

# AGENT DRIVEN E-TUTORING SYSTEM

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**Abstract:** E-Tutoring system is a process of teaching and learning for students of differing abilities in the same class in a more personalised manner. The intent of E-Tutoring is to maximize each student's growth and individual success by meeting each student where he or she is, and assisting in the learning process. Many specialists in the domain of teaching have recently identified E-Tutoring as a method of helping more students in diverse classroom settings experience success. The entire curriculum is designed to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms based on student's intellectual knowledge. The system gives students multiple options for taking in information and making sense of ideas thus in turn helping to develop student's mind map in order to help the tutors to be much more flexible in their approach to teaching and adjust the curriculum and presentation of information to learners rather than expecting students to modify themselves for the curriculum. The work flow of the system includes the student taking up a particular course and understanding the concepts with the help of the course materials provided by the system which he or she can view multiple times and then finally taking up a test. Based on the responses given by the learner his or her performance and accuracy will be evaluated.

**IndexTerms – ITS, Artificial Intelligence, Online Learning**

## I. INTRODUCTION

A fuller definition of E-Tutoring system tells us the ease of learning a student experiences as he or she can learn anytime round the clock along with a well organised course materials which in due course of time will help him or her to understand the concept more clearly and will help to remember it for a longer period of time. The computer plays an important role in the learning process if used in an encompassing learning environment individualized to the learner. The Internet and other technologies have opened up innovative new ways to teach and learn, and to communicate and collaborate across boundaries. Institutions began by putting courses online, now they strive to create a Networked Learning Environment on campus. E-Tutor is a product more than those generated by the society of the information and the digital era in that it places an importance in the mark of the new teaching / learning models and of the learning throughout a lifetime in convergence with the possibilities that the information technologies and the communication offer to educational applications. Student motivation and task persistence increase when students can work with topics that are of personal interest. The overall motivation of the system developer is to see how much could be achieved in educational terms by introduction of this type of system helping the trainee to get maximum benefit from the system. Such systems would seem to have the potential to help teachers manage their classrooms and design of their teaching flow. The system is modelled on the base of Artificial Intelligence, making use of the supervised learning approach. The system is fed with an initial input output pattern and the system then itself tries to find a mapping function which can be used to map other future input's given to the system, which in this case would be the understanding levels of different students based on the responses given by them in their respective test's. Based on this the system will be providing the next course of action for each and every individual. Thus the bottom line is, to have a system developed which will not only help the students to learn at their own pace but will also be a personalised one adapting to each and every user according to his or her understanding level.

## II. RELATED WORK

There are many educational systems developed to assist in teaching and learning the context of AI curriculum. In [8] a web-based intelligent educational system in the context of an AI course that uses AI techniques for teaching and assessing learners is presented. Furthermore, in our previous work [5], a web-based adaptive educational system that is based on interactive examples and exercises for teaching AI algorithms was developed. PATHFINDER [11] is a tool for actively learning Dijkstra's algorithm. The highlighting new feature provided by this tool is an animated algorithm visualization panel. TRAKLA2[10] is a system for automatically assessing visual algorithm simulation exercises. TRAKLA2 provides automatic feedback and grading and allows resubmission, which means that students can correct their errors in real time. In the literature, a number of tools and systems for assisting in the generation of exercises for specific domains have been developed. In the work presented in [4], a semi-automatic generator of self-assessment exercises is presented. The tool creates interactive exercises and combines the advantages of the automatic and manual classes of generators and aims to assist tutors use a more efficient teaching way. Also, in [9] a system for the automatic generation of multiple-choice cloze questions from texts is presented. EXORCISER [12] is a tool that can be used for self-training and offers exercises and automated verification for various topics in theoretical computer science, such as Markov algorithms and grammars. Furthermore, [2] present a work for helping math teachers in the automatic generation of equation exercises. The main aspect concerns the design and implementation of this kind of exercises with random coefficients.

## III. METHODOLOGY

The methodology used is the Object – Oriented Methodology. Through extensive research made on E-Tutoring systems, we concluded that the input variables are behaviour patterns of a student while learning the course. The output variables on the other hand are tasks student will do after taking a test. Basic approach to the Agent-Driven E-Tutoring System is divided into three models corresponding to three knowledge levels. Firstly, there is a domain model where the domain knowledge is gathered, that is knowledge of what has to be taught. A student model represents the knowledge of the student, that is knowledge of what student

knows. Finally, there is a pedagogical model where the knowledge of the instructing strategies, that is how to teach the domain knowledge, is described. An intelligent agent will be created to guide the student throughout the learning process. The agent will determine what the next task of a student will be after taking a test. If the student does well on the test, he will be provided with materials of the next chapters. If he doesn't do well on the test, the agent will provide depending on the student's performance with reinforcement learning material on the same chapter. Now, the working of the agent will be based on the integration of Decision Tree rules. The proposed approach focuses on the generation and adaptation of next task selection rules. Such approach is composed of two main phases and its outcome is a set of rules supporting automatic agent embedded in Intelligent Tutoring Systems. The aim of the model is to decide, at the end of each task, a suitable difficulty level of the next task.

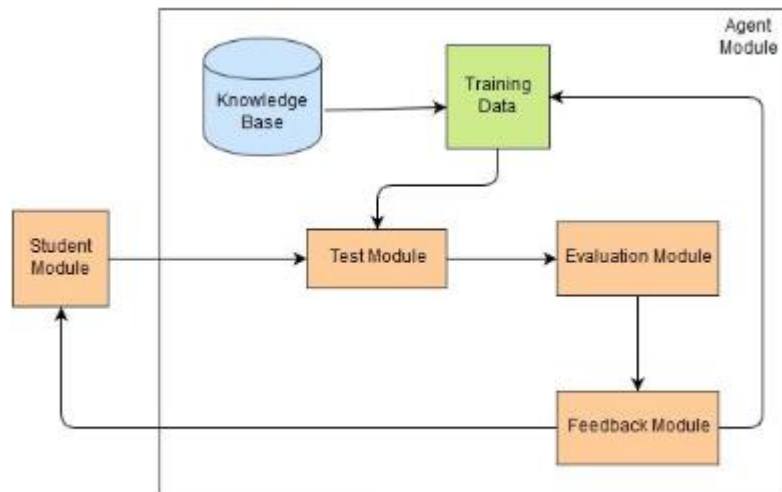


Fig. 1: Agent Module

- (A) Student Module - Initially student will be able to view all the courses provided by the system, that is just a brief overview of it. Once the student logs in with his or her login credentials and only if he registers for a particular course, only then he will be able to view the entire ontology of the course. The entire structure of the course will be made visible to him and then he can start the course week by week or module by module. No student can hop to successive module until his earlier modules are not cleared.
- (B) Knowledge Base & Training Data - All the courses offered by the system has different modules in it and each module has a test associated with it. The Evaluation Module evaluates the student's response based on the data stored in the Knowledge Base. The administrator sets all the questions with all the options available (MCQ) for it and also sets a priority for the question (easy, medium, difficult). Thus, this component holds all the questions and their corresponding answers which will be used by the other blocks for evaluation purpose along with all the learning materials which will be provided to the user for his or her learning.
- (C) Test Module - Students will be provided with all the course materials. As the entire course is organised into various modules the course materials are also divided accordingly with a test associated with each and every module. This module along with the evaluation module helps in determining where the user will go eventually on his or her current action.
- (D) Evaluation Module - This module simply evaluates the responses given by the user and checks it whether they are correct or not. A benchmark will be set and only if the student crosses that benchmark in his or her test, will be allowed to move onto the next module; else he or she will have to again go through the course materials, get his or her concepts more clear and will again have to give a test but now with a different set of questions thrown at his or her way. The number of attempts taken by the student to pass the exam and his or her accuracy will be taken into consideration at the time of final evaluation.
- (E) Feedback Module - Based on the students' performance, whether he passes the test or not he will be directed to different locations. This process of redirecting the user will be complemented with a proper message which will help the user to know from where he has come and where he is actually being redirected and on what basis. Such feedbacks will be always provided to the user by the agent i.e. the administrator.

#### IV. CONCLUSION

Considering the difficulties faced by a learner during their course of learning, the "Agent-driven E-Tutoring System" will help them to get work done in systematic and personalized manner. Referring to various technical papers, our system will be based on a hierarchical ontology and also with the help of Bayesian networks we will be getting the best of possible outcomes to move forward with. On completion of entire course, the user will get their report which will comprise of accuracy in answering the questions and also performance percentage. Thus, helping each and every one to get through the course in a personalised manner.

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