architecture. Various types of service can be shared among federation members, and deployed the specific service from remote site to client site through OSGi framework. Then the service agent, who carries the specific service, executes the service dynamically by moving it to the client site. In the IH-SAF architecture, we design the service agent federation hierarchy with the pattern of agent community, and deploy the services from the federation's service providers through the OSGi framework. We also implement the service auto discovery and auto registry ability using Jini technology to execute the service by the movement of service agent. For the purpose of making the design, deployment, and implementation more flexible and modular, we use the unified modeling language (UML) to build various models for IH-SAF. These models include the use case diagram from the user's view, and the other diagrams from the structure view, the behavior view, the implement view, and the deployment view. Finally, we take the home security service agent example to explain how the service agent federation accomplishes the home security service tasks through the CDPS plan and the federation members' interaction. The development of IH-SAF is based on the need of embedded system. It has the characters of micro system and can start or remove the services dynamically to save the device resource when this system still running. As the result, IH-SAF is suitable for embedding into the small devices as an information appliance service. Then the home services can connect and integrate to the home gateway for interoperating among the other services and construct the ubiquitous management environment.

Keywords : OSGi ; CDPS ; Intelligent Agent ; Intelligent Home Service Agent Federation ; Home Networking

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