

Cursor Movement by Sixth Sense Technology

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ABSTRACT:

In modern world laptops and leap tops play a very important role. People face many problems with the touch pad getting damaged which is very difficult and costly to replace. In this situation we may switch over to external mouse, but it won't be comfortable to use in mobile. To overcome these problems, in this paper we present a new technology called sixth sense technology. As a part of this technological growth we are proposing a new way of controlling the cursor in laptops using mat lab software with the help of RGB color coding

Keywords: MATLAB, Image Processing & Acquisition, Morphology.

1. INTRODUCTION:

In today's modern world of Computers use touch pads to control the pointer in laptops. If the touch pad is damaged it is very difficult and costly to replace it. In this situation we may switch over to external mouse which is uncomfortable to carry in many cases. To get better of these problems we propose the new way of controlling the mouse pointer using RGB color code with the help of mat lab software.

The progress of this technology is processed from the two basic fundamentals namely image processing toolbox (IPT) and image acquisition toolbox (IAT). In this paper we program a mat lab code for color sensing using the inbuilt camera in the system.

We also bring in the Morphological process which is a broad set of image processing operations that process images based on shapes. Morphological operations apply a structuring element to an input image, creating an output image of the same size. In a morphological operation, the value of each pixel in the output image is based on a comparison of the corresponding pixel in the input image with its neighbors. By choosing the size and shape of the neighborhood, you can construct a morphological operation that is sensitive to specific shapes in the input image.

The most basic morphological operations are dilation and erosion. Dilation adds pixels to the boundaries of objects in an image, while erosion removes pixels on object boundaries. The number of pixels added or removed from the objects in an image depends on the size and shape of the structuring element used to process the image. In the morphological dilation and erosion operations, the state of any given pixel in the output image is determined by applying a rule to the corresponding pixel and its neighbors in the input image. The rule used to process the pixels defines the operation as dilation or erosion. The performance of this system is checked with promising results.

2. OUTLINE OF THE OVERALL TECHNOLOGY:

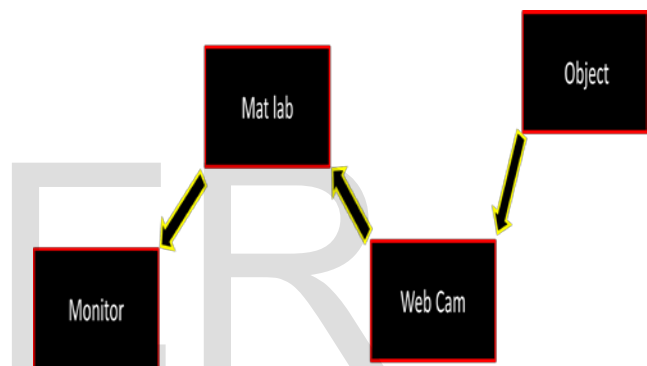


Figure 1: Outline Concept of the System

Figure 1 illustrates the outline of the system. The mouse movement is based on tracking the motion of the color object that is present. The idea of this project is, users can control by simply moving their color object without any contact. A fast and robust method is that, tracing the position of object is proposed. This method consists of four steps. First, the color of the moving object is detected by the camera. Second, the intensity level of color is calculated. Third, an interface between mouse pointer and the program technique is applied for minimizing the computational cost. Fourth, an object tracking algorithm is applied to find out the moving object's position. The pointer movement is designed in an Image processing system (MATLAB). The device works successfully, the response is quick and accurate positioning is obtained.

3. INTRODUCTION TO MATLAB AND ITS USAGE IN THIS TECHNOLOGY:

MATLAB is a programming environment for algorithm development, data analysis, visualization, and numerical computation. Using MATLAB, you can solve

technical computing problems faster than with traditional programming languages, such as C, C++, and Fortran.

You can use MATLAB in a wide range of applications, including signal and image processing, communications, control design, test and measurement, financial modeling and analysis, and computational biology. For a million engineers and scientists in industry and academia, MATLAB is the language of technical computing

MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran.

MATLAB is intended primarily for numerical computing. An additional package, Simulink, adds graphical multi-domain simulation and Model-Based Design for dynamic and embedded systems.

4. IMAGE PROCESSING:

Digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.

In electrical engineering and computer science, image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.

Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging.

4.1 GEOMETRIC TRANSFORMATIONS AND IMAGE REGISTRATION:

Geometric transformations are useful for tasks such as rotating an image, reducing its resolution, correcting geometric distortions, and performing image registration. Image Processing Toolbox supports simple operations, such as resizing, rotating, and cropping, as well as more complex 2D

geometric transformations, such as affine and projective. The toolbox also provides a flexible and comprehensive framework for creating and applying customized geometric transformations and interpolation methods for N-dimensional arrays.

Image registration is important in remote sensing, medical imaging, and other applications where images must be aligned to enable quantitative analysis or qualitative comparison. Image Processing Toolbox supports intensity-based image registration, which automatically aligns images using relative intensity patterns. The toolbox also supports control-point image registration, which requires the manual selection of control points in each image to align two images. Additionally, Computer Vision System Toolbox supports feature-based image registration, which automatically aligns images using feature detection, extraction, and matching followed by geometric transformation estimation.

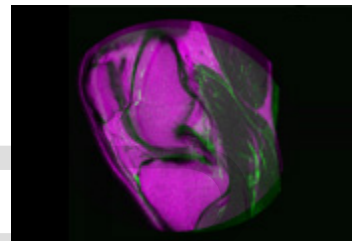


Figure 2: Aligning two MRI images using intensity-based image registration.

5. IMAGE ACQUISITION

The first stage of any vision system is the image acquisition stage after the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks required today. However, if the image has not been acquired satisfactorily then the intended tasks may not be achievable, even with the aid of some form of image enhancement

5.1 GRAPHICAL INTERFACE FOR IMAGE AND VIDEO ACQUISITION:

The Image Acquisition Tool is a graphical interface for working with image and video acquisition devices and is well suited for interactive configuration of cameras. You can browse all hardware devices available on your computer, change device settings, select a region of interest (ROI), preview an acquisition, acquire images and video, and record data. A preview window helps verify and optimize your acquisition parameters by automatically reflecting any adjustments made to camera properties in the video stream. The Image Acquisition Tool serves as a starting point in the development of automated and custom image acquisition and processing systems.

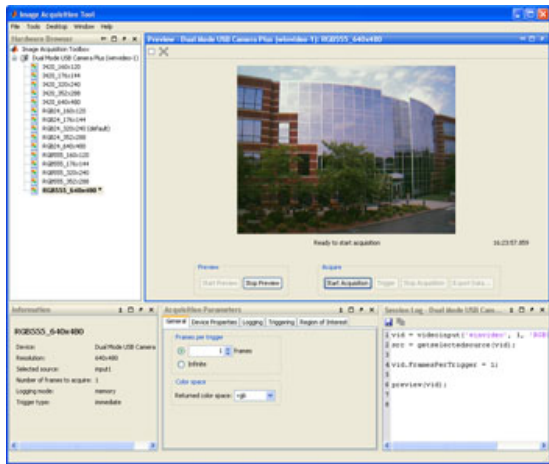


Figure 3: Typical session with the Image Acquisition Tool. You can set up hardware and acquire images and video.

6. IMAGE ACQUISITION IN MATLAB:

Image Acquisition Toolbox provides graphical tools and a programmatic interface to help you work with image acquisition hardware in MATLAB. You can automate repetitive tasks, create workflows combined with tasks such as image processing, and create standalone executables that acquire images and video with MATLAB Compiler.

The toolbox enables you to customize the acquisition process to include integrating image processing functionality to identify objects, enhance imagery, or construct mosaics and panoramic views as the data is acquired.

7. WEB CAMERA

A webcam is a video camera that feeds its images in real time to a computer or computer network, often via USB, Ethernet, or Wi-Fi.

Their most popular use is the establishment of video links, permitting computers to act as videophones or videoconference stations. The common use as a video camera for the World Wide Web gave the webcam its name. Other popular uses include security surveillance, computer vision, video broadcasting and for recording social videos. Webcams are known for their low manufacturing cost and flexibility, making them the lowest cost form of video telephony. They have also become a source of security and privacy issues, as some built-in webcams can be remotely activated via spyware.

V. PROBLEMS AND DRAWBACKS

Since the system is based on image capture through a webcam, it is dependent on illumination to a certain extent. Furthermore the presence of other colored objects in the background might cause the system to give an erroneous response. Although by configuring the threshold values and other parameters of the system this problem can be reduced but still it is advised that the operating background be light

and no bright colored objects be present. The system might run slower on certain computers with low computational capabilities because it involves a lot of complex calculations in a very small amount of time. However a standard pc or laptop has the required computational power for optimum performance of the system. Another fact is that if the resolution of the camera is too high then the system might run slow. However this problem can be solved by reducing the resolution of the image by making changes in the system.

8.1 OPERATION AND FUNCTION:

Touchpad's operate in one of several ways, including capacitive sensing and conductance sensing. The most common technology used as of 2010 entails sensing the capacitive virtual ground effect of a finger, or the capacitance between sensors. Capacitance-based touchpads will not sense the tip of a pencil or other similar implement. Gloved fingers may also be problematic. If the computer is powered by an external power supply unit (PSU), the PSU will influence the virtual ground effect, with the influence depending on the circuitry of the PSU. Laptop manufacturers account for this in the design of their PSUs, meaning that the use of generic PSUs can cause touchpads to malfunction and pointer movement to become erratic. This misbehaviour can be rectified by restoring proper grounding, either by touching a metallic part of the computer with the other hand, touching the (insulated) power supply with some part of the body, or using the computer on the lap instead of on a desk.

9. ALGORITHM:

- As the First step the camera is interfaced with the mat lab software, So that the Camer a is switched on as the program is executed.
- Detecting the Red color object in the image (obtained by the camera) by using RGB coding technique.
- Erosion and Dilation will be performed as the image filtration process.
- Code is written as such the mouse pointer is interfaced with the Red color object in the image, obtained by the camera.
- We have to call the particular tool boxes to display as per the requirement.

For Example: If multiple red colors are obtained before the web camera it shows the warning of there are multiple of red colors are present.

- The project has been done with the help of the simulink software which has been inbuilt function in the mat lab software.
- Now as the Red colored object is moved in front of the webcam the cursor will also moves.

10. CONCLUSION:

This paper gives a easy and a simple way to control the touch pad without any contact with the system through inbuilt camera. On further this project can be enhanced by converting the colors to any object and the same process can be carried out. This paper provides an effective use of the system with inbuilt applications for the physically challenged people and enhances mobilization. The performance of this system is checked with promising results.

11. REFERENCE:

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