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Visual Representation of Virtual Keyboard Using Rough Draft

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ABSTRACT

Traditional QWERTY keyboards are large in size and offer little in terms of their ability to modify. A Virtual Keyboard, with slightest physical form may provide an answer to the point of time, where the size of desktops and laptops is becoming smaller, the traditional keyboard acts as a hindrance to further miniaturization. In today's world many different Virtual Keyboard exist which are using 3D cameras. This project involves the creation of Virtual Keyboard using the shadow analysis. The project aimed to create such keyboard which requires no external hardware, easy to use with reconfigurable option in it. This project uses a iball standard web camera. The main focus of this project is to know the problems with current VK and how to solve these problems using novel techniques like shadow analysis. Finally this project aimed to discuss and evaluate the working of Virtual Keyboard. The dissertation was nicely done in creating the Virtual Keyboard using shadow analysis and image processing. Also, the layout of the keyboard generated using the laser film or alphanumeric keypad. Application was successful in generating the virtual key press events done by the users. Project also successful in allowing the users to change the layout of the keyboard based on application, hence user has the privilege to select a particular layout for gaming application.

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I. INTRODUCTION

The significant problem in normal QWERTY keyboards is its size, as they are large in size and it is really not easy for a person to carry the keyboard from one place to another. The chances of breaking are also increased. The most important problematic situation for QWERTY system keyboard is its language restriction user has to install different language software's so as to interact with the system in different language. The invention of computers in recent years has undergone a rapid miniaturization. Disks and components grew smaller in size, but only component of the computer remained same for decades such as keyboard. Since the miniaturization of a traditional keyboard is very difficult we go for virtual keyboard.

A virtual keyboard is basically a keyboard that doesn't have any physical support and operated by the user via typing i.e. by simply moving fingers on the paper rather than typing on the physical keys. It can be a simple projection keyboard projected and touched on the projected image. It is just another example of today's computer trend of smaller and faster processing. The basic idea of virtual keyboard is that the camera tracks the finger movements of the typist to get the correct keystrokes. Then the software hardware type recognizes the typed characters and passes it to the computer to display the typed key by the user. The keyboard is projected optically on a flat surface and, as the user touches the image of the key, the optical device detects the stroke and sends it. The idea of creating the Virtual keyboard is very simple and understandable. It lets people to have multilingual writing content on existing platform. The keyboard presented in our project is small, well designed, handy and very easy to operate, that results in the perfect solution for cross multilingual text input. The earlier technique the keyboard was projected on an area and selected keys were transmitted as wireless signals using Bluetooth technology. With the approach, of the virtual keyboard it is possible for the user of a small smart phone or any other wearable computer to have full keyboard capability.

II. RELATED WORK

There are various forms of virtual keyboards implemented based on 3-D optical ranging and CCD Cameras are most significant as primarily based on image processing. The elaborate research done *by Jun Hu, Guolin Li,* Xiang Xie, ZhongLv, and Zhihua Wang, highlights virtual keyboard using touch interaction on flat surface with the keyboard projected by projector[1]. They build a model that explores the finger influence on the button distortion using mono-camera. On the projected keyboard touch detection is a very big and a crucial issue . They build a model that explores the finger influence on the button distortion using mono-camera. On the projected keyboard touch detection is a very big and a crucial issue . These methods require some additional hardware and they are high in cost. They generally used two cameras one for the detecting finger movements and another for the calculation of depth[7]. Day by day as technology get advanced that so many new systems are get developed. So many people worked on the virtual keyboard.

III. PROPOSED SYSTEM

The below figure explains the block diagram of the proposed system.

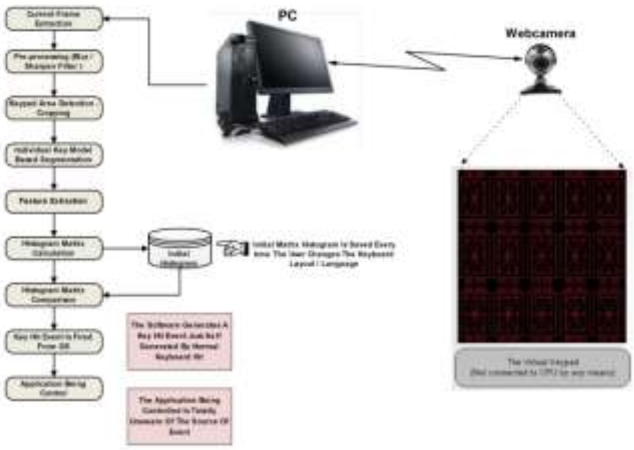


Fig 1. Architecture of Virtual Keyboard

Working Steps:

1. Video Input a constant video feed is obtained from the webcam connected to the PC. A webcam interface control / API is used for this.

2. Fram\e Grab At regular intervals (about 10 to 15 times every second), the current frame from video is copied as image to some other image control wherein we can read or manipulate pixels from that image.

3. Pre-Processing an image processing filter is applied the input image to improve it for further processing. Here we either blur the image in case it's too sharp. Else we sharpen the image in case the video feed is too blurred. Hence either sharpening or Gaussian blur filter is used based on quality of feed.

4. Selective RGB the image pixels are filtered based on their colour components (R, G and B values). The threshold ranges for these colours are specified by used initially. The ranges have to be specified based on the colour of the symbols.

5. RGB to HSV Conversion HSV model stands Hue, Value, and Saturation. Hue represents colour type. It can be described in term of angle on the above circle. Saturation represents vibrancy of colour. Value represents brightness of colour.

6. Histogram A binary histogram for individual characters is constructed. Histogram is the frequency count for the pixels (which will be either completely black or completely white after Thresholding).

7. Pattern Matching and Pattern Recognition A number of steps are applied to match the pattern being stored and recognize the exact pattern with the input given by user.

8. Output keystrokes Using the API, the output keystroke is analysed.

IV. ALGORITHM USED

Converting color to grayscale: we are converting a color image to grayscale as If each color pixel is described by a triple (R, G, B) of intensities for red, green, and blue, how do you map that to a single number giving a grayscale value? There are following three algorithms.

The **lightness** method averages the most prominent and least prominent colors: (max(R, G, B) + min(R, G, B)) / 2.
The **average** method simply averages the values: (R + G + B) / 3.

The **luminosity** method is a more sophisticated version of the average method. It also averages the values, but it forms a weighted average to account for human perception. We're more sensitive to green than other colors, so green is weighted most heavily. The formula for luminosity is 0.21 R + 0.71 G + 0.07 B.

Thresholding: Thresholding is the simplest method of image segmentation. • From a grayscale image, thresholding can be used to create binary images i.e. image with only black or white colors. • It is usually used for feature extraction where required features of image are converted to white and everything else to black. (or vice-versa).Steps / Algorithm – Traverse through entire input image array.1.Read individual pixel color value (24-bit) and convert it into grayscale.2.Calculate the binary output pixel value (black or white) based on current threshold.3.Store the new value at same location in output image.

Separating RGB: How is a pixel stored- Pixels are stored as Integers. • The integers can be 8-bit, 24-bit or 32-bit depending on the image type. • Most popular are 24 bit color images where 8 bits each for Red, Green And Blue color values are used to represent a 24-bit pixel value. • 8 bit images are grayscale images where as 32 bit images have an additional transparency channel.

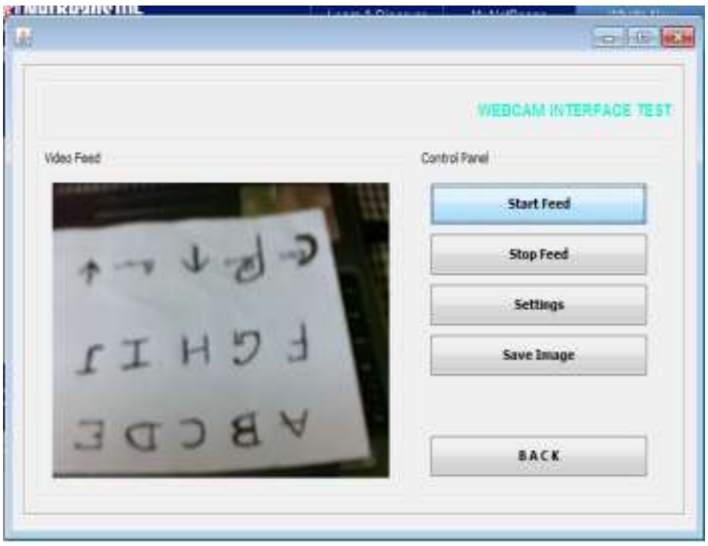
Extract 8-bit R, G and B values from 24-bit Color Value b = pix & 0xff; g = (pix >> 8) & 0xff; r = (pix >> 16) & 0xff;

Blob Detection: Blob detection refers to visual modules that are aimed at detecting points and/or regions in the image that differ in properties like brightness or color compared to the surrounding. There are two main classes of blob detectors (i) differential methods based on derivative expressions and (ii) methods based on local extrema in the intensity landscape. With the more recent terminology used in the field, these operators can also be referred to as interest point operators, or alternatively interest region operators Interest point detection: It is a recent terminology in computer vision that refers to the detection of interest points for subsequent processing. An interest point is a point in the image which in general can be characterized as a well-defined position in image space.

V. RESULTS

Main Page

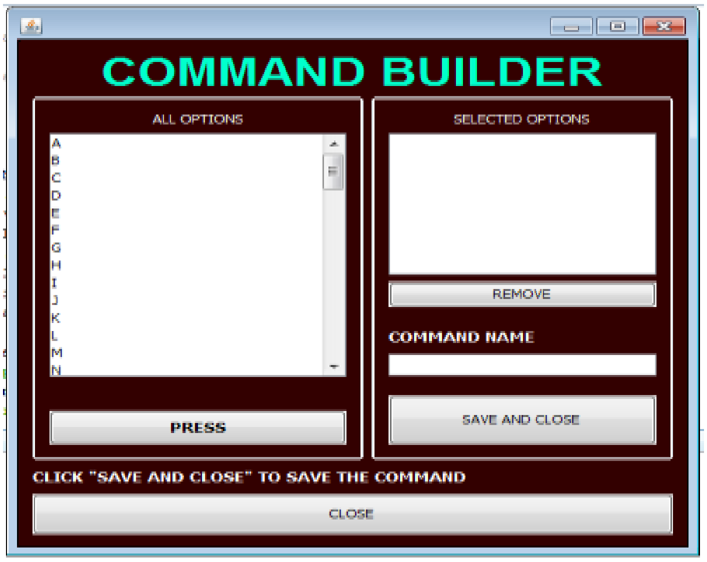
Web Cam test



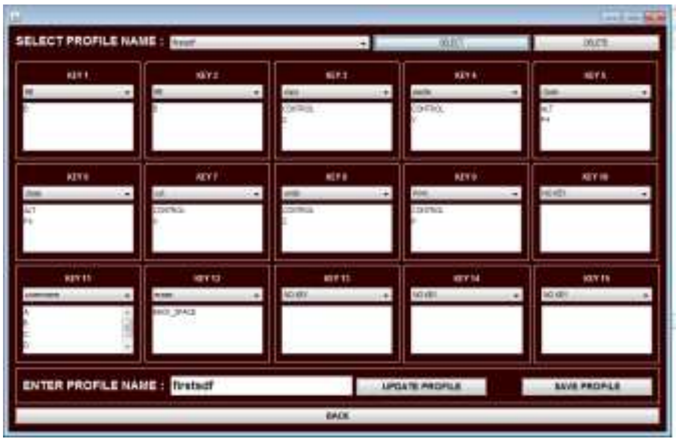
Keyboard testing

Command Manager

Add (Command Builder)



Profile Manager.



Testing of component of our project.

Ffinal Result

VI. CONCLUSION

This project illustrates about the practical implementation of Virtual Keyboard (VK) which demonstrates upcoming tomorrow of human mobile devices and human computer interaction in the creation of Virtual world. With the increasing demand of small mobile devices, conventional data entry is required that are considerably flexible and easy to use without affecting portability and mobility of such devices. As different data input methods and different types of VK are available. But still, these methods have inconveniences of a normal size keyboard and lack of accuracy. To address these issues Reconfigurable VK successfully developed. It provides easy and a simple touch style of writing using webcam and a paper layout keyboard. Reconfigurable VK is very much convenient for gamming application but it requires more time as compared to input character and results in slow processing. With using this project user can create keyboard layout easily as per his convenience. As far as security is concerned this project is better than existing keyboards.

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