



Sharif University of Technology

Computer Engineering Bachelor of Science Thesis

Implementation of a Color-based Fast Object-tracking System from Video Frames in a Robotic Environment

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Abstract:

Nowadays, vision is the main input from real world in most robotic environments. In some of these environments, due to fast object movements, we need higher frame rate video input to improve our robot control. But this increase in frame rate will limit us in using common image-processing algorithms, which are mostly time-consuming. So we need a faster method for recognizing and tracking our marked objects.

In our proposed method, for solving this problem, a fast compression-like algorithm that uses color blobs specifications for this purpose is used. Objects are recognized by considering these specifications. This method, which is based on a line-by-line scanning of the entire image, is much faster than and as accurate as classical image processing methods.

In this thesis, both design details and implementation concepts of this method will be discussed. Color Spaces, color segmentation methods, fast blob tracking algorithms, color filters, pattern matching, and object recognition from color blobs are the main topics that are covered. Also subjects like camera calibration, motion-error filtering, system structure, and additional components will be considered briefly.

Keywords: Robotics, Image Processing, Machine Vision, Color Segmentation, Color Blob, Video Frames.