

Cyber Educational Agent Community: Multiple Agent Interface for Multiple Learners

—Cyber Assistant: Children Online Education Environment—

1. 背景 (Background)

Comparing with face-to-face learning environments, online learning (or e-learning) environments face with problems of their own. First, the e-learner tends to lose motivation and concentration easily, especially in the virtual education environment that is not tailored to their needs. As is noted, “The key to success in online classes rests not with the content that is being presented but with the method by which the course is being delivered”. In traditional educational settings, experienced teachers recognize learning needs and learning styles and adjust the selection and presentation of content accordingly. Thus one challenge in developing productive online learning is to create more effective interaction between online educational content and learners. The other problem is generally called “lonely learners”, which means learning in fact is a social activity, but in e-learning environments one usually learns all by himself and lacks the communication and inspiration from his classmates. “Single user” learning designs do not provide the learner the chance to find others who face the same problem or share the same interest.

2. 目的 (Motivation)

Our work intends to build an online learning environment featured by 1) multi-character agent interface and 2) the virtual community of multiple learners. The character agent is a human-like figure embedded within the content on a web page. There are several character agents that communicate with a learner during one’s learning process. Those agents act different roles. E.g. tutor agent selects and presents the content by monitoring and analyzing the learners’ leaning status, whereas classmate agent presents a virtual classmate who is learning the same class as the current learner.

In particular, the communication between the learner and the computer is carried out via both the traditional devices like mouse and eye-tracker, which is an important instrument that detects users’ focus on the content.

With the multi-character agent interface, virtual community of multiple learners and eye-tracker, we try to provide an on-line learning environment that provides lively, instant feed back to the learner, thus improve the effects of online learning.

3. 開発の内容 (Implementation)

Figure 1 depicts the user's experiences of the system. The learning content is showing in the right-bottom (main) area. In the left bottom area, other remote learners who learn the same content currently are listed. The tutor agent that analyzes the learner's status and guides the learning process is also shown.

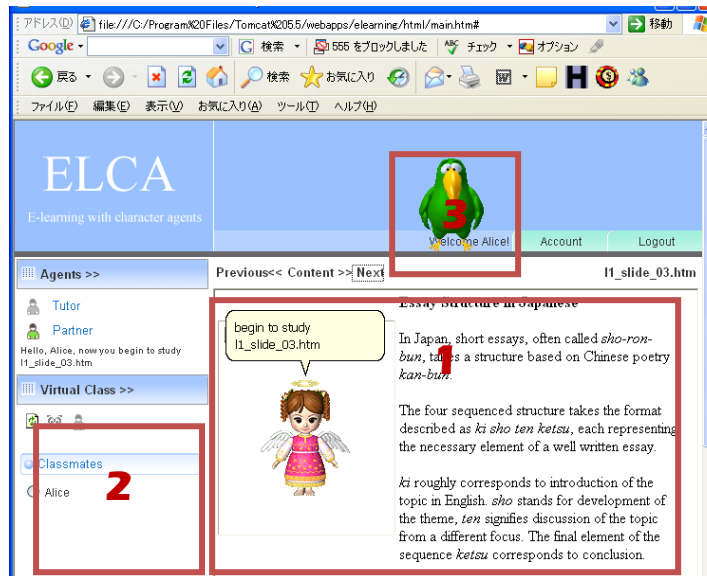


Figure 1 User Interface for learners. Area 1 shows the learning content. Area 1 shows the virtual classmate and the tutor agent is shown in area 3

The architecture of the implementation is shown in figure 2. The system takes the typical browser-server architecture. And the communication between the server and the client is feature by the use of AJAX. The client side implementation includes 1) character agents that communicate with users, 2) functions that analyze learning status of the current learner, 3) Computer-User communication through mouse and eye-tracker as well and 4) AJAX components that communicates with the server. The server is implemented as two-layered. For the first layer, application layer, we use the Apache Tomcat and implement the services by JSP. The other layer is the knowledge base layer. The knowledge base is used to store data of learning content, user's profile and learning records. The knowledge base is based on the sesame (<http://www.openrdf.org/>), which is an open source, java based RDF framework with support for RDF Schema inference and querying. The manipulating function of sesame is implemented in JAVA.

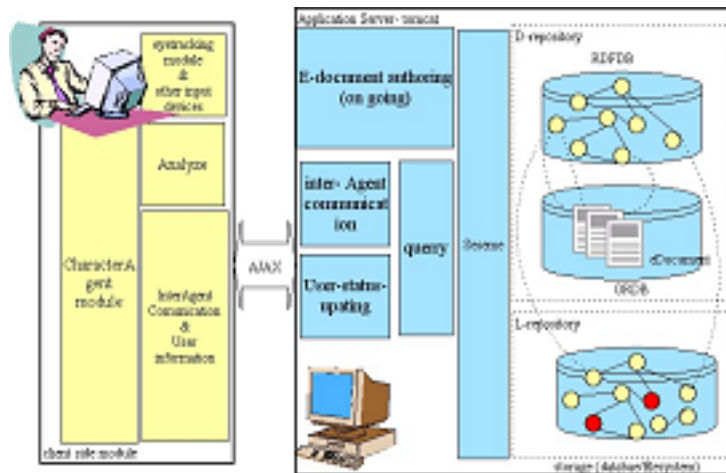


Figure 2 System Architecture

Geographically distributed learners who study the same learning content are organized into the same virtual class. Their learning information can be exchanged among themselves. It is a server based multi learner communication, which means all the information is up-sent to the server and then is dispatched to the target learner.

Eye-tracker allows the monitoring of both the conscious and unconscious gaze movements of a respondent. Figure 3 shows the setup of the eye-tracker. The learner wears the eye-mark and looks at the learning materials shown in the computer screen. Learner's eye gaze information is collected and sent to the computer through the USB port. The information then is analyzed and instant feed back is given by the tutor agent.

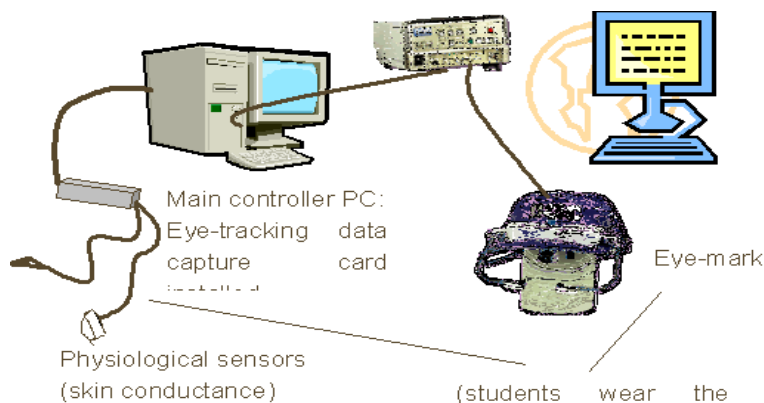


Figure 3 the setup of eye-tracker

4. 従来の技術(または機能)との相違 (Innovation)

This work differs from the current existing e-learning systems

from the following aspects: 1) Use character agent to communicate with the learner. 2) The virtual learning community is formed and the instant communication is supported among the members of the virtual community. As to the implementation 3) the learning material, users' profile data and learning records as well is stored in the form of RDF. And 4) the light-weighted AJAX is used for client-server communication.

5. 期待される効果 (Expected Effect)

The overall target of the work is to provide an effective e-learning environment. It is our expect that with the help of character agent and virtual community we can simulate the real learning environment and overcome the shortcomings of existing e-learning systems. Besides, we deem our work an attempt to a general framework for e-learning.

6. 普及(または活用)の見通し (Promotion Tactics)

This work is expected to be adopted by the colleges first; especially colleges that provide remote online free education to the masses. During the usage, more defects and demands from the learner will be discovered.

7. 開発者名(所属) (Developer)

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