

# INTERACTION-FREE HAND SEGMENTATION USING KINECT CAMERA

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## 1. INTRODUCTION

Hand segmentation is a fundamental technology in computer vision, which is used as a pre-processing step for various applications such as human-computer interaction (HCI), sign language translation, and medical systems [1]. This demo provides interaction-free hand segmentation using Kinect camera. It is completely automatic, which can automatically segment foreground from the background and select the seed on the depth image for hand segmentation using Kinect camera. Compared with existing methods [2], main contributions are summarized as follows:

- We perform automatic seed selection on the depth image by foreground segmentation and variable-scale circle detection.
- We perform seed-based hand segmentation on the color image using Gibbs random field.

## 2. ON-SITE DEMO DESCRIPTION

Fig. 1 illustrates the block diagram of interaction-free hand segmentation using Kinect camera. We perform experiments on a PC with an Intel Core i7-6700 3.40 GHz CPU and 8 GB of RAM using C#. Also, we use two datasets for tests: 1) *Hand Gesture Image Datasets* provided by Multimedia Technology and Telecommunications Laboratory in University of Padova (2014) [3], and 2) our own hand gesture dataset captured by Kinect 2.0. This system provides two simple functions of capturing a hand image by Kinect camera and segmenting the hand on the hand image. Moreover, we provide an introduction video for better understanding in this demo. Experimental environment of our system is shown in Fig. 2. We briefly describe the main functions of our system step by step as follows:

- (1) The user captures color and depth images from Kinect camera by clicking *Capture Image* button;
- (2) The user performs foreground segmentation on the depth image by clicking *Extract Foreground* button;
- (3) The user selects the seed position on the depth image by clicking *Search Seed* button;
- (4) The user produces the final segmentation result by click-

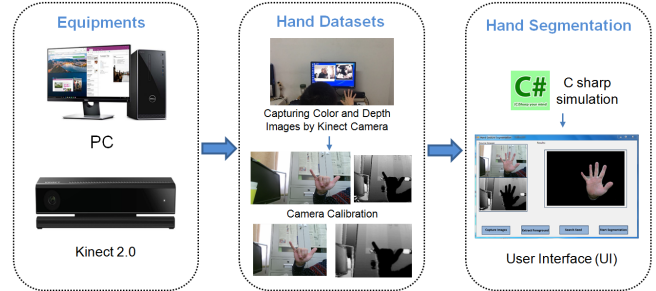


Fig. 1. Block diagram of interaction-free hand segmentation using Kinect camera.



Fig. 2. Experimental environment.

ing *Start Segmentation* button (see Fig. 1);

## 3. REFERENCES

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- [3] G. Marin, F. Dominio, and P. Zanuttigh, "Hand gesture recognition with leap motion and kinect devices," in *Proceedings of IEEE International Conference on Image Processing (ICIP)*, p. 1565–1569, 2014.