Chat Module Guided for Moodle

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1. Introduction

The usage of computers on research centers at universities is a part of the history of computers but since the computer prices decrease and they can be easily accessed from common users the use of these devices has never stopped and the case of their usage for pedagogical matters will not be different.

The concept of e-learning has born at the beginning of last decade when universities and institutions saw this as a solution for problems like distance and costs of personal and material 00. The success came with the appearance of the concept of Learning Management Systems (LMS), defining the structure and objectives for applications which are used to create and manage on-line courses. The open source project Moodle 00 is a kind of LMS and a fully example of this success, a complete suite of tools are provided in order to create and manage courses.

New advantages on multimedia and communications bring several concepts on web and the use of these for pedagogy can improve the experience and enrich the education contents. The other web chat modules for Moodle do not cover the pedagogical needs due to the simple integration of "box-on-box", or because they need a stream server which can also cause bottleneck problems.

This paper shows the technologies which are introduced in order to create a "guided web chat" through its insertion in courses which can be aimed on institutions of languages for teaching interests. The web chat can be configured by professors in order to establish a desired focus talk, the recorded section can be saved and available for teachers or students. The creation of a module will allow a better integration with the Moodle.

On next sections of the document will be presented a new module for Moodle, dividing the text as following: first will be explaining the applied technologies and the implemented solutions to solve some constrains and finally a conclusion of this work.

2. Multimedia enrichment for e-learning

The use of new technologies for on-line education brings more tools for teacher and students, but the simple usage of this advances needs to be still focused on pedagogical interests. Web chat communications are not a new concept and additional functions should be introduced to achieve these interests. The guided web chat module presented here tries to cover the current need of students and professors, in order to create the proposed applications many technical problems should be resolved and more than one technology will be necessary to develop the final application.

The main lists of characteristics expected for this module are enumerated here:
- Videoconference;
- Bandwidth efficiency;
- Guided text;
- Picture view;
- Audio and text recording.

2.1 Streaming

The Adobe Cirrus, before codenamed Stratus, is a hosted service from Adobe which allows the creation of network applications using the new communication protocol Real Time Media Flow Protocol (RTMFP) to make connections directly between two computers.

The protocol RTMFP is designed to reach the real-time requirements for audio and video communication, since it is based on User Datagram Protocol (UDP) not on Transmission Control Protocol (TCP) like Real Time Messaging Protocol (RTMP). The usage of UDP to create streams reduces the end-to-end delays on connections. The protocol can provide low latency connections without reliable delivery, but can also use reliable delivery on its desire; the methodology of peer-to-peer performing connection directly between client computers without server, another characteristic is the data priorization on audio streams in front of video and other non-time critical data which guarantees a better communication.

The Flash player instances have to connect to a Cirrus hosted service in order to get the ID which is used to identify the peers through the network, after knowing the pairs ID and net address a connection can be established directly between the clients, see Fig.1.
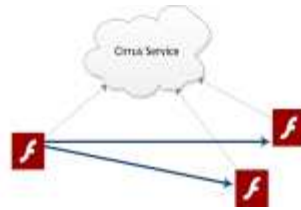
Fig. 1. Adobe Cirrus stream methodology

Once the connection is established, the instances of flash player peers allow the clients to attach a stream of video and/or audio and text.

2.2 Videoconference module for Moodle

The creation of a module will allow using the Moodle resources to manage the data from web chat, develop this using effectively these resources facilitate the integration of the module, avoids data replication and improve application performance. The granted rights from students and professors will be different, see Fig. 2, the students have only access to the web chat application, meanwhile the teacher have the permition to configure the guided text, the student pairs and to view chat logs.

An interface to configure the guided text will be available for the professor in order to set the guided text for the activity with the following features: a desired text which will be presented on chat window for students, the time elapsed since the application start which will be used to control the messages, status of text, if published. Another interface allows configuring the students pairs (peers), these peers will be associated with the activity ID in order to manage the peers between different activities, thus the professor should set pairs according class subject.
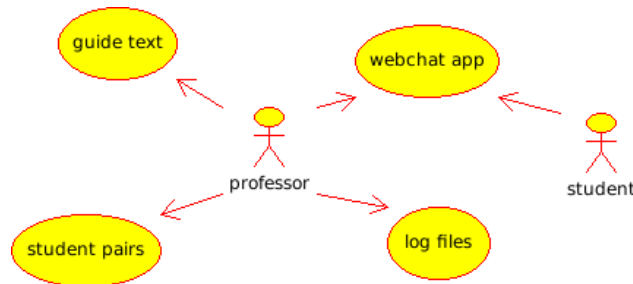

Fig. 2. Access layout from webchat clients

The flash player instances will receive and send information to module through the data base since the applications need to know both peers addresses to create the connection, the Cirrus ID will be saved on user table in order to reach the peers connections.

When user open the web chat interface an automatic connection to cirrus service is initialized, a received ID is saved into database and the application checks if the other peer has an ID if it is true the instance tries to establish a connection between both peers, once the connection has been complete the peers attach an audio&video stream, see Fig. 3.
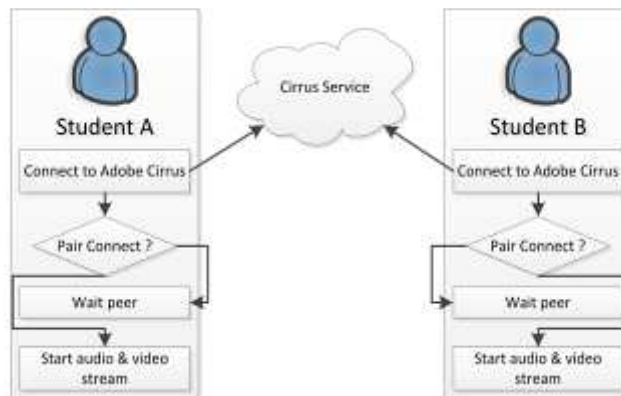

Fig. 3. Connection flow diagram

When the connection is established a JavaScript counter will be started to control the activity chat, the messages will be presented to users when the elapsed time is achieved thus for all presetting messages by professor, this feature is a key for the educator to route the conversation.

Another function implemented on module is the possibilities of use images instead of peers video, this ability can be used to show thematic images for students, such as people, objects, cities, etc.

2.3 Evaluation resources

The professor would be able to evaluate the students and to achieve this, the module will provide data results from chat sessions.

The simple task of recording the audio conversation from users chat can be complicated due the streaming technic selected and the programming levels characteristics, since the data does not pass through a server which can access both streams from peers and due the security constrains of Flash, which restrict some resources from computer, that are not full accessible, such as the audio card mixer or saving files on local storage without user interaction, in order to record the audio chat a third software is added to complete this task, an open source tool derived from *The Gong project* 00 called *nanogong* which is java applet and can be used to recorder, playback and save audio files, the applet has been implemented on Moodle.

A tuned version of *nanogong* will be created with a few modifications, increasing the maximum time of record and getting a two input sources, mixing both in order to create a chat audio with sender and receiver audio data in the same file.

A java sound API 0 provides a layer to communicate with audio and MIDI devices, the API defines two types of data lines which can be accessed by developers. The *SourceDataLine* is an input source of mixer connected to output ports of audio card and used to play sounds through the speakers, in another way the *TargetDataLine* is a output source of mixer used to receive the data audio from input ports of audio devices connected to mixer, like microphone and input sources.

Some kind of audio devices have an input source named *Stereo Mix* which can provide a feedback of the currently audio played on card that can be selected to record the listened audio of client but in order to make this application more flexible, a third part software called *Virtual Audio Cable* will be used to create a virtual input channel connected to real output channel with the received audio, see Fig. 4.

When the connection is established the Flash instance sends a message to a tuned version of *nanogong* to start the record and once the connection has finished the applet receives a message to stop the record session and save the data audio file.

Fig. 4. Schematic of audio system implemented

3. Conclusions

The web chat module proposed on this paper is totally functional and the implemented features have been tested, a view of web chat window is presented on Fig. 5

Fig. 5. The messages shown to students can convert a web chat on a tool to pedagogical use, also giving professors the control of conversation; the results provided by the application like the audio and text log are helpful to make analysis of oral speaking skills of students.

The use of more than three development languages brings some difficult to design the application, and the dependency of an external authentication server could not be desired. The recently technology HTML5 is very auspicious and could be used to develop a full application without third part software to complete the entire desired tasks proposed here and the use of Moodle to manage the pairs ID can be reliable.

Fig. 5. Real view of application

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