SEVENTH FRAMEWORK PROGRAMME

FP7-ICT-2011-1.5 Networked Media and Search Systems
b) End-to-end Immersive and Interactive Media Technologies

Specific Targeted Research Project

VENTURI

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immersiVe ENhancemenT of User-woRld Interactions

D2.3.1 First implementation of junaio-based AR framework for STE U8500-based platform

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1.1.1.1 Summary of the document

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Abstract:	This document is deliverable D2.3.1 "First implementation of junaio-based AR framework for STE U8500-based platform" and presents the released software for the first year scenario that was adapted and tested on the STE U8500 platform.
Keywords:	AR framework, AR SDK, 3D markerless tracking, authoring tool, environ-ment capture
References:	Refer to the corresponding section at the end of the deliverable

1.1.1.2 Document Control Page

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1.1.1.3 Change history

Version number	Date	Changed by	Changes made
1.0	31/05/2012	S. BenHimane	Initial version from template, ToC, sections assignment, summary.
1.1	01/06/2012	P. Chippendale	Final quality check

Table of Contents

1 Executive Summary

1.1 Audience

This deliverable is public software.

1.2 Summary

The document briefly describes what has been released for the first year VENTURI demonstrator.

1.3 Structure

This deliverable is structured as follows: Section 2 contains an introduction to the report. Section 3 describes the different software released for the VENTURI first year demonstrator. Sections 4 and 5 conclude the document with future work and references to available web pointers.

2 Introduction

For the first year demonstrator, a standalone application is planned to run a single/multi-player game based on 3D markerless tracking running on the first version of the VeDi device. The game takes place indoor on a table-top 3D game board (see Figure 1). The game is built on top of the metaio Mobile SDK which is the junaio AR framework.

3 Released software

3.1 Creator Mobile for VENTURI

The Creator Mobile allows the creation of tracking configurations for the VENTURI Y1 demonstrator on the VeDi device without the need of programming. The game organizer positions a set of markers in the neighborhood of the 3D game board (the miniature city) and starts learning the 3D environment appearance and geometry by moving the mobile device around the board. The markers are used to define the origin and the orientation of the coordinate system (see Figure 1). They also help to provide a reliable camera pose estimation during the 3D tracking configuration creation stage, and estimate the scale of the environment. In case more than one marker is used, an online inter-marker calibration is performed.
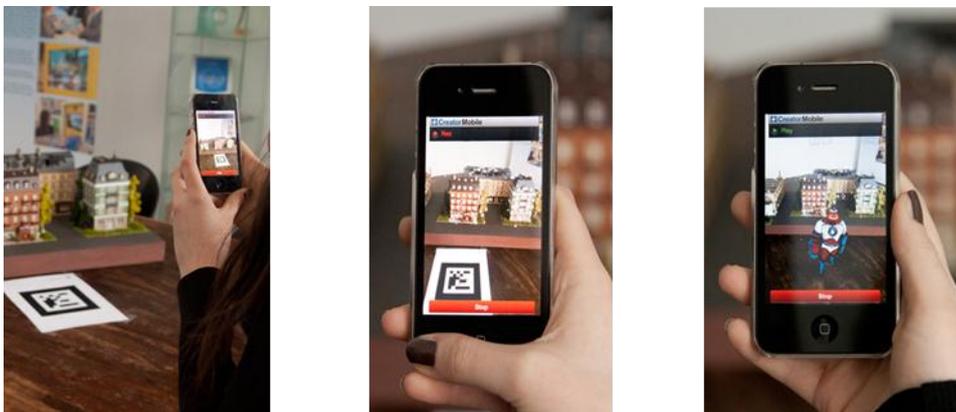

FIGURE 1: GENERATION OF THE TRACKING CONFIGURATION USING CREATOR MOBILE

The markers also help during the authoring process using Creator [2] since the point clouds are not an intuitive representation of the environment. Displaying the markers in the Creator tool (see Figure 2) helps the user in the task of positioning the virtual augmentations during the authoring.
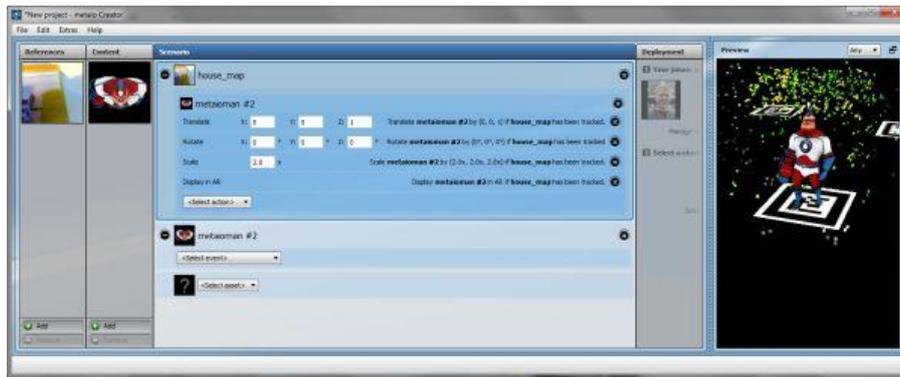
FIGURE 2: DISPLAYING THE MARKERS IN THE CREATOR TOOL HELPS THE AUTHORING OF THE AR SCENARIOS

A special version of the official Creator Mobile [1] has been created and adapted to the VeDi device constraints of Y1. Mostly, it takes into account the VeDi device specific changes to the camera and handles the gravity sensor data differently.

3.2 Mobile SDK for VENTURI

The output of the Creator can be loaded by the new version of the Mobile SDK [3] in order to run the 3D markerless tracking on the configured model based on the Creator Mobile. The tracking configuration parameters and the 3D tracking map are set in a simple XML file. The game user interface as well as the game logic and the models to be loaded are defined at the JAVA level.

4   Conclusions

The first version of the 3D tracking implemented in the Mobile SDK has some limitation. It is designed for small environments ($1m^3$). Only few markers could be used to cover the map creation without a drift (ideally, maximum 3 markers should be used). The tracking is sensitive to light changes and gives better results when the gravity orientation of the tracked environment is known. The algorithms give better results when the device creating the tracking configuration (environment map, photometric description, etc.) is the same as the one used during the tracking.

We are working on improving some of these limitations in the next release by, among others, including intrinsic camera calibration in the tool, by having a better inter-marker calibration (many more markers could be used with very little calibration drift) and by handling different orientation of the objects with respect to the gravity.

5   References

[1] http://www.metaio.com/software/creator/creator-mobile/
[2] http://www.metaio.com/software/creator/
[3] http://www.metaio.com/software/mobile-sdk/