Chapter 7
Personalized Web Services Selection

Tarek Helmy*
King Fahd University of Petroleum and Minerals, Saudi Arabia

Ahmed Al-Nazer
King Fahd University of Petroleum and Minerals, Saudi Arabia

ABSTRACT
Web services have gained an increasing popularity over the Internet. Because of today’s wide variety of services offered to perform a specific task. The task of finding selected Web services to perform a specific task becomes very hard, and it is essential that users are supported in the eventual selection of appropriate services. Web services are a great application area for agent techniques and a great substrate for developing serious autonomous agent-based systems to support a personalized Web services selection. In this chapter, we present a Collaborative Autonomous Interface Agent (CAIA) that collaborates with the Internet search engines and supports the user in finding exactly the Web services consistent with his/her needs. CAIA system has been designed, fully implemented and tested. As a case study, the testing results show a big improvement in the relevancy of the retrieved results and of the user’s satisfaction by using CAIA+Google compared to using Google only.

INTRODUCTION
With so much information available on the Web portals, finding what is exactly needed is a big problem. Intelligent agents can take “instructions” about the types of things a person is interested in, report immediate findings, remember search parameters over time, repeat the search at intervals to adapt the results, and create customized research lists. Tools that make it easier to find, retrieve, and organize information will be in demand more and more as the amount of available information continues to increase. In this chapter, we present a Collaborative Autonomous Interface Agent (CAIA) that will collaborate with the Internet search engines (i.e. Google) and support communities of people in finding exactly the information consistent with their interest. The CAIA uses data mining and machine learning techniques in order to learn and discover user’s preferences. The rest of this chapter
is organized as follows: Section 2 gives a brief overview of the related work. In Section 3, we present an overview of the CAIA framework architecture for the personalized discovery and selection of Web services. Section 4 presents the methodology of capturing the user’s preferences by CAIA. Section 5 presents the details of the implementation. The performance evaluation is presented in Section 6. Finally, conclusion and future work directions are outlined in Section 7.

RELATED WORK

Personalization; carry out retrieval for each user incorporating his/her interests; of Web searching process has long been a topic of study, (Eirinaki, Vazirgiannis, 2003), (Lee, Tsai, 2003), Sugiyama et. al., 2004), (Tijerino et. al., 2007), (Somlo, Howe, 2003), (Joana, Gauch, 2004). Customized intelligent search agents (Helmy, 2006), (Helmy et. al., 2003), (Helmy, Al-Nazer, 2007) may allow institutions to offer tools focused internally on their own collections. Offered perhaps through a web portal, these search tools will return reliable, accessible results for the campus community. As the tools become more sophisticated they will be able to search different collections of a variety of materials, regardless of format or of where the materials may be housed. The following examples show how intelligent searching is being applied in various settings.

• **Arts & Design.** Using new search tools like IBM’s Query by Image Content (QBIC), users sift through the online databases of thousands of images, specifying content-based parameters like texture, shape and color that search the visual properties of images without using text descriptors.

• **Medicine.** Medicine students use a special search tool with integrated thesaurus to locate references tagged with a variety of related keywords, producing an extensive list of resources around a single topic.

• **Science.** Using intelligent search agents and a technology like RSS, a biologist creates a custom Web page that automatically finds and posts new research abstracts in his/her field as they are published.

• **Theater.** A costume designer collects images and descriptions of period clothing, easily locating source documents related to a particular period with a single search, whether the documents reside on his/her own system, the university’s digital archives, or elsewhere on the Internet.

Regarding our approach to personalized Web service discovery and selection, we briefly survey ongoing Web service standardization activities and relate them to other work concerned with interface agents for personalization of Web portals search as follows:

• **ACM Digital Library** (portal.acm.org/dl.cfm): The ACM digital library offers a service to its subscribers called my binders, in which users can save found articles. Articles can be added manually, by means of a saved search, or by an Agent which can periodically run the search and add any new findings.

• **DSpace** (dspace.mit.edu/): The Massachusetts Institute of Technology’s (MIT) enables advanced searching of research in digital form held by MIT. Users can create their own collections within DSpace to bookmark articles of interest.

• **Dashboard** (www.nat.org/dashboard/): As you go about your work, dashboard proactively finds documents, links, bookmarks, and other files related to whatever you happen to be doing, and displays these in a friendly way, keeping relevant files at your fingertips.