

Appliance for audience response systems in mobile devices

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Abstract

Classroom response systems (CRS) enable the gathering, in real time, answers from an audience during a class. Ordinarily, CRS are implemented with small electronic devices called clickers. Those electronic devices are expensive. In this article, we present the challenges to develop a low-cost solution of classroom response systems, including technological and user-interaction challenges.

Key words: audience response system, bring your own device, web services

Introduction

Technology has been increasingly used in the learning process in schools and universities. Classroom response systems (CRS) play a great role in this context.

Currently available CRS are expensive, due to the cost of acquisition, installation and maintenance. The price of this devices is a huge obstacle for schools in disadvantaged areas. Also, clickers have a hardware limitations and are not flexible. Most devices can only offer a limited number of types of answers, which sometimes do not satisfy instructor's needs.

Virtualclicker shows up as an affordable solution for schools with lower budgets. The project is based on the concept of Bring Your Own Device (BOYD). In that way, we are able to eliminate the electronic hardware that is prohibitive for our market share.

Results and Discussion

Virtualclicker project uses a web system (hosted by a Raspberry Pi) with Apache embedded web. The main programming language used was PHP. Rich interfaces can be achieved using HTML5, CSS3 and Javascript. The database was developed using MySQL.

The development of the project is divided in two different interfaces: the instructor interface and the learner interface. The interfaces are used by professor and student to interact to each other. In the end of the project, we tested the interface with real users so we could have a real life feedback about the interactivity of the platform.

Conclusions

As an on developing project, future work includes making the platform more flexible, developing different types of questions, answers and graphics.

Virtualclicker is part of a wide research about human-computer interaction which includes another solution for classroom response system called Paperclickers. This approach uses concepts of image processing to capture students' answer identifying top codes in the class.

After all the research, both approaches met the expectations behind. Virtualclicker and Paperclicker shows up as promising solutions for the problems found with classroom response systems.

Acknowledgement

This research was funded by PIBITI/CNPq and was developed at the LCA Lab/FEEC/UNICAMP. Thanks to Prof. Dr. Renato R. Lopes, Master Student Jomara Mota Bindá for their help and important contributions to this work. Thanks also to B.Sc. Student Wilson José Prata Neto for his help in conceiving and conducting the user experiments.

¹ Raspberry Pi Documentation (Online) – Accessible: <http://www.raspberrypi.org/>.

² Data-Driven Documents (D3.js) Documentation (Online) – Accessible: <http://d3js.org/>.

³ PHP Documentation (Online) – Accessible: http://php.net/manual/pt_BR/.

⁴ MySQL Documentation (Online) – Accessible: <http://dev.mysql.com/doc/>.

⁵ Niederauer, Juliano, “PHP para quem conhece PHP: recursos avançados para criação de websites dinâmicos”, 3. ed. – São Paulo: Novatec Editora, 2008.

⁶ Welling, Luke, “PHP e MySQL desenvolvimento web” / Luke Welling, Laura Thompson; tradução Edson Furmankiewicz e Adriana Kramer. – Rio de Janeiro: Elsevier, 2005 – 6ª Reimpressão..