

# Facilitating Studies Using Neural Network on e-Learning System

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Abstract : In Senegal as many developing country it has become increasingly difficult for student to focus on learning, define goals, and work toward them. The current communication between the actors of education is not sufficient to adapt to the ever changing world. Designing tools to complete and reinforce their work has become necessary. The purpose of this research is to help design an e-learning complemented with neural network that will advise students depending on their current status. In the e-Learning environment, students can improve their learning. To achieve these goals, we use the evaluation of the students' performance coupled with the workload they receive. The results produced are distributed between student and teacher to facilitate their work. This feedback can be used by teachers to identify parts of their course they should improve. Armed with that knowledge we hope that student can make better use of the time they have to prepare for the challenges ahead.

Keywords : E-learning, Neural networks, Performance evaluation, Intelligent Tutoring System, Workload

## 1. Introduction

In Senegal as many developing country it has become increasingly difficult for student to focus on learning, define goals, and work toward them. The current communication between the actors (students, teachers, and so on) of education is not sufficient to adapt to the ever changing world. Designing tools to complete and reinforce their work has become necessary<sup>(1, 2)</sup>.

The purpose of this research is to design an e-learning that will advise student on their current status. Thus optimizing the time management and extracting information that could be relevant to the users in the improvement of learning

A student take an assessment. The goal is to measure prior knowledge that would increase the speed of acquisition. The student for each lesson complete a set of assignment dependent on a key point. The progress of the student are compared to other student (Determine if the student needs to put emphasis on the current point). If a lesson is too difficult, the lesson is simplified through division by Key points. The student progress is regulated by policies that are triggered by the comparison of the student performance and the overall performance.

The expected result is to generate data that will help both student and teacher.

## 2. Learning control flow

This section explain the features of our e-Learning system especially focusing on the learning control flow.

### 2.1 Flow of the system.

The following shows the typical flow of learning for the given subjects:

- 1 First the student will take an assessment,
- 2 The student for each lesson complete a set of assignment dependent on a key point,
- 3 The progress of the student are compared to other student (Determine if the student need to put emphasis on the current point),
- 4 If a lesson is too difficult the lesson is simplified through division by Key point,
- 5 The result come out, the teacher get the data he need to update the lesson, and

### 6 The training data is updated.

This is applied to a system where a subject has a set of lessons. Within the lessons, there are the content and it is summarized by key points. To acquire the knowledge the student will have to solve a set of assignments. Fig.1 shows the data format of learning material stored and used in our e-Learning system.

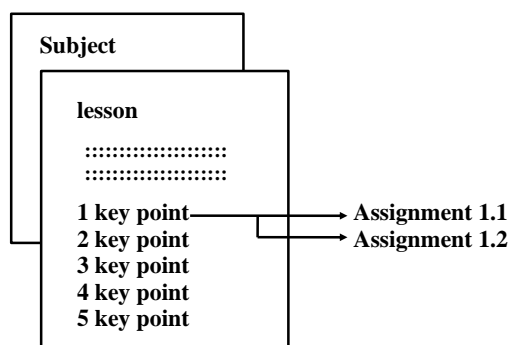


Figure 1 Format of learning materials

To start a subject, our system give an assessment. The goal is to estimate how fast a student can advance.

### 2.2 The system configuration:

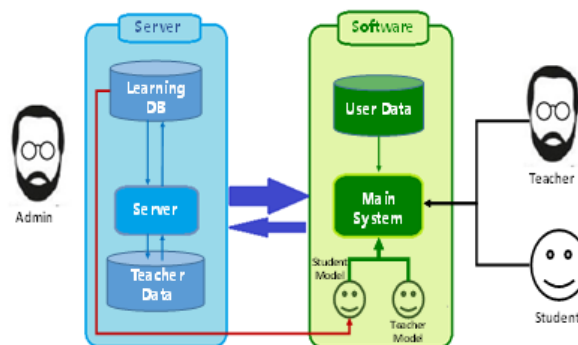


Figure 2 System configuration

In this system configuration shown in Fig.2, we have five different agents. Among them we have three real agents and two virtual agents.

Real agents have the following features:

- The admin is responsible for verifying that the user registered as a teacher is a really a teacher. Secondly the admin vetting the content supplied by the teacher,
- The teacher who is in charge of creating material for the student to use. Teachers can also review the performance of the student, and
- The student who can study access the material review their record.

On the other hand, virtual agents mean both “virtual teacher” and “virtual student”. They have the following features:

- The virtual teacher will receive the lesson published by teacher that no longer use the system, and
- The virtual student is a model of the students' performances.

### 2.3 The neural network and its policies

Our system use a neural network. Its purpose is to estimate the student situation compared to the norm, for example, which is overall results of the students in that subject. While trying to comprehend a lesson the students' result depend on the prior knowledge they might have. The number of opportunities they have to apply the knowledge. So for these reasons the following simulation have been made. Fig.2 shows the simulation result.

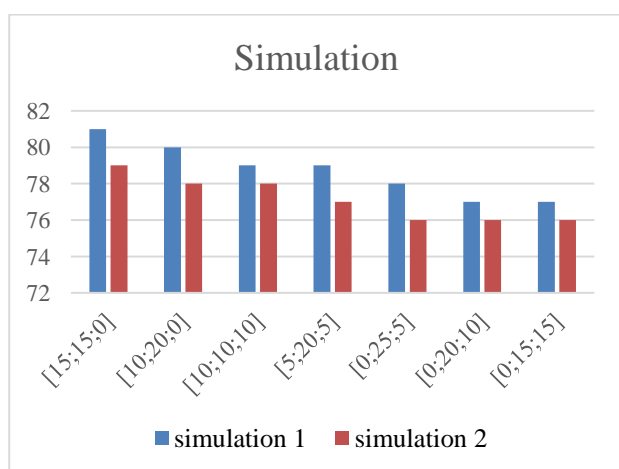


Figure 3 Performance of students depending on number of assignment and assessment score

The more assignment there are to more likely it is for students to understand the lesson. Then the other influence on the student understanding is the workload. The time the student have to complete these assignment.

The followings are more simulation parameters especially about input and out output data for neural network calculation: The input data are Assessment (Initial head start), Number of assignment, and Time (the time required by the student to complete a set). The output data is Estimated Score.

To complement the network policies triggered by the network results are. The number of assignments modifying the number of assignment make it easier for the

student to understand. To make sure the student is not dissuaded to use the material the number of assignment to do for the student is maintained under six for one key point.

Simplification, this uses the key point of each lesson to create sub lessons to divide a material into more manageable parts. For one lesson with eight key points we can separate into two lessons with four key points. In the case two key points are interdependent, since they cannot be separated they will stay in the same group or be their own group.

Material update by the teacher allow to gradually address the flaws in the material. When the teacher reviews the student's record s/he will see which part of the lesson has the higher rate of failure. From then first check if the simplification has solved that problem. If so make the change permanent. In the case it did not the teacher can propose a different solution or try solution that have been used before if they apply.

### 3. Expected result

For the teacher when a large number of student get stuck at the same problem this material will be marked as something that must change. First the teacher can know if simplification solves the issue. Otherwise s/he can implement other solutions. By adjusting the complexity of the material, we can adjust the workload of the student to manageable level. The student will get to quickly isolate the points that trouble them and resolve these issues.

### 4. Summary

In this paper, we described the e-Learning system with neural network for facilitating studies. Especially, the learning control flow is explained from viewpoints: typical learning flow, system configuration with real and virtual agents, and adopted neural network in our system. By dividing the workload, facilitating student studies become possible to improve the learning environment. We hope that student will get the habit of managing their performance. As well as allowing the study material to improve over time

The current status of this study are:

- Design of an e-learning system that help student plan their next step,
- Development of NTE, and
- Network including time number of assignment and assessment result.

As for future works, we need to improve the performance of the neural network, and we implement NTE.

### References

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