Virtual Keyboard using Image Processing

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ABSTRACT
As the technology advances, additional and additional systems area unit introduced which is able to take care of the users comfort. Few years before exhausting switches were used as keys. Ancient QWERTY keyboards area unit large and supply little in terms of enhancements. Now-a-days dupe keypads area unit a lot of well-liked within the market. These keypads provide a sublime look and a more robust feel. Presently keypads area unit static and their interactivity and usefulness would increase if they were created dynamic and all-mains. Varied on-screen virtual keypads area unit out there however it’s troublesome to accommodate full sized keyboard on the screen because it creates hindrance to envision the documents being typewritten. Virtual Keyboard has no physical look. Thought alternative sorts of Virtual Keyboards exist; they supply solutions victimisation specialised devices like 3D cameras. Owing to this, a sensible implementation of such keypads isn't possible. The Virtual Keyboard that we tend to propose uses solely a regular internet camera, with no extra hardware. So we tend to see that the new technology forever has additional advantages and is additional easy.

To develop associate degree Application to envision the key board of laptop with the thought of image process. The virtual keyboard ought to be accessible and functioning. The keyboard should provide input to laptop. With the assistance of camera image of keyboard are going to be fetched. The typewriting are going to be captured by camera, as we tend to kind on cardboard merely drawn on paper. Camera can capture finger movement whereas typewriting. Thus essentially this is often giving the virtual keyboard.

The Objective of this final year project is to implement a virtual keyboard victimisation the image process techniques. within the system we tend to used one quality camera for capture RGB pictures of a user’s hands, that bit a tabby surface, or choose keystrokes.

Based upon this data and in standardisation image of the keyboard paper/mat, the system made a separate sequence of keystroke. We tend to examine the performance of every of the 3 main phases of image analysis and compare the potency of 2 techniques for locating the user’s fingertips in a picture. We tend to conjointly analysis the degree to that our system is sensitive to changes in lighting and frame rates.

KEYWORDS
Virtual Keyboard, Pattern Recognition, Segmentation, Thresholding, RGB, HSV, API, VK

INTRODUCTION
As the demand for computing surroundings evolves, new human-computer interfaces are enforced to supply multiform interactions between users and machines. However, the premise for many human-to-computer interactions remains the binomial keyboard/mouse. We have a tendency to ar presenting here a next generation technology, that is that the Virtual input device. Because the name suggests the virtual input device has no physical look. Virtual keyboard is AN application that virtualizes hardware keyboard with totally different layouts therefore permitting user to alter the layout supported application. E.g. user will choose totally different language for editor or choose a specialised layout for vice applications. User will even style his own layout in hardware version.
The Virtual Keyboard has been enforced during a variety of various forms, as delineated by Adajania, Gosalia, Kanade, H. Mehta, Prof. N. Shekokar, Kölsch, M. and Turk, M of these, those supported 3-D optical go and CCD cameras are most important as they're based mostly totally on image process. The frilly analysis done by Kölsch, M. and Turk, highlights a range of virtual keyboards in numerous forms, like gloves, rings, hand gestures {based|based mostly|primarily based mostly} and projection based devices. In , a special 3-D camera, or 2 2-D cameras ar used. in addition a pattern projector is employed for projected the keyboard. The VK designed in make use of one CCD camera. Even additional vital is that the work conferred in, wherever a shadow based mostly analysis is employed to amass depth data.

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Miscellaneous

In this step, we have a tendency to estimate the locations of the user’s fingertips (in image-space) supported geometrical options. AN low-level formatting of wordbook contains the single-character strings. the only character strings square measure square measure akin to all the attainable input characters. The system works by scanning the data through a input string for in turn substrings till they notice one that's not in wordbook. once such string is found in wordbook, the index for the string but the last character is retrieved from wordbook and sent to the output. The new generated string is superimposed to wordbook with consequent out there code. consequent start line to scan for substrings is employed by the last input character. Given this geometrical knowledge, we’ve 2 approaches for locating the fingertips in a picture. The first approach is to calculate the sequence of angles , and associate fingertips with points wherever is maximized. The second approach is to calculate the curvature values and associate fingertips with positions wherever is maximized. Naturally, each approaches need non-maximum suppression or different post-processing to be effective. each of those approaches square measure delineate in and that we compare their performance.

2 Touch Detection:

In this part of process, we tend to ar given as input the calculable positions of the user’s fingertips and should output that of these tips ar calculable to be to bear with the keyboard-mat. we tend to used a method known as shadow analysis, wont to solve this downside. The first step in shadow analysis is to extract the shadow of the user’s hands from the scene. we tend to accomplish this by thresholding the image in 8-bit HLS color space coordinates. From examining several check pictures, we tend to found that a threshold of L < zero.30•255 made a binary image S that clearly depicts the shadows within the image. for every fingertip position p, we tend to examine sq. 20×20 neighbourhood of p within the binary image S. If share|the share|the proportion} of shadow pixels within the neighbourhood is smaller than a fixed percentage s, we tend to conclude that the fingertip is to bear with the table. we tend to ask s because the shadow threshold. Within the experimental section, we tend to investigate the effect of variabl...
tendency to assume all of our length-valued variables have a similar units. to get the positions of the control-points in image-space, we start by thresholding associate 8-bit RGB check image captured at the start of process with the difference B < one hundred. The ensuing binary image has four connected elements, we have a tendency to assume that the keyboard-mat is aligned in order that the vectors $c_1 - c_0$ and $c_2 - c_3$ are parallel to the coordinate axis with length $w$ and therefore the vectors $c_3 - c_0$ and $c_2 - c_1$ are perpendicular to the coordinate axis, with length $h$. Thus, under the perspective projection, the keyboard-mat looks like the image in Figure.

![Image](image.jpg)

Figure: An example of the keyboard mat, under perspective projection

4. Problem Definition:

Recent years have marked a pointy increase within the variety of the way during which individuals act with computers. wherever the keyboard and mouse were once the first interfaces for dominant a pc, users currently utilize touchscreens, infrared cameras (like Microsoft’s Kinect), and accelerometers (for example, at intervals the iPhone) to act with their technology. In lightweight of those changes and also the proliferation of tiny cameras in several phones and tablets, human pc interface researchers have investigated the chance of implementing a keyboard-style interface employing a camera as a substitute for actual keyboard hardware. loosely, these researchers envision the subsequent scenario: A camera observes the user’s hands, that rest on a flat surface. The camera might observe the hands from on top of the surface, or at associate degree angle. The virtual keyboard’s package analyses those pictures in period to see the sequence of keystrokes chosen by the user. These researchers envision many applications for this technology: in some countries (for example, India), users speak several different languages, that makes manufacturing physical keyboards for several different orthographies big-ticket. A camera-based keyboard will simply support several languages. Smart-phone and pill users might sometimes wish to use a full-sized keyboard with their device, however square measure unwilling to hold a physical keyboard. Since most mobile devices square measure equipped with a camera, a camera-based keyboard may give a software-based resolution for this downside.

The objective of this semester project was to implement a virtual keyboard victimisation the image analysis techniques represented. within the system we have a tendency to enforced, one low-quality camera captures RGB pictures of a user’s. Hands, that bit a freckled surface, or keyboard-mat, so as to pick out keystrokes. primarily based upon this info associate degree an initial standardisation image of the keyboard-mat, the system produces a distinct sequence of keystrokes that may be accustomed control alternative package.

5. Product Perspective:

1. Video Input a relentless video feed is obtained from the digital camera connected to the computer. A digital camera interface management / API is employed for this.

2. Frame Grab At regular intervals (about ten to fifteen times each second), the present frame from video is derived as image to another image management whereby we will scan or manipulate pixels from that image.
3. Pre-Processing a picture process filter is applied the input image to enhance it for additional process. Here we have a tendency to either blur the image just in case it’s too sharp. Else we have a tendency to sharpen the image just in case the video feed is simply too blurred. thus either sharpening or Gaussian blur filter is employed supported quality of feed.

**Figure: System Architecture of Virtual Keyboard**

**ALGORITHM**

- The keyboard are drawn on blank paper. A camera are there to capture live feed of fingers typewriting on blank paper with keyboard drawn on that.
- Video Input a continuing video feed is obtained from the digital camera connected to the computer. A digital camera interface management / API is employed for this.
- Frame Grab At regular intervals (about ten to fifteen times each second), the present frame from video is derived as image to another image management whereby we are able to scan or manipulate pixels from that image.
- Fingers are taped with completely different coloured tapes.
- Pre-Processing a picture process filter is applied the input image to boost it for more process. Here we tend to either blur the image just in case it’s too sharp. Else we tend to sharpen the image just in case the video feed is simply too blurred. thus either sharpening or mathematician blur filter is employed supported quality of feed.
- Hence with image process, in real time written words on keyboard are detected those words are screened on desktop.

**CONCLUSION**

In this project, we tend to tend to implemented a virtual keyboard by exploitation Camera and Image method. Implementing a virtual keyboard system gave America an improved understanding of the trade-offs one should take into account once selecting image analysis techniques within the context of a bigger system.

We square measure attempt to characterize what writing tasks users presently perform on their touchscreens then examine whether or not those tasks may be performed effectivly with a virtual keyboard.

**REFERENCES**


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YouTube Videos For Virtual Keyboard using Image Processing. http://www.youtube.com/watch?v=uHmWNOipFis