Chapter 14

Cognitive Techniques for the Development of Services in Broadband Networks: The Case of Vocabulary Learning Management Systems

Yiouli Kritikou
University of Piraeus, Greece

Maria Paradia
Pedagogical Institute, Greece

Panagiotis Demestichas
University of Piraeus, Greece

ABSTRACT

Information and Communication Systems have tremendously evolved in the past years. This has resulted to the respective increase of the use of communication systems, devices, and applications. To follow this evolution, the applications now focus not only on the delivery of each application, but also on adaptability, so as to meet users’ needs. This is aimed to be achieved by adapting to these needs in the most efficient and seamless way, thus offering an advanced experience to the user. To this end, this chapter focuses on an application of cognitive networks, presenting the mechanism by which self-adaptation can be added. More specifically, this chapter discusses e-learning management systems and showcases the methodology by which such a system may be adapted to users’ preferences and achieve effective learning. This is achieved by using vocabulary teaching as a specific instance of e-learning. Scenarios and the respective results of this methodology are also presented.

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INTRODUCTION

As Information and Communication Technologies have tremendously evolved in the last years, people are more and more accustomed to using their portable devices for not only communicating with their acquaintances, friends and colleagues through voice and data, but also to be able to exploit the potentials of such a device. More specifically, it is part of peoples routine to take advantage of their time “on-the-go” to check and respond to e-mails, make bank checks and transfers or read a book; all these through their portable device (mobile phone, or tablet).

Further to this, as mentioned by Cisco, by 2016, one-quarter of mobile users will have more than one mobile-connected device, and 9 percent will have three or more mobile-connected devices (Cisco, 2012). Moreover, in the same study, it is mentioned that by 2016 smart phones and tablets will equal the amount of laptops/ netbooks. This practically means that portable devices will be very commonly used.

It is therefore imperative in the context of this new era to provide the users the potential of not only to access plain material through their device, but also enhance this experience with further features for an advanced user experience and effective exploitation of the time and effort invested.

On the other hand, Information and Communication Technologies have obliterated physical distance and natural borders. The communication between people of different countries and culture is now performed on a daily basis for most of the modern professions, but also for personal life. Consequently, people need to be acquainted and be able to communicate using more than one language, their mother language, in order to facilitate their interactions. Therefore, taking also into consideration the abovementioned increase of usage of mobile devices and the need to expand the knowledge horizons, the e-learning systems have significantly gained ground in the recent years. More specifically, as also discussed in the forthcoming section, the e-learning systems are used more and more to enhance peoples’ knowledge remotely.

This work discusses on the approaches followed by the researchers throughout the years, with respect to personalized e-learning systems, focusing on the current trends of vocabulary learning systems. Furthermore, the architecture of such a system is presented, providing also details on the functionality of the different components of the system. Finally, scenarios of the system’s operation and their respective results are concluding this chapter. Future research directions, as well as the conclusion of this research are given in the end of this work.

BACKGROUND

General Approach

During the last two decades, several research attempts have led to the design and development of various electronic environments that aim at facilitating learning, through specialized forms of teaching, namely e-learning environments. Such systems have been many times discussed and presented, for instance by Alomyan (2004), Brusilovsky (2001), Dagger et al. (2003), Dolog et al. (2004), Hsu et al. (2008), Juvina and Oostendorp (2004), Ong and Hawryszkiewycz (2003). In Alomyan (2004) the focus is placed on the individual differences in the context of Web-based learning, as well as the personalisation approach that may be followed. Proposed architectures and methodologies for achieving personalisation are described in Brusilovsky (2001), Dagger et al. (2003), Dolog et al. (2004), Hsu et al. (2008), Juvina and Oostendorp (2004), Ong and Hawryszkiewycz (2003). These approaches are mainly based on the structure of the system, while Dolog et al. (2004), Hsu et al. (2008), and Ong & Hawryszkiewycz (2003) use mechanisms to detect the personal preferences of each student.