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Indoor 3D Modelling with RGB and Depth Images for Service Field Simulation

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Abstract. This paper discusses the interactive 3D indoor modelling that uses the RGB and depth images for realizing the virtual environment in the service field simulator. Service field simulator, houses 40 LCD displays in 360 degrees, displays the 3D indoor model, and provides the user the experience of walking inside the virtualized reality environment. The aim of the service field simulator is to support the service industries by detecting the customer's interest towards the particular products. The simulator is also designed to evaluate the service environment and processes in advance by sensing the users behavior in the simulated environment.

1 Introduction

To improve the service industries, sensing and analyzing human behavior in virtual environment is essential. The data simulation tools [1] help to analyze the user's performance from the recorded data. Also the user's performance can be analyzed in the simulated environment [2]. Service field simulator displays the 3D indoor model, designed from the Interactive 3D indoor modeler and lets the user experience the virtual environment. The users walking movement is detected by the RGB-D sensors and orient the 3D model for the user's view of interest. The following section briefly states the proposed concept for the interactive indoor modelling.

2 Indoor Modelling with Superpixels and Depth Data

The outlook of the service field simulator and a sample 3D indoor model is shown in figure 1. Figure 1, also outlines the indoor modelling concept, findings of the 3D geometry from the 2D textures. Our previous contribution [3] lets the user to design the 3D virtualized reality model from the single image. The collection of images and the modelling for the complete environment makes the desired virtualized reality setup. The revised modelling technique [4] improves the performance by detecting the 3D geometry from the 2D textures, from the shape from texture principles. In this paper, we tend to increase the modelling efficiency by the support from the depth data.

In figure 1, the single input image is segmented (superpixels), their geometry such as the slant and tilt angles are found out [4]. The depth data captured for the scene supports the 3D correspondence between the superpixels. Our future work will be focused on the evaluation criteria for the depth data usage.

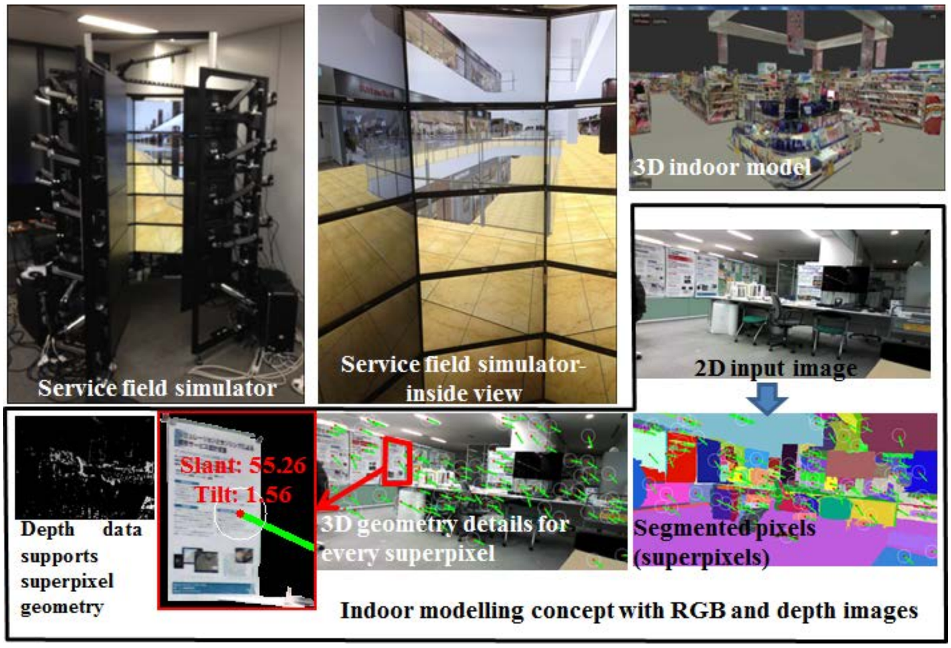

Fig. 1. Outlook of the service field simulator with 40 LCD displays, featuring the 3D indoor model. The 3D geometry detected for every superpixel is shown with red dot and green line.

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