Chapter VIII

A Choreographed Approach to Ubiquitous and Pervasive Learning

Sinuhé Arroyo, Digital Enterprise Research Institute, Innsbruck, Austria

Reto Krummenacher, Digital Enterprise Research Institute, Innsbruck, Austria

Abstract

This chapter introduces a conceptual choreography framework and shows its tremendous interest for ubiquitous and pervasive applications. Choreography is the concept of describing the externally visible behavior of systems in the form of message exchanges. As information of various sensors, services, and user applications have to be integrated in ubiquitous and pervasive environments to provide seamless assistance to users, it is indispensable that means to map heterogeneous message exchange patterns and vocabularies are provided. The authors aim at giving the reader an understanding of the principles and technologies underlying the choreography framework of SOPHIE. Semantic descriptions of message exchange patterns are used to overcome heterogeneity in communication, regardless of the concrete application domain.
Introduction

In a highly mobile and active society, ubiquitous access to information and services is an observable desire. Due to the fast improvement and wider use of information and communications technology, the amount of information accessible has become much greater than only a few years ago. Adaptive and pervasive systems allow humans accessing user-tailored information spaces to filter the overwhelming flow of data and extract the knowledge that is relevant and needed. To do so, these applications have to be able to identify where, and under what context, a user is engaged with a given process. The context is of high importance for an application to adapt automatically to changing situations and to provide relevant information. Context is a very general term comprising information not only about the human user and the environment, but also about the devices and services involved. In general, context information consists of highly heterogeneous data from various data sources delivered and received following various protocols. There are only two solutions to the problem of accessing ubiquitous services and extracting knowledge from manifold information sources. Either there are ways to standardize the description and the communication protocol to agree on the processes and data format in forehand for all information sources and services (which is on a global scale an impossible endeavor) or, there have to be means to map and align related information and communication patterns.

For example, one information provider might use the term “painter,” while another might use the term “creator” to describe an artist. In order to search for a painting by Picasso in both their data repositories using the same query, it is necessary—in the case of paintings—to connect the terms “painter” and “creator” so that a machine can figure out that they refer to the same concept. Furthermore, it can be the case that one of them expects an “ack” confirming the reception of the information, while the other one does not, thus also requiring alignment, as far as message exchange patterns (MEPs) are concerned.

The requirements in the design of ubiquitous and pervasive software systems call for well decoupled approaches, where devices interoperate by exchanging self-contained messages. These systems realize their functionality by defining from a high-level point of view their dynamics, control flow, and the message interface that allows others to consume their functionality by making or responding to requests.

Choreography deals with describing the external visible behavior of systems as message exchanges. In order to allow interoperation among systems exposing different visible behaviors, the means to map heterogeneous message exchanges is required.

The Semantic Web provides the technology for aligning related descriptions on a machine level, allowing—by semantically annotating data—communication, system coordination, and information exchange among heterogeneous applications.
Issues on Acting in Digital Dramas
www.igi-global.com/chapter/issues-acting-digital-dramas/58587?camid=4v1a