Apps for Synchronized Photo-Audio Recordings to Support Students

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Abstract

We introduce new prototype Apps for the automated recording of complete lessons, seminars, talks, *etc* using mobile devices running Android OS and iOS, which aim at supporting the recoding of academic lectures by students themselves. These Apps are free for use and are based on the experiences gained by the ICTP Science Dissemination Unit (SDU) in Trieste, Italy with its open source *"Enhance your Audience"* (EyA) recording system: wwww.openeya.org --with more than 10 thousands hours of automated educational recordings in the fields of physics and mathematics.

Author Keywords

Automated recording, Photo-Audio Recordings, physics and mathematics

ACM Classification Keywords

H.4.3 Communications Applications, H.5.1 Multimedia Information Systems, H.5.2 User Interfaces, K.6 Management of Computing and Information Systems

Motivation

Rich-media video recordings of lectures, seminars, conferences, *etc* are now being produced world-wide by prestigious institutions, research centers, schools and others since the technology to implement video streaming and recordings is getting robust and cost effective. Another reason for this growth lies in the fact that access to the Internet is now available to all at affordable costs and at faster speeds throughout different means, including the new mobile devices. It is forecasted that in only few years ahead, on-line videos traffic will consume most of the bandwidth available for academia and entertainment [1].

Pioneering educational video archives such as the MIT OpenCourseWare [2], and the ICTP pre-PhD Diploma Courses On-line for Physics and Mathematics [3] are increasing their popularity with scholars around continents. New open educational programs for blended learning, mobile learning and others in different fields are being developed and made available at reasonable prices, giving the opportunity scholars to advance in their careers. Most recently, the implementation of Massive Open On-line Courses (MOOC) [4, 5] by EdX.org of MIT and Harvard are opening also new ways to offer excellence and free education for all. The technology needed to optimize these educational programs such as Coursera and Audacity are still under developments [6]. In this regard, the recent Pinvox algorithm [7] can be used to certificate self-study by the attentive vision by students of their assigned educational on-line videos by their Tutors.

There is little work for supporting and facilitating the easy recordings by the students themselves, specially now that they have easier access to computers, and a large variety of mobile devices to communicate with their peers and to participate in social networks activities or to use them during their academic activities. From the technological point of view, many efforts have been principally devoted to support the recordings by Institutions, and little support has been given to the possibly of developing tools for allowing students to carry out their own recordings, which should be optimized for long traditional classroom lectures of 45min or so.

In this work we introduce our new prototype Apps for the automated recording of complete lessons, seminars, talks, *etc* using mobile devices running Android OS, and iOS (displayed in Fig.1). Our aim is to support the recoding of academic lectures by the students themselves.

Figure 1. EyApp icon on a iPhone.

EyApp & AndrEyA Apps

The releases of the applications for AndrEyA on Android OS and EyApp that can be used also on iPads and iPod

touch, have been deployed to allows scholars to make their own recordings or Postcasts with just the press of a button, and to allow them to share their recorded courses immediately on the Internet soon after the lectures ends or save it for future reference and study.

These Apps are free for download and use, and are based on the experiences gained by the ICTP Science Dissemination Unit (SDU) in Trieste, Italy with its open source *"Enhance your Audience"* (EyA) recording system: www.openeya.org --with more than ten thousands hours of automated educational recordings in the fields of physics and mathematics (see: ICTP.tv).
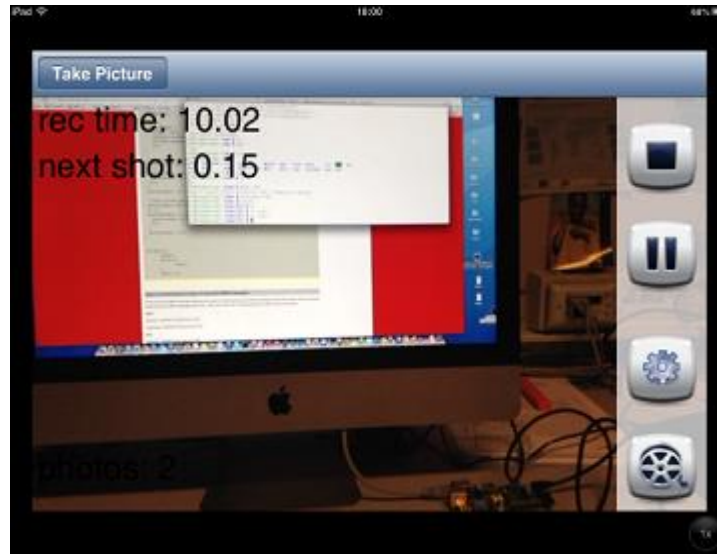
EyApp is available on the iPhone App Store: https://itunes.apple.com/, and the AndrEyA App through the website http://www.andreya.org.

Like a small video camera, EyApp (shown in Fig. 2) and AndrEyA can simultaneously record the voice of the speaker and take pictures of the screen, which projects digital presentations, or from a podium holding a traditional blackboard. As a main difference though, these Apps on an iDevice (iPhone, iPad or even an iPod touch) save students from the frustration of learning the art and science of video recording and the many options of conversion to multiple video formats.

Figure 2. EyApp Control Panel with buttons for Manual Photo Shooting, Recording/Stop, Pause, Preferences and View.

Figure 3. EyApp Frame Control from 5 to 20 seconds.

With EyApp and AndrEyA Apps it is possible to create one's own photo-audio movies that are composed by still frames (*i.e.,* screenshots of what is projected or written by the speaker or lecturer) synchronized with a continuous audio signal. The result is a file of smaller size compared with a traditional video (HD or standard resolution) because the still frames can greatly benefit of the highly-efficient compression algorithms used by the H264 video format used by modern mobile iDevices.

Figure 4. AndrEyA App icon for Android: www.andreya.org

Within EyApp and AndrEyA one can shot automatically, every 5, 10, 15 or 20 seconds, or the shootings can be controlled manually by the user as shown in Fig. 3, allowing for many different situations of usage. There is also the possibility to pause the recording by pressing a button and to re-start the recording again from the point at which was paused, saving in this way periods of silence or any breaks done throughout during the lectures.

To make the application even more engaging, EyApp outputs (and also next versions of AndrEyA --whose icon is shown in Fig. 4) can be saved on the device's photo/movie gallery, and from there it can be further edited with other Apps, shared by e-mail and rich-media messaging systems, or via social networking Apps, or transferred to a computer (*c.f.,* Fig. 5). In particular, our EyApp allows to create personal

recording archives as well as to share them via popular self-video archives such as YouTube.

Figure 5. EyApp Output files containing synchronized audio-photo recordings. These can be easily erased or transferred.

Our final goal is to facilitate the recording of seminars with Apps like EyApp and AndrEyA, either at an School, University, Conference or anywhere a student could be present. Most importantly for the project ay hand is to allow students to record an event of their interest at any time and for their own purposes, and/or for sharing their recordings with colleagues and friends.

Mobile Internet in Developing Countries
For developing countries experiencing the so-called Digital Divide, there are now new opportunities to leapfrog "old" technologies such as wired phones and desktop computers. This is increasingly the case in Africa, as the costs of intelligent mobile devices continue to fall and the prices and availability for WiFi and cell phone coverage improve [8].

According to a recent report [9], Africa is the most dynamic e/m-Learning market on the planet. In the last two years, many African countries have embarked on new government backed initiatives to integrate learning technologies into education and training. The growth rate for self-paced e-Learning is above 15%. Senegal

has the highest growth rate in Africa at 30.4%, followed by Zambia (27.9%), Zimbabwe (25.1%) and Kenya at 24.9%.

Many countries are adopting e/m-Learning programs as a way to meet the strong demand for higher education. For example, the pan-regional virtual University of South Africa (UNISA) has over 310,000 students (of which 3,500 come from outside Africa). A year ago, the African Development Bank Group (AfDB) approved a $15.6 million grant, "to help strengthen the capacity of the African Virtual University (AVU)", with the goal to use these funds to build out 12 e-Learning Centers.

On the other hand, the growth of mobile phone subscriptions world-wide in the last few years has been also tremendous. With 5.9 billion mobile-cellular subscriptions, today's global penetration reaches 87% and 79% in the developing world. Mobile phones have changed the way people access the Internet to study, work and search for information and knowledge.

Mobile-broadband subscriptions have grown 45% annually over the last four years, and today there are twice as many mobile-broadband as fixed subscriptions. This means that people, especially scholars at a young age, use the Internet via mobiles devices more than they do at home. Hence, it is foreseen that educational Apps, like EyApp and AndrEyA --that aim to support students' work, will became more and more useful and popular.

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