VideoPlayer3D - An Android application

Martin Månsson Henrik Montán

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Introduction

This article reflects the work of developing a 3D video player application for Android running on a mobile device. Today the 3D experience is already available at the theaters and is making its way into people's living room in the form of 3D ready TV sets. Nintendo recently announced their first portable game console with a 3D display, bringing the 3D experience into the mobile gaming industry. A company called Scaleform has presented 3D user interface functionality running on a mobile phone, which the large handset manufacturers might integrate into their products in the future. With 3D display technology emerging in the mobile phone industry, the possibility to watch 3D movies on the cell phone arises.

Android is an open source operating system developed by Google targeted for cell phones. It is the leading operating system for smartphones and was in the second quarter of 2010 ranked first among all smartphone OS handsets sold in the U.S. Major cell phone vendors like, Sony Ericsson, Samsung and HTC, have already started to use Android as the operating system for their new smartphones.

In this thesis we identify the challenges of bringing 3D video interaction into a mobile environment by developing an Android application called VideoPlayer3D. This is a 3D video player that enables user interaction.

Development of VideoPlayer3D

To simulate a mobile environment the target platform used was a BeagleBoard. BeagleBoard is a low-power, low-cost (appr. 149 USD) single-board computer produced by Texas Instruments. It has similar specifications as todays smartphone and is therefore a suitable platform to use. First it is needed to prepare the 3D video file in the correct frame compatible format. The format used is the checkerboard scheme which enables up to four viewpoints in a single video file. Four is the maximum since Android doesn't support higher resolution than 640x480 pixels and to retain the resolution of 320x240 pixels per viewpoint. An arbitrary number of viewpoints can be achieved by using multiple video files and on every fourth switch change to another file containing the next viewpoint. However, this will cause a delay of up to 2 seconds since the new file must be loaded into the player. Given these video files, some modifications to Android had to be done in order to do spatial line interleaving to playback them as 3D. The modifications were done in both the Android application framework and the OpenCORE media framework. The latter is used by Android to handle media files such as audio, video, recording and playback.

The VideoPlayer3D itself is designed and implemented using Eclipse and the Android SDK. The design of the application reminds of a regular desktop video player. When 3D mode is on the user can switch between the viewpoints when the video is playing and also when it is

paused. This can be done either by clicking on the buttons or simply by swiping left or right with the finger in case of a touchscreen is used. The player also supports streaming of video files from the Internet. The interface of VideoPlayer3D is shown in figure 1.

Conclusion

With 3D display technology emerging in the cell phone industry, comes the possibility to watch 3D movies on the mobile phone. Also it enables new ways to interact with video players, in example, the user might want to see a movie from another angle and even changing the viewpoint while watching the movie. In a mobile environment with the limited amount of resources, how can you achieve this?

With VideoPlayer3D we present a solution to how this can be achieved.

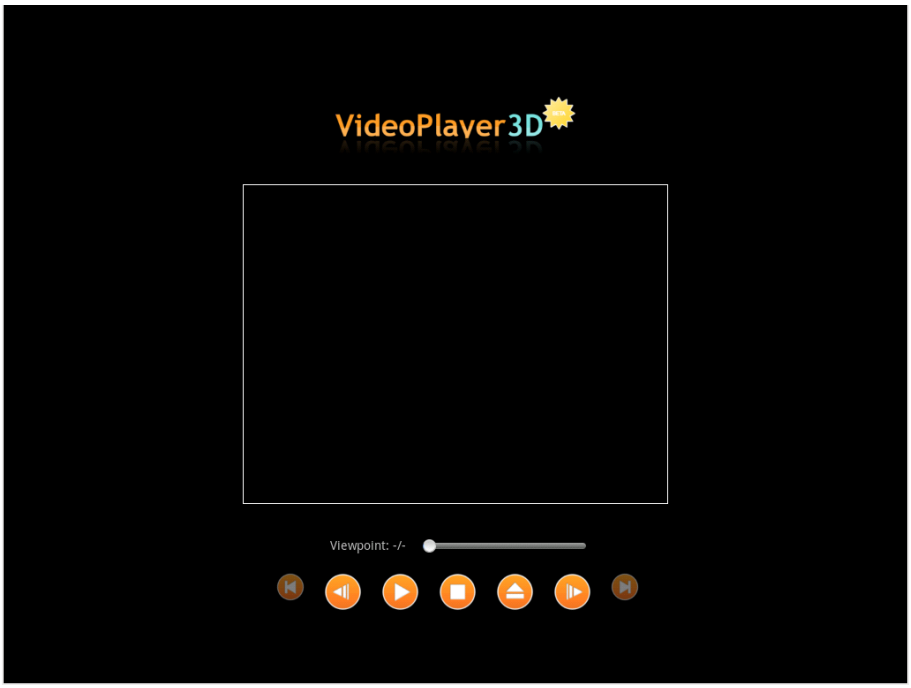

Figure 1: VideoPlayer3D user interface when 3D mode is turned on.