Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 65 (2015) 744 – 753

Procedia Computer Science

International Conference on Communication, Management and Information Technology (ICC 2015)

E-inclusion modeling for blended e-learning course

Ieva Vitolina*

Riga Technical University, Kalku street 1, Riga, LV-1658, Latvia

Abstract

This study addresses the e-inclusion problem that relates to the inclusion of as many individuals as possib enjoy benefits of information and communication technology. Despite the fact that European Union accepte inclusion declaration in 2006 which aims to reduce disparities that exist among individuals and to improve the l of e-skills among people, nowadays e-inclusion problem still exists. Therefore it is necessary to find out approach to promote e-inclusion in society. We propose a more nuanced design approach that takes into acc student's satisfaction with e-learning environment and e-materials, student's ability to learn, instructor willingne share knowledge and others factors. Moreover we believe that e-inclusion means not only high level of digital s but also the usage of these digital skills to benefit from technologies. To obtain predictors for algorithms we d inclusion data domain study based on knowledge management theory. The aim of proposed work is to prese inclusion theoretical model which is based on integration of several algorithms as multiply linear regression cluster analysis. These algorithms were calculated based on statistical data obtained on evaluating a group of hundred blended e-course learners. In this paper we propose architecture designed to predict e-inclusion degr student based on machine learning and intelligent agent approach. We identified two main processes in th inclusion prediction system. The first process consists of agent learning activities. Intelligent agents learn the appropriate algorithm to predict e-inclusion degree of student based on linear regression or cluster analysis. second process includes activities to predict e-inclusion degree of student. This process covers analysis inclusion risks and communication between student and instructor also. Proposed e-inclusion model consists of diagram, use cases diagrams and main algorithms of the system. As the result of the e-inclusion model is predi of e-inclusion degree of person as well as e-inclusion risk factors for person, for instance inappropriate e-lear materials or no interest to learn, or dissatisfaction with e-learning environment, or others factors.

* Corresponding author. Tel.: +371 29215073.
E-mail address: ieva.vitolina@rtu.lv

Peer-review under responsibility of Universal Society for Applied Research
doi:10.1016/j.procs.2015.09.019

Peer-review under responsibility of Universal Society for Applied Research

Keywords: E-inclusion; e-learning, machine learning

1. Introduction

This study aims to address the e-inclusion problem that was outlined in the EU Digital Agenda 2020 that r to the inclusion of as many individuals as possible to enjoy the benefits of information and communic technology (ICT)[1]. Nowadays the digital divide goes beyond the issue of access to technology. Focus has sl from access to ICT to digital skills and the meaningful use of ICT[2]. There is a gap between knowing to d practical usage of digital skills. Learning a new skill and using it are two separate steps[3]. The 2010 OECD r stated that a second digital divide separates those with the competencies and skills that benefits from compute from those without these advantages[4].

Several studies indicate that there is a need to look for factors that characterize the e-included individ Therefore, it is necessary to identify the factors that influence e-inclusion process so that individuals learn technologies and use them meaningfully. There are currently no comprehensive methods to monitor meaningfu of digital skills in order to prevent the ICT usage gap.

There is no special technology for e-inclusion prediction. Usually systems predict whether students drop c complete course. Machine learning approach is used for student achievement and other event prediction. Ma learning and agent technologies are integrated with a particular interest on applying agent-based solutio supervised learning[6].

This study contributes to research of the meaningful ICT use in blended learning context. In this pape propose a new system architecture designed to predict e-inclusion degree of student based on machine learnin intelligent agent approach.

The paper is organized as follows. In the section 2 technologies and methods of prediction are described. section 3 introduces e-inclusion model design. In the section 4 e-inclusion prediction algorithms are presented section 5 is conclusion part.

2. Technologies and methods of the e-inclusion prediction

2.1. Review of literature

According to Strickland[7] predictive analytics is an area of data science that deals with extracting inform from data and using it to predict trends and behavior patterns. A predictive model is a statistical model or ma learning model used to predict future behavior based on past behavior. Machine learning approach is used into oriented systems to train agents. In the literature machine learning and agent oriented system development m has following steps: agent selection, problem domain analysis and data selection and pre-processing, selecti machine learning method and algorithm, model evaluation and implementation with prediction function[8].

Machine learning-based system has two main processes: (1) system training process and (2) the predi process (Fig.1). Each of these two phases is subdivided into several steps and presented in the Figure 1.

Machine learning process begins with analysis of problem domain and data selection[9]. More appro selection of data is possible after deep problem domain analysis.

Data pre-processing aims to create a sample database containing both the training and test data for the model

Next step is selection of algorithm and method for prediction. Training data are transferred to the tra algorithm. At this stage a predictive model is build. In the literature this stage is known as creation of the know base[11]. It should be noted that no machine learning method or algorithm is clearly better than another, bu machine learning method should be assessed with test data sets for more precise results. Data analysis professi