MED-STEER: Enabling Composition and Execution of Semantically Described Medical Informatics Services for Mobile Caregivers

Sung Lee, Michal Galdzicki, Ryusuke Masuoka, Yannis Labrou, Jon Agre
Fujitsu Laboratories of America, College Park, MD
sylee@fla.fujitsu.com
8400 Baltimore Ave., Suite 302
College Park, MD 20740
301-486-1748

Abstract

Purpose: Access to medical information and analyses at the point-of-care is becoming feasible due to advances in mobile computing and internet technologies. However, many point-of-care providers are hampered by the complexity of organizing, integrating and displaying information needed to accomplish their tasks (e.g., assessing risk, diagnosis, treatment, and follow-up). MED-STEER incorporates semantic web technology to help mobile caregivers easily compose and execute basic services and deliver results to the desired locations.

Methods: Fujitsu Laboratories of America, jointly with the University of Maryland MINDSWAP group, have demonstrated Task Computing, which is a framework allowing users to focus on the tasks they want to accomplish using electronic devices, e-services, or applications, rather than on how to accomplish them. A middleware layer dynamically discovers the available devices, e-services, and applications and enables them to collaborate in executing a user-defined task. This is achieved by exposing all functionality as semantically described services built upon new and emerging standards such as OWL, UPnP and WSDL. TCE has been successfully demonstrated for e-office and e-home environments consisting of local, remote and pervasive services providing access to equipment (e.g., videocameras, printers, displays) and data producing services.

Results: MED-STEER is a Task Computing client under development for the medical informatics domain. Together with ontologies and services defined for this domain, MED-STEER, allows a caregiver with a mobile device to easily execute a multitude of commands (resulting from compositions of more basic services) in various locations such as a patient's room or his/her office. For example, "View on Bedside Monitor, X-ray image," "print directions from the patient's home address to the office"or "View on Office Monitor, video stream from hospital room" are simple to execute. However, remote services such as searching an image database or viewing semantically described medical news feeds are also easily composed with those locally available, greatly increasing a user's ability to accomplish complex tasks.

Conclusion: The MED-STEER is a user-friendly interface that assists clinicians by linking data from multiple sources, tools and input/output devices into a coherent environment. It allows non-computing experts can take full advantage of available resources and services without requiring programming skills. As new tools and data become available and their corresponding semantic service descriptions are provided, they are easily incorporated into MED-STEER. Additional topics include security, use of RFID tags for patient/drug/devices and biometric data from bio-sensors.