Ubiquitous and biometric applications on distance education. An alternative to the traditional examination

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Abstract. The Project MOSAICLearning tries to alleviate the high economic cost derived from the examinations in a distance university, allowing by a side the remote examination using biometric and security techniques, and by another one a better control from access to the examination classrooms by means intelligent RFID tags.

1 Introduction

The distributed and distance education model that is applied in the Spanish University for Distance Education [2] (UNED) makes necessary the arrival of new technologies able to assume the challenge of educate a great number of students.

A relevant problem inside UNED is the examination of their students due to the UNED students are distributed along of the world (but mainly distributed along Spain), and some of them are with some kind of handicap or in jail. This supposes a high cost for the UNED due to the enormous infrastructures existing, and for the students, because sometimes they have to travel to other countries to can do an exam. Indeed, to this fact is to which the project MOSAICLearning talks about. MOSAICLearning tries to facilitate the examinations, allowing by a side the remote online examination, and by another one better accesses control to the examination classrooms.

2 RFID Applications on examination classrooms

Sometimes an area habilitated for examinations must receive more than two thousand students in half an hour to be sited and to be got the exam form, which causes that the infrastructures to make a suitable pursuit of entrance and exit are difficult to manage, also the exams must be printed in the act, due to depending on the hour zone and the subject, they will be a model or another to avoid possible frauds.

For this reason, the MOSAICLearning project will allow that when a student goes to a classroom to be examined a RFID sensor will detect the presence of its intelligent

RFID tag in the enclosure. Once the student is located and identified the system will print its exam, customized for this student, and it will show to him where it must be located within the enclosure.

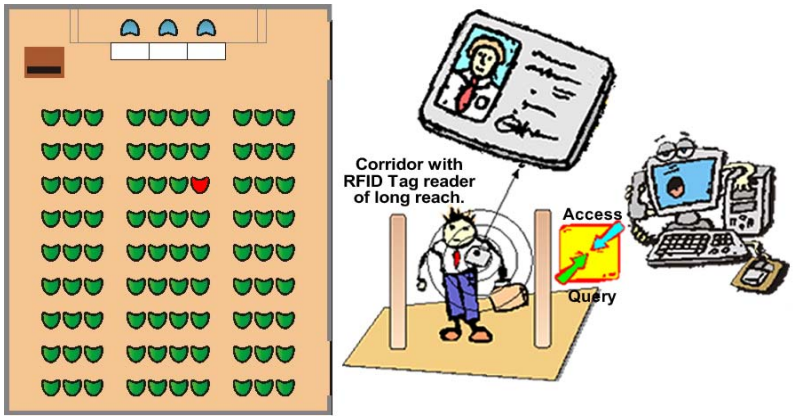

Fig. 1. Figure of the operation of the system. The user is identified and registered in the entrance and exit to the enclosure of the examination.

As it is possible to see in the figure 1 the student will be identified when he enters in a zone with readers of long reach thanks to the RFID chip incorporated in his student card, which is provided by a banking entity. The system registers his entrance and exit to the examination enclosure in a server. The main contributions of this system are:

- An examination room will be able to receive to high number of students simultaneously.
- The students will not have to wait for long time to enter in the examination classroom.
- The enter and exit of the students in the examination room will be suitable registered.
- It allows printing a customized exam in real time.
- This system will make the life a little easier to the students and to the people in charge of the examination.

The RFID Tags give a very good solution to the examination problem of UNED due to its characteristics: robustness, speed of reading, simultaneous reading, security, existing programmable tags and it does not need direct line of vision.

3 On-line university examination, biometry control

The use of on-line test in education is not a new concept, but in the university scope is not frequently to find a course with only on-line examination. This fact is because there is a great risk of fraud on the part of the student. A student doing an

exam from his home can use a thousand of techniques to play cheat in the resolution. Due to that, in this project we are affronting an important challenge, contributing with all kind of measures to avoid the fraud.

At first (Fig. 2) it seems necessary to use biometrics techniques [3] to assure that the user who makes the examination is who must be. To obtain this point the system will recognizes the user fingerprint in little intervals of time by mean a biometric mouse with a fingerprint sensor [4][5]. The client side will send this identifier of the user to the server to assure the authentication of the user. In addition, the system will be composed by the following controllers too:

- Proximity and Visual Controller: These sensors have the function to control the presence of any person within the examination room.
- Audio Controller: This module will register with a microphone all the sounds produced in the room at the same time that avoids with an earpiece that the student hears originating sounds of other people.
- RFID Reader: This sensor obtains information about the user reading a RFID tag incorporated in the student card.

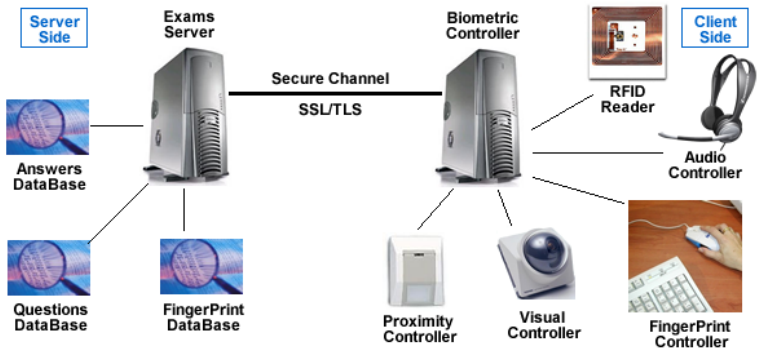

Fig. 2. System Architecture [1]. Represent the logic system operation schema, distinguishing two mains parts: the server side (on the left) and the client side (on the right).

As it can be observed in the figure 2, the communication between client and server side will produce by means a SSL/TLS secure channel. On the other hand, the server will access to three main databases: the fingerprints, questions and answers databases. Thanks to these data warehouses the system can verify the identity of the user tag and show the suitable questions to the student and register the answers.

Nevertheless, all these technologies are not enough to assure a high quality and security level at the examination moment. These techniques will must have to complemented with a suitable philosophy of examination, promoting the practical examination versus the traditional test with only theory. Finally, this system presents a great number of advantages as opposed to the traditional systems of examination:

- Reduction of infrastructure costs in the UNED associated centres.
- Reduction of student's costs, they will not have to travel to do an exam.
- Rapidity in the correction of the examinations.

- It will facilitate the accomplishment of examinations to people with difficulty to move, like students with some kind of handicap or jailed.

In contrast, despite all the new technologies involved in this system it will not be probably as safe as the traditional examination, and it will increment the infrastructure cost in the student room. This cost will be assumed, of course, by UNED.

4 Conclusions

The new technologies, and more concretely, the ubiquitous techniques are acquiring a very relevant roll as much in distance as in the non distance education, simplifying many task that would be impossible to approach without the aid and support of these new tools.

The use of these tools in the UNED examination process will allow taking care more effectively to the students, customizing this process for every student, every moment and every place.

And those new hardware integration inside the service provider tools and software will allow the University to provide to students (as well as teachers and administrators) the best applications to support the examination process having the best features in security, control and availability.

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