Implementation of Hand Mouse : Hand Segmentation and Optical Flow

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ABSTRACT

This paper describes the algorithm used for implementation of a hand mouse. Hand segmentation and tracking was done using the output obtained with an over-head camera. Hand segmentation was a two step process, which involved thresholding in HSV space and then filtering the blobs based on size. This biggest blob was then passed as an input to the Shi and Pomasi algorithm which produced the best tracking points inside the blob. The obtained points were tracked with Lucas-Kanade algorithm. The velocity obtained [1] by using these tracked pixels were served as inputs to the mouse movement, which was scaled by the screen resolution.

Keywords

Hand Mouse, Optical Flow, Tracking, HSV Thresholding

1. INTRODUCTION

A creature either biological or mechanical is to interact effectively with its environment, it needs to know what objects are where. Computer vision provides a primary method for understanding how to make intelligent decisions about an environment, on the basis of sensory inputs. In this modern world of changing times, display devices, cameras, mobile phones are getting more and more interactive and intuitive. Such technologies are are expected to grow in the future. Computer vision based input devices and sensors are becoming prominent owing to faster processing power that now available in modern day computers. This increased computing speed has help in development of application which can run in real-time environment with modest reqirements. The up-coming fields like optical flow provide an excellent opportunity to design such application with robustness and speed.

In this paper, we describe the details of the algorithms and the implementation of the hand mouse that we have implemented. A hand mouse is a concept, of tracking your hand's motion and moves your mouse pointer the screen accordingly. It can be used as a deviceless mouse. Only device that is needed is a overhead web-cam. It provides better control and sensitivity option than a normal mouse. We have prototyped our application using the Intel OpenCV library for image processing and X11 library for the mouse movements on the screen.

The basic procedure that is followed is that, optical flow is computed on a specified region which was found with HSV based thresholding and connected component analysis. The movements thus obtained was passed on to the X11 library functions and scaled appropriately for the mouse movements. The prespecified color strip was placed on the hand, which helped in determining the points which were to be tracked. These points were tracked with the Pyramidal Lucas-Kanade algorithm[2].

2. REFERENCES

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