

A benchmark data generation tool using walking simulation and virtualized reality models for evaluating AR visual tracking

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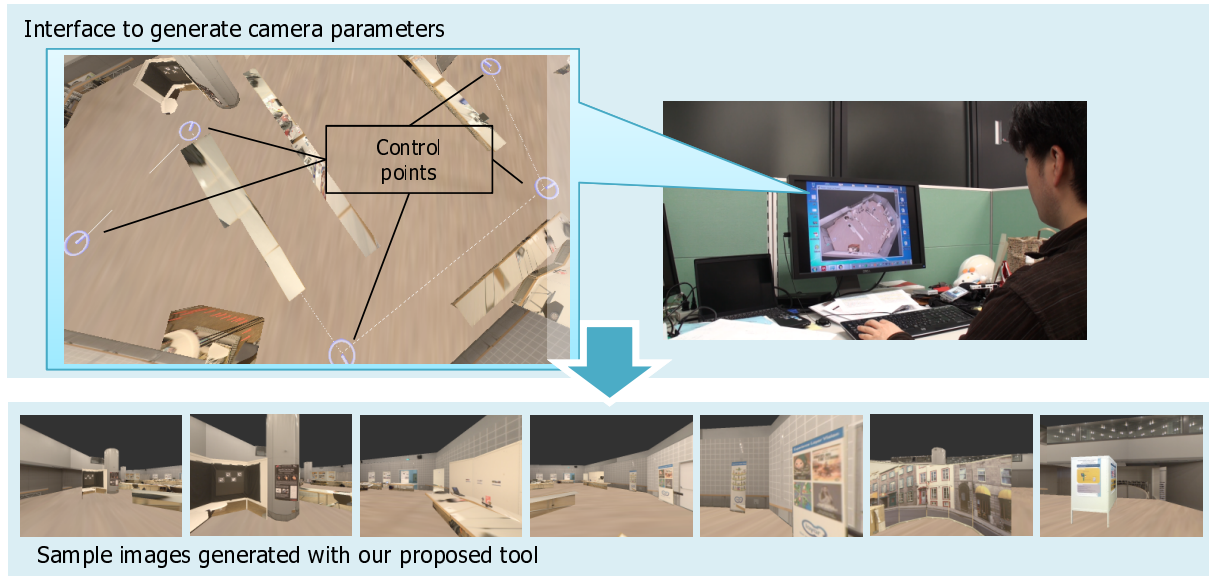


Figure 1: An outline of our proposed tool

ABSTRACT

This paper describes a tool to generate benchmark data sets using walking simulation and virtualized reality models for evaluating visual tracking methods for augmented reality (AR).

Ground truth data of camera parameters and feature points are needed for evaluating the accuracy of visual tracking methods. But making ground truth data is costly in real environment. Therefore, in TrakMark [1], we have been developing a tool to generate data sets for benchmark using virtualized reality models [2]. Lower images in Figure 1 are sample images generated with our proposed tool using a model of ISMAR2011 demo room.

AR applications are often used by walking users with head-mounted devices or hand held devices. Therefore, in this study, we have introduced a function of walking simulation for the tool.

The data sets are composed of images generated from models and ground truth data. The ground truth data includes intrinsic and extrinsic camera parameters, and tracking data of interest points.

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In the tracking data, 3D-2D correspondences of interest points are shown. Generated images and all materials of ground truth data are synchronized. An outline of the data sets is detailed in [2].

The tool is composed of four functions, **1 : Model rendering**, **2 : Function to generate camera parameters**, **3 : Function to generate interest points and its tracking data**, **4 : Data output**. In the tool, an interface to generate camera parameters is based on control points the user can set anywhere on the ground plane of the model. Upper of Figure 1 shows the interface to generate camera parameters. The user of the tool discretely set control points as keyframes with mouse clicks. A line in each control point shows a direction (yaw) of a camera. The user can change the direction of the control point by rotating a mouse wheel. After setting control points, camera parameters between control points are automatically generated by interpolation with walking simulation parameters the user can set with an interface.

In a final paper, the design and the functions of the tool are going to be detailed. Moreover, a visual tracking application we have developed is going to be evaluated with data sets generated with the tool.

REFERENCES

- [1] TrakMark WEB
<http://trakmark.net/>
- [2] K. Makita, T. Ishikawa, and T. Kurata: "A prototype tool in TrakMark to generate benchmark data sets for visual tracking methods using virtualized reality models", The 2nd International Workshop on AR/MR Registration, Tracking and Benchmarking (TrakMark2011).