Creating synchronised presentations for mobile devices using open source tools

Juan R. Rico-Juan
Universidad de Alicante
Alicante (Spain)
juanra@dlsi.ua.es

Abstract

In this paper, we describe a way to create synchronized presentations for mobile devices using only open-source tools. In the framework of higher education, it is important to provide the students with flexible and interactive resources when the time assigned to laboratory or lectures gets decreased. Nowadays, the students have often one o many mobile devices such as mobile phones, smartphones, PDAs (Personal Digital Assistant), etc. This gives teachers the opportunity to create resources for these kind of devices. On the other hand, the open-source software offers an interesting alternative in order to create educational resources, just using a single tool or a combination of them.

The main idea here is to describe a procedure to create presentations combining PDF files as slides, audio files with detailed explanations and flash video files (.swf) as showing demos. We describe in detail how to integrate these individual components to create a high quality presentation,, based on vectorial components, with small size of result files. It also allows to play these presentations in a mobile devices.
In contrast to commercial tools, our approach does not use special interfaces or formats and it allows one to export presentations to formats compatible with other tools in a future tools. Our proposal also allows one to work with conventional tools to create slides (such as PowerPoint, OpenOffice.org Impress or LaTeX) due to the final slides are exported to PDF and also to use standard audio tools to create audio (WAV, OGG and MP3 are supported). Video can be included just by converting the original file to SWF (flash video) format. In order to make use of the educational resources, we just need a mobile device with a web browser and a flash plug-in installed and, therefore, the result can be easily distributed through a web server or as a package that can be stored locally in the device.

Keywords

mobile-learning, educational technology, multimedia, hypermedia

1. INTRODUCTION

Some papers [16,17] explain how to use open source tools to create educational presentations as resources to be uses in a computer. This paper is focused on particular difficulties one can find in mobile devices and how to solve them. This approximation is a powerful solution combining slides, m-learning and open-source software, to obtain high quality audio/video presentations.

Audiovisual presentations can be built using proprietary and open-source software tools. A description of the state of the art is briefly explained below.

1. Proprietary software tools

There exist commercial tools such as Flash[1], Director[2], Articulate Presenter[3], Camtasia Studio[4], Acrobat Connect[5], etc. could be bought. On the other hand, in order to create high-quality presentations one needs to learn how to use the tools. These tools are more complicated than usual slide tools such as PowerPoint or Impress (OpenOffice.org). However, when the presentation is saved (audio, video, slides,...) the tools use a proprietary format, so it is difficult to export the resources designed with the tool.

2. Open source tools

The tools which belong to open-source philosophy are designed to cooperate with other tools. So, the problem of creating mobile presentations could be solved using different tools in a cooperative way. The approach presented here to create an audiovisual slide presenter is based on this idea.

There are some tools to capture video such as Xvidcap[6], Istanbul[7] or Wink[8]. Additionally, there are other tools to help us to create the video presentation efficiently, as described below.

2. OUR APPROACH

1. Slides as a digital video

An easy way to built a video presentation is to capture the computer screen and save it as digital video. We tested with different codecs (mpg4, Divx, Xvid, H.263 and H.264) to encode the video and different frames per second (10, 15, and 25), but several problems appeared:

- If we want higher quality, the size of video files increases dramatically. So, we need to find a compromise between quality and size. Most mobile devices have a small screen with low resolution (typically 320x240 pixels), so is hard to follow a presentation. Moreover, the mobile devices have a reduced memory capacity (compared with a computer), so the requirements of the resources should be small.
- The user needs the same codec we used to encode the video. Therefore, we force the user to install the same codec in the mobile device.

2. Optimizing the presentation

In order to optimize the presentations, we selected the following requirements:

- Use a frame and an audio file to build a usual slide; only if we need animation as demo, a video will be used.
- The web browser is used as interface program to watch the audiovisual presentation.
- The Flash player plug-in is the only extra program needed by the web browser.

The advantages are:

- A decrease in the size of each slide because Flash use a vectorial components.
- The text in the presentation has high quality.
- One can follow the presentations from different operating systems.

3. OPEN SOURCE TOOLS HELP US TO SOLVE THE PROBLEM EFFICIENTLY

There are some tools that can help us in this task. In order to manipulate archives the best way we found is using the Linux shell. It is easy to create directories, copy files and integrate audio and video tools. We can see the general diagram integration from the media in figure 1.
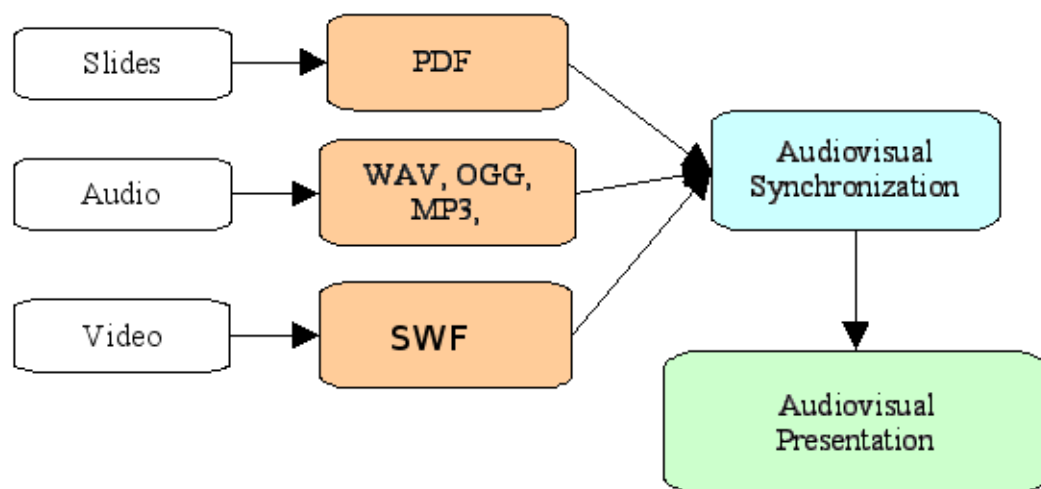

Figure 1: Procedure to create audiovisual presentation for a mobile device

In order to simplify the creation of five presentation, four different directories are used to organize the information:

- **pdf**: files in PDF format.
- **AV**: this directory contains the different audio and video files, one per slide, audio or video.
- **configuration**: if we want to integrate the slides in a web environment we need the main colours of the slide, the title of presentation, index of slides, etc.
- **tmp**: this directory store the temporary files needed to create the final presentation.
- **web**: this is the output directory where we store the final presentation. It includes a index.html, CSS files and slides in flash format.

The main steps to follow are:

1. Export the slides from your usual presentation tool to PDF. There are many different ways to do that, for example in Windows there is a GPL software called pdfcreator [9] which installs a virtual PDF printer. In Linux, print to a file in PS format and convert PS to PDF with a command line such as `ps2pdf` and the latest Linux distributions has a printer control that allows to print directly in a PDF file.

2. Save one audio or video file for each slide. We can use audacity [10] to save the audio in individual files. Use sequential names: for instance, snd.001.wav, snd.002.ogg, snd.003.mp3 to audio files and vd.004.320x200.swf for video; that is:

   - snd or vd means is sound file or video file, respectively;
   - 001, 002,… is the number of the slide;
   - wav, ogg, mp3 is the type of the audio file;
   - swf is the type of the video file;
   - 320x200 are the dimensions of this video file in the presentation.

3. Use the swftools [11] command line programs to build an audio slide or convert video to SWF format. For example, to convert a PDF file to SWF we can use `pdf2swf -p 1 myFile.pdf -o myFrame001.swf`. This command extracts page 1 from myFile.pdf and creates a Flash file called myFrame001.swf. We can convert WAV audio files to SWF audio files with wav2swf. For instance, `wav2swf snd.001.wav -o myAudio001.swf`. If we need transform audio files as OGG or MP3, there is software such as sox [12], lame [13] and oggenc [14].

4. Merge SWF files, audio and frames with `swfcombine`. For instance, `swfcombine -Tm myFrame001.swf myAudio001.swf -o slide001.swf`. This command synchronizes audio and video. If several frames are wanted to put in a single final slide the `swfc` compiler from `swftools` could be used with a programming language to manipulate objects and generate a SWF file.

5. Modify the CSS and HTML files according to the configuration figure 1.

The steps can be automatized easily. An environment for this purpose is shown in figure 2.
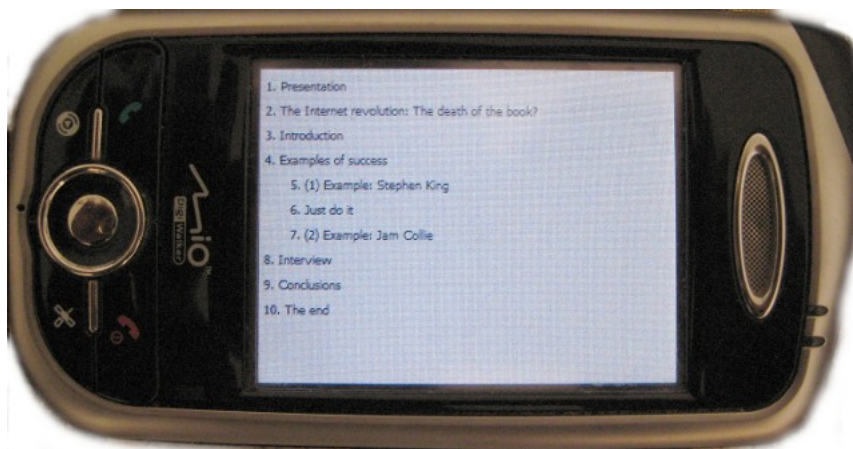
a)
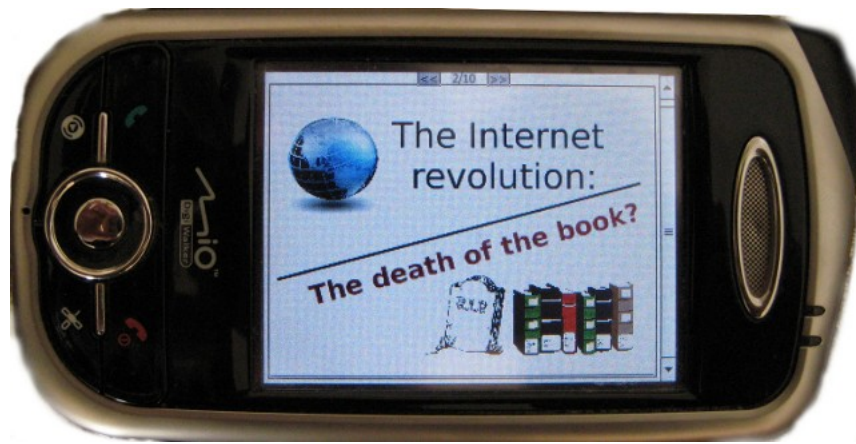
b)

Figure 2: Audiovisual environment in a mobile device. 2a) Index of the presentation. 2b) An slide of the presentation with previous and next buttons, and slide number on the top.

4. CONCLUSIONS AND FUTURE WORK

A way to create a synchronised presentation for mobile devices using open source software is presented. The output has high quality because the components of the slides are in vectorial format. The size needed to store these slides is typically 100 times smaller than the equivalent one using standard video recording tools. This reduction of the file size allows play these presentations in a mobile device with a reduced capabilities. In this way, the original files from the presentation, audio and video are kept. So, if the use of a different tool is preferred it could do it easily. The method allows to use any program to create the slides (PowerPoint, Impress or LaTeX). At the same time, a traditional digital video could be included without any configuration nor special video server.

As future work, we would like to integrate the present shell scripts in a graphical web environment accessible from different operating systems using only the web browser to create the presentation. We would like interaction to the presentation adding quizzes with answers and to compute the final score.

Acknowledgements

References

1. Adobe - Adobe Flash Player <http://www.adobe.com/es/products/flashplayer/>
2. Macromedia - Director MX 2004 <http://www.adobe.com/products/director/>
3. Articulate Presenter <http://www.articulate.com/>
4. Camtasia Studio. <http://www.techsmith.com/>
5. Acrobat Connect (Breeze) <http://www.adobe.com/products/acrobatconnect/>
6. Xvidcap <http://xvidcap.sourceforge.net/>
7. Istanbul <http://live.gnome.org/Istanbul>
8. Wink <http://www.debugmode.com/wink/>
9. PDFCreator <http://sourceforge.net/projects/pdfcreator/>
10. Audacity <http://audacity.sourceforge.net/>
11. Swftools <http://www.swftools.org/>
12. SOX <http://sox.sourceforge.net/>
13. LAME <http://lame.sourceforge.net/>
14. OGG Vorbis <http://www.vorbis.com/>
15. FLV player <http://www.jeroenwijering.com/>
16. Rico-Juan, J. R. and Carrasco, R. C. (2007b). How to do easy video presentations using open source tools. In

International Technology, Education and Development Conference (INTED), volume 1, pages 30-31, Valencia, (Spain). International Association of Technology, Education and Development (IATED).

17. Rico-Juan, J. R. and Carrasco, R. C. (2007a). How to create an efficient audiovisual slide presenter. In *IADAT-e2007. 4th. IADAT International Conference on Education*, volume 1, pages 40-43, Palma de Mallorca, (Spain). International Association for the Development of Advances in Technology (IADAT).