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SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 2

Editors
Md. Raisuddin Khan
Md. Mozasser Rahman
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Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

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CHAPTER 20

HUMAN POSTURE RECOGNITION PREPROCESSING TECHNIQUES

Othman O. Khalifa[a], Kyaw Kyaw Htike[a], Lai Weng Kin[b] and A. Albagoul[a]

[a]Department of Electrical and Computer Engineering, International Islamic University Malaysia

[b]Centre for Multimodal Signal Processing, MIMOS Berhad, Technology Park Malaysia, 57000 Kuala Lumpur, Malaysia

20.1 Introduction

20.1.1 Background Segmentation

Background subtraction is the process of separating out foreground objects from the background in a sequence of video frames. Background subtraction is used in many emerging video applications, such as video surveillance, traffic monitoring, and gesture recognition for human-machine interfaces, to name a few. Many methods exist for background subtraction, each with different strengths and weaknesses in terms of performance and computational requirements. Most were developed in university labs over the last few decades.

As computer vision begins to address the visual interpretation of action [1], applications such as surveillance and monitoring are becoming more relevant. Similarly, recent work in intelligent environments and perceptual user interfaces [2, 3] involve vision systems which interpret the pose or gesture of users in a known, indoor environment. In all of these situations the first fundamental problem encountered is the extraction of the image region corresponding to the person or persons in the room.

Previous attempts at segmenting people from a known background have taken one of three approaches. Most common is some form of background subtraction. For example, some researchers use statistical texture properties of the background observed over extended period of time to construct a model of the background, and use this model to decide which pixels in an input image do not fall into the background class. The fundamental assumption of the algorithm is that the background is static in all respects: geometry, reflectance, and illumination. The second class of approach is based upon image motion only presuming that the background is stationary or at most slowly varying, but that the person is moving [3].

In these methods no detailed model of the background is required. Of course, these methods are only appropriate for the direct interpretation of motion; if person stops moving, no signal remains to be processed. This method also requires constant or slowly varying geometry, reflectance, and illumination. The final approach is based upon geometry. Kanade, et al. [4] employ special purpose multi-baseline stereo hardware to