

Surangrak Sutiworwan 2012: Planar Surface Area Calculation Using Camera and Orientation Sensor. Master of Engineering (Information and Communication Technology for Embedded Systems), Major Field: Information and Communication Technology for Embedded Systems, Department of Electrical Engineering. Thesis Advisor: Mr. Miti Ruchanurucks, Ph.D. 124 pages.

To calculate planar surface object, this research proposes image warping to top view algorithm. The sensor attached to a camera is used to compensate the camera's orientation in real time. In practice, the alignment of sensor and camera is imperfect. This error makes the calculated area size inaccurate. To address this problem, calibration between camera and sensor is required by using Iterative Least Square method. However, the imperfect alignment also causes the time shifts between the camera and sensor. This is due to the computer system added the unknown latency between sending data. In this contribution, the arrangement processes needs to be identified to reduce the elapsed timing. Then, the extrinsic parameters derived from calibrated sensor and pre-computed intrinsic parameter will be used to generate a homography matrix. In top view image, we can directly count the number of target pixel. Finally, we will also find the relationship between rotation angle and size of each pixel in real-world unit with calculating percentage accuracy of this method. The experimental results show top view target area size generated from the tilted camera using information from the orientation sensor in real time.

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Thesis Advisor's signature