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A Novel Input Method of Computers: Virtual Keyboard

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Abstract: There are various input of computers but here We propose a novel input method of computers. The proposed method is called Virtual Keyboard. Input to small devices is becoming an increasingly crucial factor in development for the ever-more powerful embedded market. We discuss the various Virtual Keyboard & its flexibility and applicability & also discuss how fingertip detect on image using HSV Color Model.

Keywords: *Input method, Mobile Interface, Fingertip Detection using HSV*

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I. INTRODUCTION

Virtual Keyboard is the another example of today's computer trend of 'Smaller and Faster'. Computing is now not limited to desktops and laptops, it has found its way into mobile device like palmtops and even cell phones. But what has not changed for last 50 years is the input device, the old QWERTY Keyboard. The virtual keyboard technology is the latest development. The virtual keyboard technology uses the sensor technology and artificial intelligence to let users to work on any flat surface as if it were a keyboard. Virtual Keyboard, being a small, handy, well-designed and easy to use application. In this paper, we proposed a new method for fingertip detection on virtual keypad image.

II. VIRTUAL KEYBOARD

As the demand for computing environments evolves, new human-computer interfaces have been implemented to provide multiform interactions between users and machines. Nevertheless, the basis for most human-to-computer interactions remains the binomial keyboard/mouse. We are presenting here a next generation technology, which is the Virtual Keyboard. As the name suggests the virtual keyboard has no physical appearance.

There are number of virtual keyboard available. The following subsections explain the main characteristics of each VK[18].

A. Visual Panel

The Visual Panel[13] consists of a camera and a sheet of paper. The location of the extended index finger in reference to the paper is located with computer vision means. The primary application is a mouse pointer, clicking is achieved by resting the fingertip in its current position for three seconds. The authors demonstrated text entry by interpreting pointer locations as the keys of a keyboard, which were printed on the sheet of paper. An audible notification signals the recognition of a character after the 3 second significance interval.

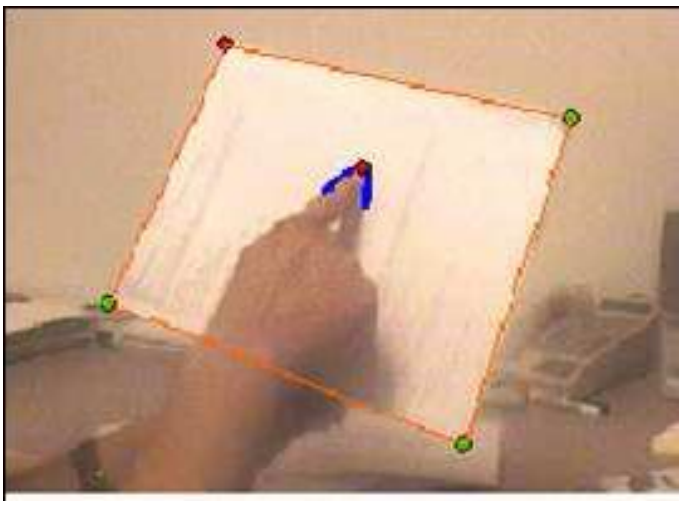

Figure 1. Visual Panel[18]

B. Finger-Joint Gesture Wearable Keypad

The FJG[13] suggests viewing the phalanges of the fingers (besides the thumb) of one hand as the keys on phone keypad. The thumb is used to press the virtual buttons. This is similar to Thumbcode, but it solely relies on word disambiguation to produce more than 12 characters. Yet the drawback of this 1.5 DOF key-to-symbol mapping might be mitigated by the familiar layout. Also, less complex hand configurations might be less tiring for the user. Just as Thumbcode, FJG has no user feedback method beyond skin contact sensations.

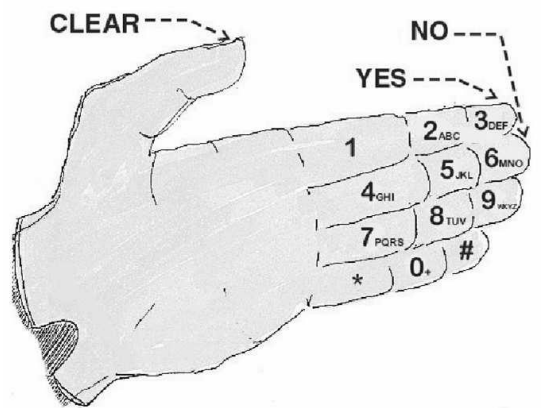

Figure 2. Finger-joint Gesture Wearable Keypad[18]

C. VType

VType [17] detects the key stroke of each finger "in the air" with a data glove (fiberoptical curvature detection). Different locations of the key strokes are not distinguished, only which finger pressed a key. Instead, disambiguation with standard statistical methods on the word and sentence level solves the 1.5 DOF mapping problem. There is currently no feedback mechanism incorporated into the VType prototype.

Figure 3. Visual Panel[17]

D. VKey

Virtual Devices Inc. recently announced a combined projection and recognition VK [15]. Little is known about this device, but their press release suggests that visual sensors (cameras) detect the movement of all ten fingers. Just as the VKB device, the Vkey also consists of a tabletop unit and feedback is the tactile sensation of hitting a surface.

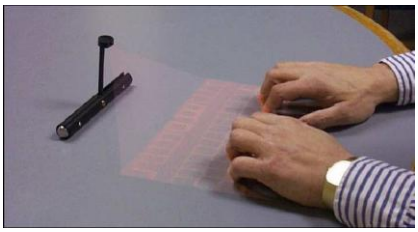

Figure 4. VKey[15]

E. VKB Projection

The virtual keyboard technology developed by VKB [16] is a tabletop unit that projects a laser image of a keyboard on any flat surface. Infrared cameras detect key strokes of all ten fingers. Word disambiguation techniques are employed despite this 1 DOF mapping. Therefore, our guess is that engagement of all distinct key locations is detected, yet with a fairly low accuracy. These two characteristics in combination should result in fairly good recognition rates. Surface impact of the fingers serves as typing feedback.

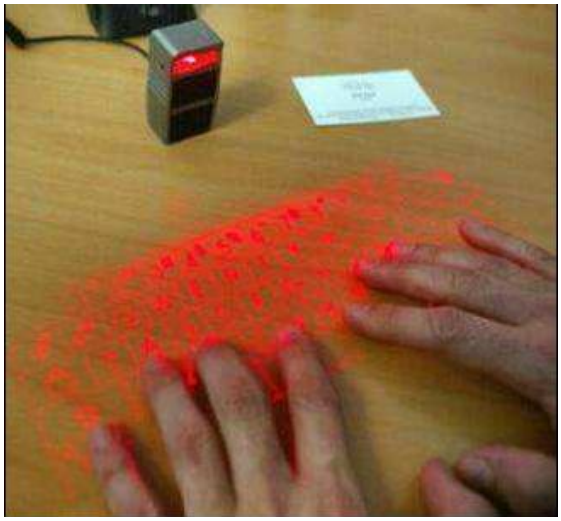

Figure 5. VKB Projection[16]

III. PROPOSED METHOD

But here we proposed a new method for fingertip detection using HSV Color model on Keypad image. First take any color image, then separate the R, G, and B component.These components are converted into H,S and V component. Then after applying thresholding algorithm to diffrentiate the object from background. Finally, Merged the final result of HSV and keypad image.

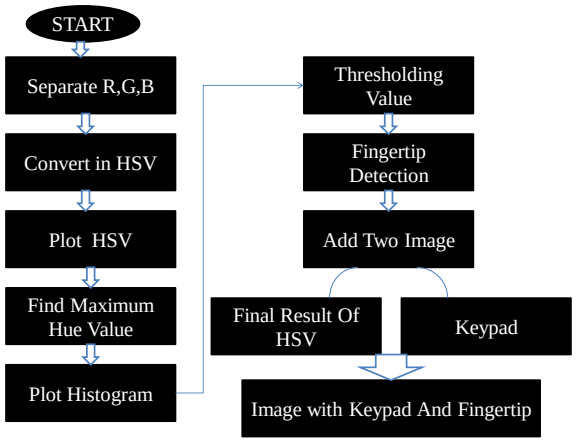

Figure 6. Proposed Method

In Figure 7, HSV(Hue Saturation Value) Hue indicates the dominant color of an area; saturation calculates the colorfulness of an area in proportion to its brightness. Value indicates the color luminance. Separation between chrominance & luminance makes this color space popular in the skin color detection. The transformation of RGB to HSV is invariant to high intensity at white lights, ambient light and Surface orientations relative to the light source and hence, can form a very good choice for skin detection methods.[19]

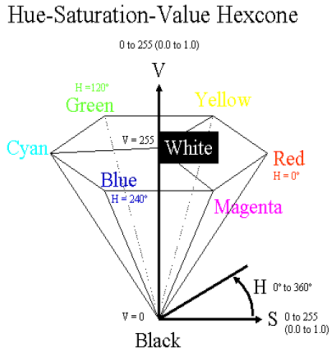

Figure 7. HSV Color Model[19]

IV. EXPERIMENTAL RESULTS

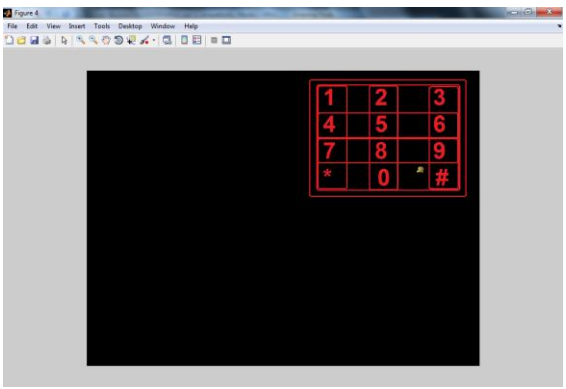

Figure 8. Image with Keypad and Fingertip

V. CURRENT STATUS FUTURE WORK &CONCLUSION

This method is applicable on static image only but this process also possible in real time. Here we have discussed a fast and efficient method for fingertips detection. This paper gives the survey of various virtual keyboard and is designed for detecting the fingertips with virtual keyboard image using HSV color model.

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