Adaptation in E-Learning Management System Using Possibility Theory

P. Sivaranjani 1st
Research Scholar
Department of Computer Science
Sacred Heart College
Tirupattur, India
E-mail: sivaranjanics05@gmail.com

Dr. M. Maria Dominic 2nd
Department of Computer Science
Sacred Heart College
Tirupattur, India
E-mail: dominic@shcpt.edu

Dr. Britto Anthony Xavier 3rd
Department of Mathematics
Sacred Heart College
Tirupattur, India
Email: brittoshe@gmail.com

Abstract: Learning is the process of actively creating knowledge. Learning is the gathering of experiences and the consequential development and new understanding of the world around us. With the rapid growth of computer and internet machineries e-learning has become a major trend in the computer teaching and learning field now. The aim of adaptive e-Learning is to give the students the suitable content at the right time means that the system is able to find the keep track of usage, knowledge level and arrange content automatically for each student for the greatest learning result. This paper provides an overview of possibility theory in using adaptive e-learning. To get a more specific estimation of learner ability, the Maximum Possibility Estimation (MPE) applies to approximation learner’s ability based on explicit learning path and resources.

Keywords: Adaptive e-learning, Possibility Theory, E-Learning, Learner, Learning Path

I. INTRODUCTION

The internet offers an outstanding and easy way to get learners in interaction with learning resources. Technology enhanced learning solutions offer the possibility to give learning situations that support and acknowledge individual differences [1]. Technology can enable learners to acquire information and skills at a time, place and pace that are right for their own specific circumstances. There is a vast different learner in the world, each person has she or he owns learning preference, aims and objectives. Every learner has the correct to demand a high quality, personal learning experience [2]. However, as current web-based learning environments proposal a one size fits all method for the delivery of learning materials, the adapted approach to education is sadly lacking from most online systems [3].

A. Learning

Learning is the personal growth of a person as an outcome of supportive interaction with others. It is developing of understanding that enables the learners to act improved in their place, improve adapt behaviors, create and support good relationships, and make personal success [4]. Moreover, it is a common experience as a student acquires the same cognitive perspectives of assured learning areas. Learner’s unique way of acquiring and process information in known as learning style[5]. Different learning philosopher delivers through different learning style models [6] each depicting the way learner acquires and method information. Most of them overlap each other and some others explore new possible ways [7].
B. E-Learning

E-Learning which breaks the conventional classroom based learning mode allows distributed e-learners to use various learning resources much more stable and flexible.

However, it also takes disadvantages due to distributed learning environment. So, how to give adapted learning content is a tall priority for e-learning applications. An effective way is to group learners with parallel interests in the same community [8]. E-learning is an education via the network, standalone computer or Internet. E-learning is generally the networks enabled the transport of skills and knowledge. E-learning refers to using electric applications and processes to learn. E-learning applications and ways include digital collaboration, virtual classrooms, Computer-based learning and Web-based learning. There are six core aims of the e-learning programmed concern [9], they are

A) Learner access and choice
B) Flexible, customizable systems and tools
C) Practitioner confidence and skills
D) Institutions using e-learning to deliver flexible opportunities, widen participation, support work-based learning.
E) Responsive e-learning policies, Enabling and processes
F) Enabling, cost-effective technical infrastructures

C. Adaptive Based Learning

The goal of adaptive based education is to consider a system which is expressing the architecture of pedagogic resources and guide the student in his creation according to his resources and to the pedagogic target that is a definite by the teacher [10]. This is the pedagogy aim presents the capacities that the learner must have obtained at the end of the formation activity [11]. Adaptive e-Learning systems should good solution for better e-Learning [12].

D. Adaptability

In demand to overcome Establishes that implementation of adapting e-learning system is a highly explored part of research in distance Web-based study. There have been known differences in styles of learning and so imperative to embed in our e-learning system, the capability to fit the learning process to these different requests of learners [13]. Personalization of the learning experience means providing personalized content in adapting learning path based on the inferences about subject knowledge, cognitive skills, learning styles, reasoning skills, competency levels, perpetual abilities and more of the learner. In overall, there are three kinds of adaptation element [14] namely,

![Adaptive Element Types](image)

Figure 1. Adaptive Element Types

Adaptive presentations The presentation of the content can be enhanced with prerequisite, additional, comparative descriptions and all possible variations of these approaches as well as sorting content units towards conditions like relevance to background, knowledge level, knowledge and the like. These techniques can be realized using techniques like conditional stretch-text, text, fragment variants, page variants and frame-based methods. It presents the learning resources adapted according to the learner characteristics [15].

Adaptive navigation can be adapted in terms of global or local leadership and global or local orientation. Consequently, an e-learning environment could offer direct leadership as well as sorting, hiding and annotating links [16].

Adaptive content can be an adaptation of the learning resources permitting to the learner characteristics. The constraints in performing adapts are designing and incorporating adaptive structure is complex and expensive. Recreation and reuse of LO (Learning Object) is difficult. The users need to have pre usage knowledge of the system [17].

II. POSSIBILITY THEORY

The theory of possibility is analogous to, yet theoretically different from the theory of probability. Probability is basically an estimate of the frequency of incidence of an event, while possibly used to calculate the meaning of an event. Possibility theory is uncertainty theory information. It is comparable to probability theory since it’s based on a set-function. Possibility theory has allowed a typology of distinguishing rules whose purpose is to propagate ambiguity through reasoning steps, fuzzy rules to lay bare from rules whose main purpose is similarity-based interruption
semantics to natural language declarations. Possibility theory introduced to let a reasoning carry out on imprecise or vague knowledge, creating it possible to deal with uncertainties on this knowledge [20]. Possibility is normally linked with some fuzziest, either in the background information on which possibility based, or in the seat for which possibility asserted [21].

Background on Possibility Theory

We recollection some basic concepts from possibility theory, Possibility theory deal with the degrees of likelihood. The word ‘possibility’ is from now on employed as a graded notion, much in the same method as the term probability. At leading sight this might strike as odd since possibility is typically considered a two-valued notion of natural language [22]. Before turning to extra technical aspects, let us make several brief remarks on the semantics underlying the idea of possibility as used to possibility theory. Just as the concept of probability, the concept of possibility can have different semantic meanings. Towards begin with, it can used in the logic of a ‘degree of ease’. Example, that it is more possible for Hans to have two eggs for dinner than eight eggs, simply because eating two eggs is easier than eating eight eggs [23]. However, as concerns the use in most applications of possibility theory considered as a means for representing the uncertain information that means, to specify the epistemic state of an agent. For instance, certain the information that Hans has eaten many eggs, one is clearly unclear about the exact number [24]. Still, three eggs seem somewhat more plausible than two eggs, since there is more well matched with the linguistic quantifier many than two. It is essential to note that a degree of possibility, as opposite to a degree of probability, is not unavoidably a number. In fact, for the probability theory, in which case a possibility level can specify, e.g., an upper probability bound [26]. For convenience, possibility degrees are often code by numbers from the unit interval even within the qualitative structure of possibility theory. As a means of representing the uncertain familiarity, possibility theory make a distinction between the notions of the certainty and the plausibility an event. As opposite to probability theory, possibility theory does not claim that the confidence in an event is finding the sureness the complement that event and, so, involves non-additive measures of uncertainty [27]. Take existence of two quite opposed but complementary kinds of knowledge in view a possibility distribution meant to give a graded representation and information into account, two different types of possibility theory will explain in the following [28].

Possibility Distribution

A possibility distribution is a representing π from a set of situations of affairs S to a fully ordered scale, such as the unit weight [0, 1]. The function π represent familiarity of an agent distinguishing what is believable from what is less plausible, what is the usual course of things from what is not, what is in expect from what is expected [29]. It represents a flexible restraint on what the real state of affairs is, with the next conventions:

- \( \pi(s) = 0 \) means that states disallowed as impossible;
- \( \pi(s) = 1 \) means that states are totally possible.

If the state space detailed, at least one of element the real world. So, that at least one state is totally possible. Discrete values may concurrently have a degree of possibility equal to one (1). Possibility theory focused by the principle of minimal specifically. A possibility distribution said to at least a specific as another one if and only if each state is at least as possible permitting to the latter as to the former. Then, the most exact one is the most restrictive and informative [30].

Research Objective

The main purpose of this research effort is, everyone has a different learning style. So, understand the students learning ability use of Felder-Silverman learning style. Use this learning model based on the possibility theory used to generate the learning path. Accordingly, to finding student’s ability based on the resource provided through leaners.

III. ADAPTIVE E-LEARNING ARCHITECTURE

Most learning recommendation systems mostly focus on analyzing the learner’s behavior and interests to give an adapted e-learning service. However, both learner ability and course material are usually ignored as main factors while adapting e-learning service is to act difficult [31]. In the main goal of this research In order to use the possibility theory based on the FSMLS to give an adaptive learning path to the learner. To calculate the learner usage time and how many times, repeat to use the particular resource to store in the repository. The learner characters to show based on the learning path and then to give particular resources for the learner.
Step 1 FSMLS using Auditory, Visual and Kinesthetic learning resource are used for possibility theory to generate a learning path.

Step 2 Learning path using possibility theory

\[(A \cup V) \cup K = A, V, K \Rightarrow LP 1\]
\[(A \cup K) \cup V = A, K, V \Rightarrow LP 2\]
\[(V \cup K) \cup A = V, K, A \Rightarrow LP 3\]
\[(V \cup A) \cup K = V, A, K \Rightarrow LP 4\]
\[(K \cup A) \cup V = K, A, V \Rightarrow LP 5\]
\[(K \cup V) \cup A = K, V, A \Rightarrow LP 6\]

Where,

\(A \rightarrow\) Audio
\(V \rightarrow\) Video
\(K \rightarrow\) kinesthetic
\(LP \rightarrow\) Learning Path

Step 3 To generate all learning paths give to the learners.

Step 4 To calculate learner usage time particular path to store the repository.

Step 5 To find the learning style for the learner and give resources based on the characteristic.

V. CONCLUSION

This research focused on enhancing the learning path based on learner’s character and their preferences. It gives the possibility theory using adaptive e-learning and increase the learner ability to give adapted e-learning resources. The possibility theory and e-learning concept joined to create personalized e-learning architecture for the learners. The learner uses the learning path to calculate the time to store in the repository and based on the character to provide learning content for the learners can use correct way.

At present this architecture is been test built and the results will be published in the future publication.

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**AUTHOR’S PROFILES**

**P. Sivaranjani** is currently doing Research Scholar, Department of Computer Science in Sacred Heart College, Tirupattur, India. Her research area of interest is in the field of Adaptive e-learning.

**Dr. Maria Dominic** is an Assistant Professor in the Department of Computer Science, Sacred Heart College, Tirupattur, India. He is specializes in field of Adaptive e-Learning.

**Dr. Britto Anthony Xavier** is an Associate professor in the Department of Mathematics, Sacred Heart College, Tirupattur, India. He specializes in Difference Equations, Graph Theory.