

WIRELESS CONTROL OF POWERPOINT SLIDES THROUGH MOBILE CAMERA USING IMAGE PROCESSING BASED MATLAB SOFTWARE

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ABSTRACT

Presentation using slideshow is an effective and attractive way to convey information in the digital world. PowerPoint slides can be controlled by various devices like keyboard, mouse, laser pointer etc. Here we are proposing a new method to control the slides during a presentation using mobile camera. This is all about controlling of PowerPoint presentation wirelessly with the help of a colour paper and a mobile camera which is connected with the computer through software called smartcam and with the help of smartcam software the image processing will be done through MATLAB and with the help of MATLAB the PowerPoint slide will change. Various devices are available which can be used to control slides wirelessly such as Bluetooth mouse but a Bluetooth mouse is costly and this technique eradicates the use of Bluetooth mouse. Since there is no such use of any hardware except mobile phone which is available with everyone now days, so it gives a cost effective way to control slides wirelessly.

Keywords: Smartcam, Image Processing, Face Detection, Wireless Control

1. INTRODUCTION

This technique represents the way to control the power point slides with the help of image processing and to do that we need MATLAB software. For image processing we need a camera to acquire the images and mobile camera is used here for that purpose which has to be connected to the personal computer wirelessly. If a person is giving presentation and he/she wants to interact with the audience by moving through them then there should be a person on the personal computer who has to control the slides or there should be a Bluetooth mouse from which the presenter can able to control the slides. As we know Bluetooth mouse is costly so this project can control the slides with the help of mobile camera which is available to everyone nowadays. So with the help of MATLAB and a mobile camera we can control the slides.

2. METHODOLOGY

MATLAB (MATrix LABoratory) is a multi-paradigm numerical computing environment and fourth-generation programming language. 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, FORTRAN and Python. MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time.

Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing capabilities. An additional package, "Simulink" adds graphical multi-domain simulation and Model-Based Design for dynamic and embedded systems to this environment. MATLAB provides various functions like `imread()`, `imwrite()`, `imshow()`, `rgb2gray()`, `imhist()`, `imadjust()`, `im2bw()` for image processing.

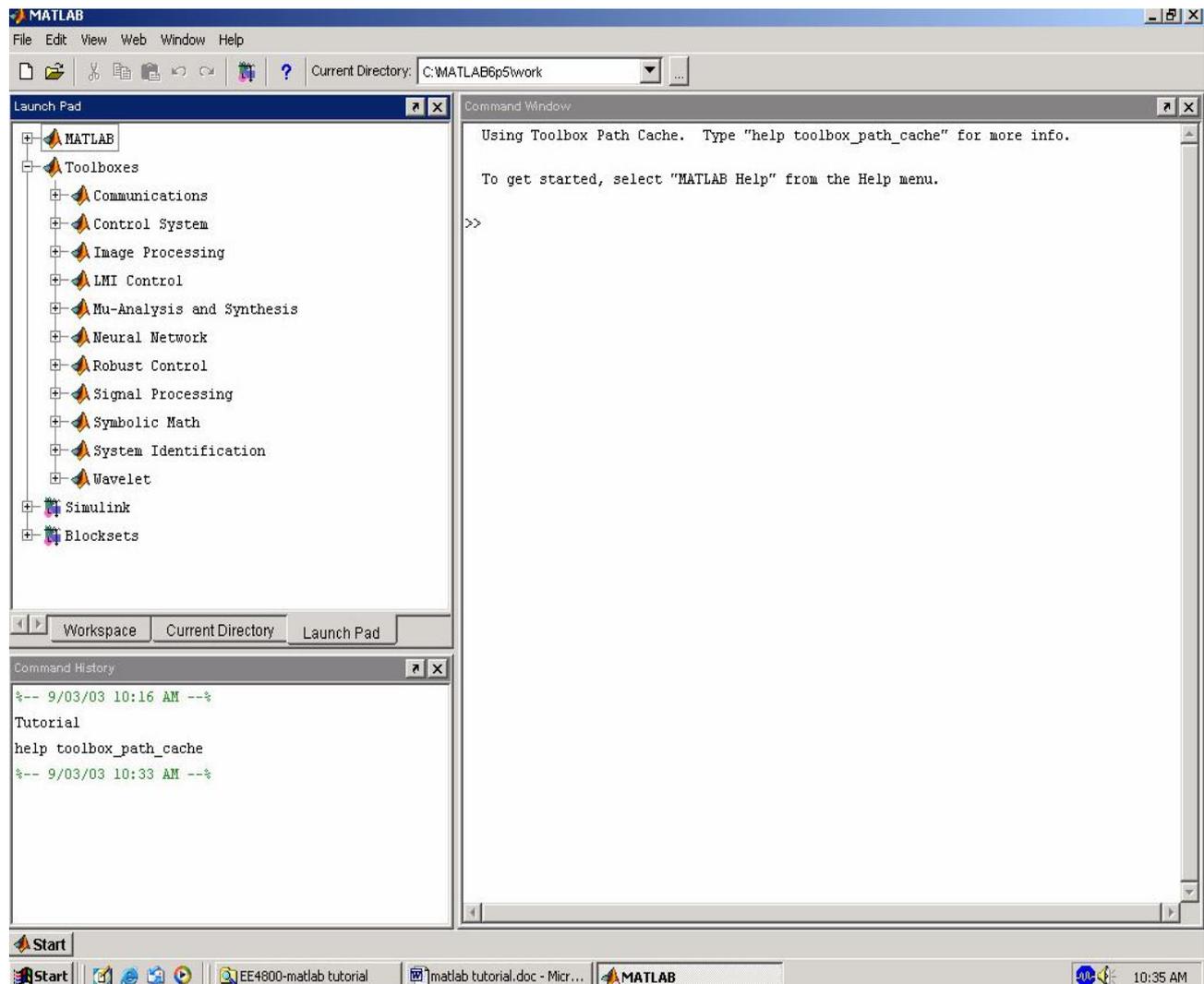


Figure 1: MATLAB Window

In this paper we are using image processing technique to detect the colour of the paper by which we want to move the slide.

In imaging science, image processing is one form of signal processing where the input is an image. The image input can be 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 is referred as imaging process.

3. IMPLIMENTATION

Object detection and tracking are important for computer vision applications including activity recognition of the object. Here we have developed a simple system for tracking a single face in a live video stream captured by a webcam. MATLAB provides webcam support through a Hardware Support Package, which has to be installed in the computer system we are going to use. The support package is available via the Support Package Installer. The face tracking system in this example can be any one among these two modes: detection or tracking. In the detection mode we can use a `vision.CascadeObjectDetector` object to detect a face in the current frame. If a face is detected, then we have to detect the corner points on the face & initialize a `vision.PointTracker` object, and then switch to the tracking mode. In the tracking mode, we must track the points using the point tracker. While tracking the points, some of them will be lost because of occlusion. If the number of points being tracked falls below a threshold that means that the face is no longer going to be tracked. Then we have to switch back to the detection mode & should try to re-acquire the face. To detect face, nose, mouth and eyes using the MATLAB built-in class and function are there. Based on Viola-Jones face detection algorithm we are going to detect the objects. In this algorithm the computer vision system toolbox contains `vision.CascadeObjectDetector` System object which detects objects.

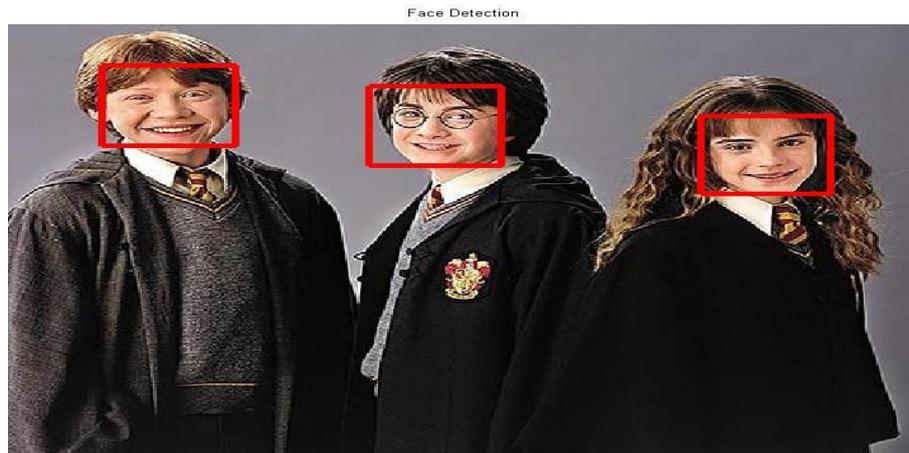


Figure 2: Face Detection

4. ANALYSIS & RESULT THROUGH CONNECTING THE MOBILE PHONE WITH MATLAB

Basically if we want to connect our mobile phone with the personal computer then we need a data cable or a Bluetooth connection. If we want to see the live video of mobile camera in the personal computer i.e. making the mobile phone as a wireless webcam we can use Bluetooth or Wi-Fi connection. According to the required range between the mobile phone & Personal Computer we can choose Wi-Fi or Bluetooth connection. So the presenter is able to control the slides up to the Wi-Fi range of Bluetooth range and the range depends on which protocol we are using to connect the mobile phone with the computer. Now the mobile camera can be accessed from MATLAB with the help of following commands

`“vid=videoinput('winvideo',2,'YUY2_320x240');”`

winvideo represents the camera and "2" represents the mobile camera which is connected to the computer . If there would have been 1 instead of 2 then the computer's webcam would be accessed by MATLAB. So the above command is used to acquire image via mobile camera. Then we need a smartcam software which can connect the mobile camera to Personal Computer or we can say make the mobile camera as a wireless camera. With the help of smartcam software mobile phone can be connected to the computer via Bluetooth or Wi-Fi. So now when the MATLAB starts capturing the images, image processing technique will be used to detect the images and when the desired colour combination will be found the MATLAB code will let the slides to move.



Figure 3: Mobile Camera Connected With the Personal Computer

5. CONCLUSION

With the help of this technique anyone can control the slide in computer wirelessly without using any costly hardware. This is the major boon of the project and with the help of image processing technique many things can be controlled such as we can play music and many more. also face detection technique can be added to reverse the slide. Like if we want to change the slides in reverse order all we need to do is to keep the mobile phone in front of face then the slides will move in reverse direction. Many more applications running on computer can be controlled by this wireless technique without using any costly extra hardware device.

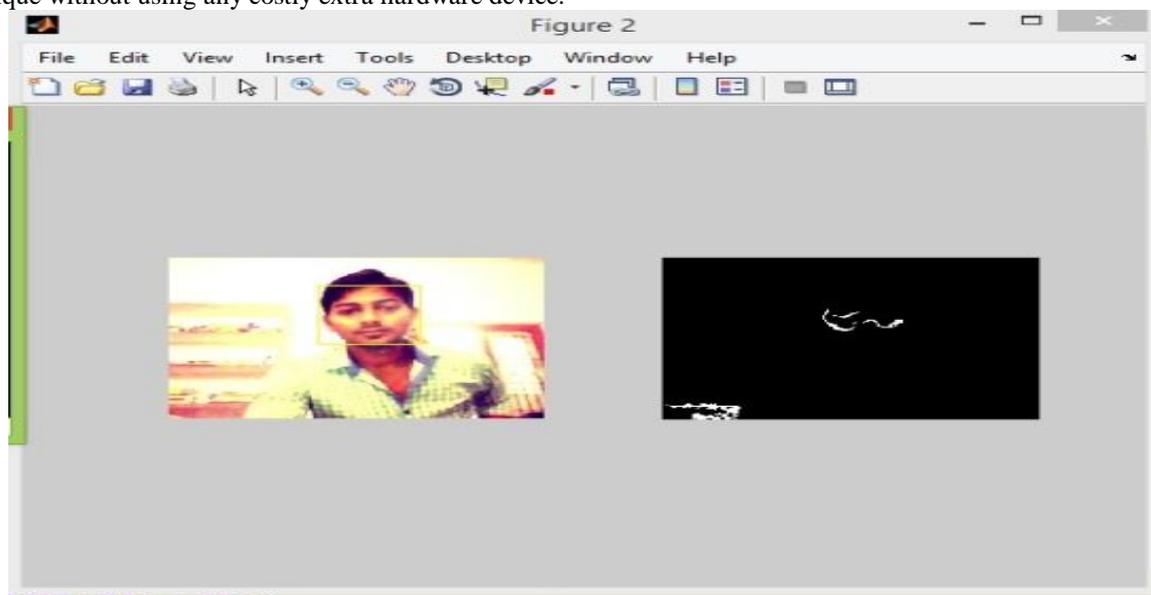


Figure 4: Face Detection

We can see in the above fig 4 that whenever the program is executed a figure window opens in which there are two sub window, as we can see the the face in the first sub window and in the second sub window we can see the detection takes place.

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