

1. Introduction

The UOW 3-D Range Dataset is created to support research on scene segmentation and pedestrian classification. It contains 220 images for scene segmentation and 2000 images for pedestrian classification. The database is available at:

<http://www.uow.edu.au/~phung/download.html>.

To download it, complete the Release Agreement form at the above URL.

The data set was acquired using a time-of-flight (TOF) range camera SwissRanger SR4000, produced by MESA Imaging (see Fig. 1). The camera operates at a speed of 30 frames per second and has a frame size of 144×176 pixels. The maximum depth is 5m.

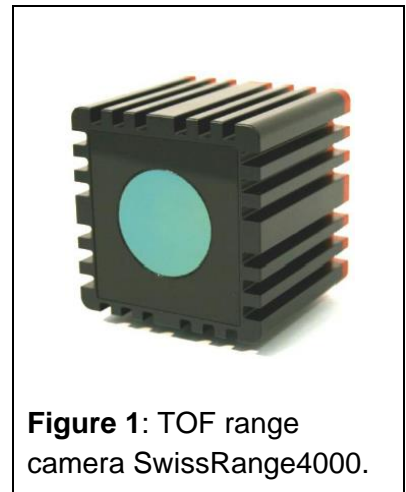


Figure 1: TOF range camera SwissRange4000.

The images were taken in different indoor and outdoor environments, on different days, and with various lighting conditions. All images were extracted from 50 video sequences of 20 different people performing different activities (walking, running, or standing). To provide ground-truth for segmentation, 220 images were segmented manually. In addition, 1000 pedestrian patterns and 1000 non-pedestrian patterns were generated for classification. Example images from the database are shown in Fig. 2 and Fig. 3.

2. Datasets

The database has three subsets (see Table 1). Descriptions of the subsets are as follows.

- Subset 1 contains 220 3-D range images and the segmentation ground-truth. The first 20 images should be used for training, and the remaining 200 images should be used for testing.
- Subset 2 contains 1000 pedestrian patterns and 1000 non-pedestrian patterns. The patterns include both range format and intensity format.
- Subset 3 consists of 1000 original 3-D data acquired by the SwissRanger SR4000 camera. For each pixel location, the camera produces five outputs: X coordinate, Y coordinate, Z coordinate, 16-bit intensity, and a confidence score. The Z coordinate is along the depth dimension. The confidence score is an integer value between 0 and 7; the higher is the confidence score, the more reliable are the range data.
- The images are stored in MATLAB file (.MAT format). Each image filename has a four-digit number between 0001 and 1000 (####).
- Folder 'code' contains MATLAB functions to display the data.
- Folder 'other' contains other readings.

Table 1: A summary of the UOW 3-D Range dataset.

Subset	Description	Images	Folder	File name & Format
1	For scene segmentation	220	segmentation	scene_####.mat scene_####_gt.mat
2	For pattern classification	2,000	classification	pedestrian_####.mat non-pedestrian_####.mat
3	3-D data (x,y,z,a,c)	1,000	general_data	3D_####.mat

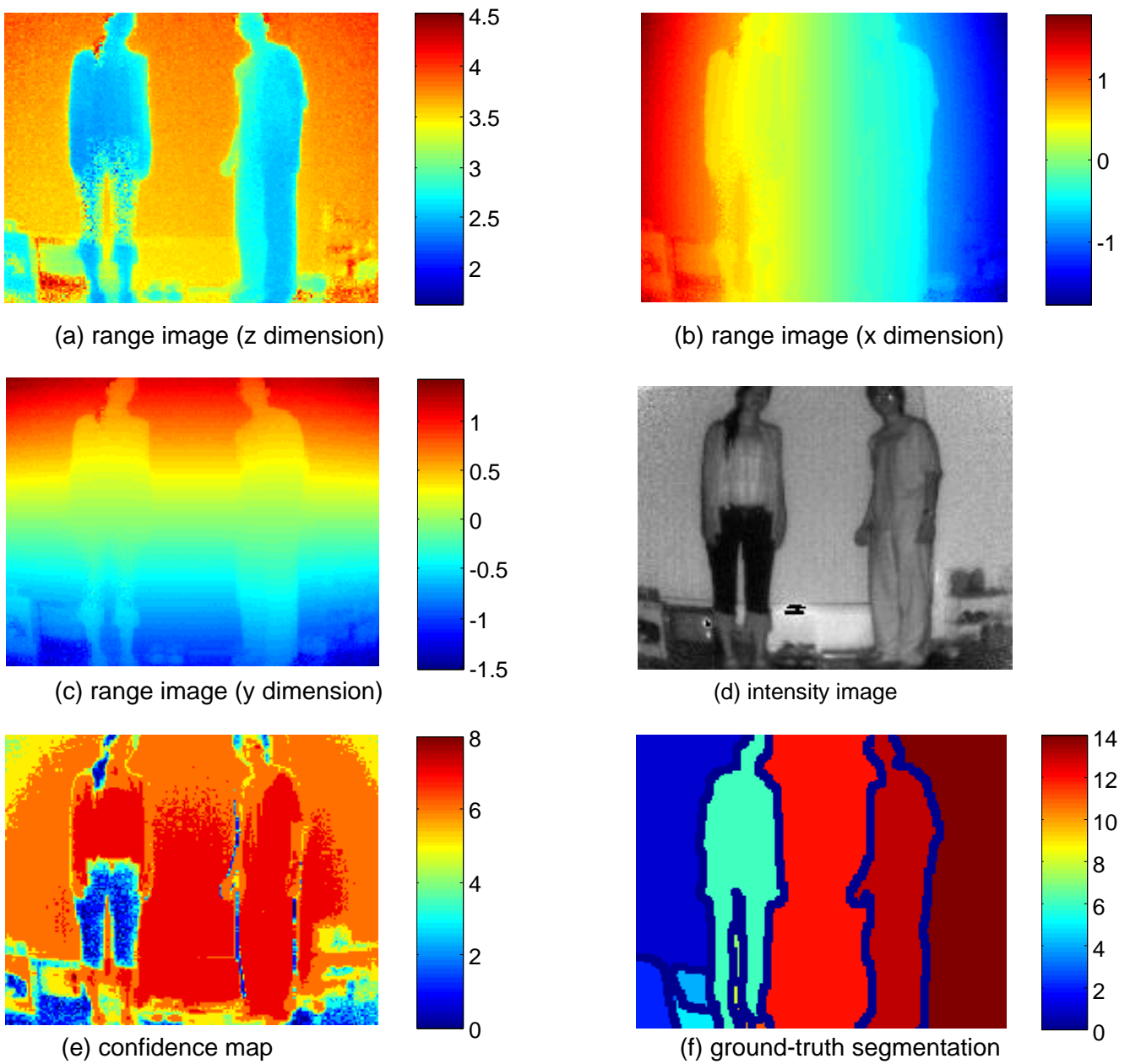
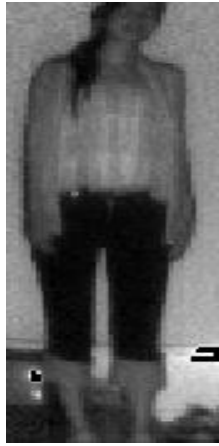
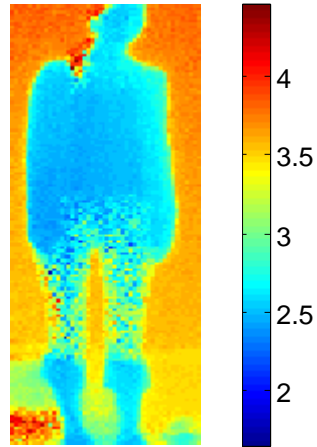


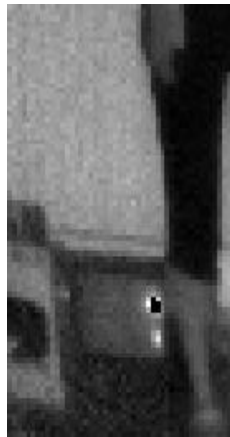
Figure 2: Example images in Subset 1 for scene segmentation.



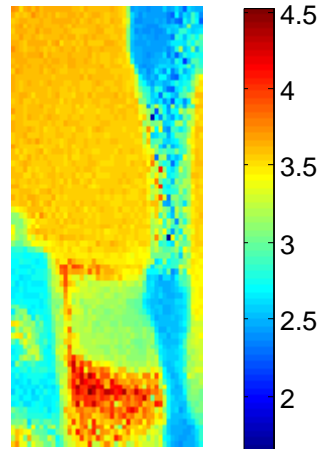
(a) pedestrian pattern (intensity)



(b) pedestrian pattern (range)



(c) non-pedestrian pattern (intensity)



(d) non-pedestrian pattern (range)

Figure 3: Example images in Subset 2 for pedestrian versus non-pedestrian classification.

3. Publications

This dataset is used in the following publications:

- [1] X. Wei, S. L. Phung, and A. Bouzerdoum, "Object segmentation and classification using 3-D range camera", *Elsevier Journal of Visual Communication and Image Representation*, special issue on "Visual Understanding and Applications with RGB-D Cameras", 2013.
- [2] X. Wei, S. L. Phung, and A. Bouzerdoum, "Pedestrian sensing using time-of-flight range camera", in *IEEE Conference on Computer Vision and Pattern Recognition Workshops*, Colorado Springs, U.S.A., 2011, pp. 43-48.
- [3] X. Wei, S. L. Phung, and A. Bouzerdoum, "Scene segmentation and pedestrian classification", in *IEEE International Conference on Multimedia and Expo*, Melbourne, Australia, July 9-13, 2012, pp. 103-108.

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