

Chapter 17

Optimization Scenarios for Open Source Software Used in E-Learning Activities

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ABSTRACT

Using open software in e-learning application is one of the most popular ways of improving effectiveness of e-learning-based processes without thinking about additional costs and even focusing on modifying the software according to needs. Because of that, it is important to have an idea about what is needed while using an e-learning-oriented open software system and how to deal with its source codes. At this point, it is a good option to add some additional features and functions to make the open source software more intelligent and practical to make both teaching-learning experiences during e-learning processes. In this context, the objective of this chapter is to discuss some possible applications of artificial intelligence to include optimization processes within open source software systems used in e-learning activities. In detail, the chapter focuses more on using swarm intelligence and machine learning techniques for this aim and expresses some theoretical views for improving the effectiveness of such software for a better e-learning experience.

INTRODUCTION

With the transformation of the society into information society, all fields of the life have started to change form according to needs of this new society form. Now, it is more important to reach to desired information rapidly and adapt it to the problems – tasks by using specific approaches of the digital world. Among all the improvements, the field of education has a unique place because it is both among objective fields to be changed and supportive fields to grow up individuals, who are appropriate members of the information society. At this point, the field of education has received many revolutionary changes in time and the educational experiences has become some type of special processes, which are done even we do not take place face-to-face in a real classroom environment. In this sense, the approach of

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Distance Education and the E-Learning, which is a type of Distance Education as supported with computer, communication and multimedia technologies, have become very popular leading an unstoppable trend towards the future (Bates, 2005; Klačnja-Milićević et al., 2017a; Moore, 2013; Welsh et al., 2003).

E-Learning is today's effective form of education with its features and mechanisms to eliminate limitations regarding time and place. But as a result of rapid improvements in especially computer and communication technologies, it has become more common to run E-Learning processes just simply and considering other factors directly in order to improve effectiveness and efficiency of this process. As general, both teachers and students may need different supportive factors to make E-Learning better for them. Although it is more considerable to run E-Learning solutions instead of traditional educational approaches before, it is now more widely followed to find alternative ways of improving E-Learning experiences.

It is possible to see many different types of ways for improving effectiveness of E-Learning activities. In the associated literature, this issue is even widely discussed (Burgess, 2017; Dascalu et al., 2014; Hamburg et al., 2008; Johnson et al., 2008; Kalyuga & Sweller, 2005; Kechaou et al., 2011; Korres, 2017; Liaw, 2008; Macleod & Kefallonitis, 2017; Romero & Ventura, 2006; Shen et al., 2009; Song et al., 2004; Sun et al., 2008; Zhang et al., 2006). At this point, using open software in E-Learning application is today's one of the most popular ways of improving effectiveness of E-Learning based processes without thinking about additional costs and even focusing on modifying the software according to needs. Because of that, it is important to have idea about what is needed while using an E-Learning oriented open software system and how to deal with its source codes. Generally, it is a good option here to add some additional features and functions to make the open source software more intelligent and practical to make both teaching - learning experiences during E-Learning processes. That can be achieved better thanks to a strong scientific field: Artificial Intelligence. Approaches, methods, and techniques in Artificial Intelligence has a remarkable place in a multidisciplinary manner with all effective and efficient solution that have been provided so far, even for the most complex, and advanced types of problems. So, in the intersection of E-Learning and open source software systems, applications from Artificial Intelligence could be very effective to improve E-Learning. In the associated literature, we can see many different examples of Artificial Intelligence applications within E-Learning and Distance Education in a general manner (Aroyo & Dicheva, 2004; Brusilovsky & Peylo, 2003; Colchester et al., 2017; Herder et al., 2017; Klačnja-Milićević et al., 2017b; Kose & Koc, 2014; Schiaffino et al., 2008; Tang & McCalla, 2003; Van Eck, 2007; Villaverde et al., 2006; Wen-Shung Tai et al., 2008; Wenger, 2014; Woolf, 2010). But as an alternative, it will be a good way to think about some 'butterfly effects' by considering improve of open source based E-Learning software systems.

Considering the explanations so far, objective of this chapter is to discuss about some possible applications of Artificial Intelligence to include optimization processes within open source software systems used in E-Learning activities. Here, the main issue is achieving an actual mathematical optimization model or a solution process that can be accepted as 'optimizing something' in the active E-Learning habitat towards an improved E-Learning experience for both teachers and students. In detail, the chapter focuses more on using Swarm Intelligence and Machine Learning techniques for this aim and express some theoretical views for improving effectiveness of such software for a better E-Learning experience. It is believed that this research work will be a good opportunity to have ideas about possible optimization oriented applications within open source software systems of E-Learning and lead the interested readers to realize further investigations in this manner.

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