International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 5 Issue 3 ǁ Mar. 2017 ǁ PP.35-38

Virtual Projection Interface

Ankita Vilas Sawant Bhonsle, Abdul Samad Shaikh, Shivam Shukla,
Suraj Subhash Tawde:
(Be Students) Prof. Chillton Fernandes (Assistant Professor)
Shree Rayeshwar Institute of Engineering and Information Technology

ABSTRACT: Now a Days computing is not constraint to desktops and laptops, it has got its way into mobile devices like mobile phones. But the input device for the computing process has not been modified from the last few years.
Eg:- QWERTY keyboard. Virtual Keyboard allows users to work on any surfaces by using sensor technology.Our device will have three main partsi.e the camera, IR sensor, lazer pattern projector. The Virtual Keyboard uses light to project a full-sized computer keyboard onto almost any surface, and disappears when not in use. Used with Smartphone and PDAs, the keyboard provides a practical way to do email, word processing and spreadsheet tasks, allowing the user to leave the laptop computer at home.

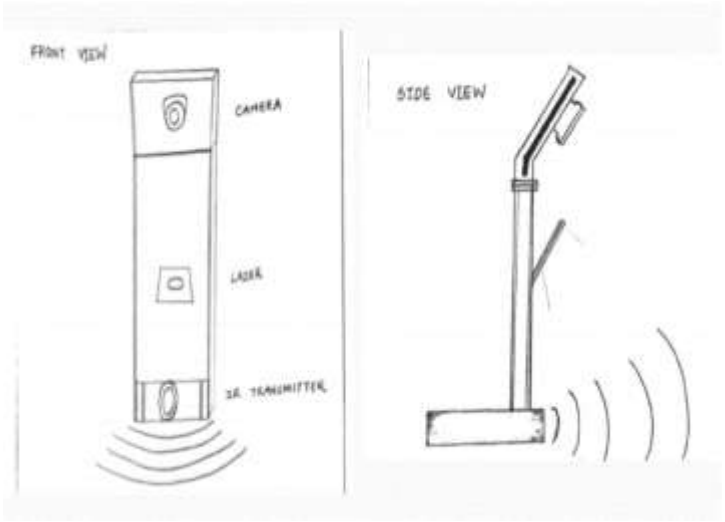
I. INTRODUCTION

Virtual keyboard is just another example of today‟s computer trend of „smaller and faster‟. Computing is nownot limited to desktops and laptops, it has found way into mobile device also. But what is not changed is theinput device, the good old QWERTY keyboard. The virtual keyboard technology is a tabletop unit that projectsa laser image of a keyboard on any flat surface. They are not the electronic device they are just the set of lightsthat look likes the keyboard and works like a keyboard. In this technique we use a device that produces theLASER light on the flat surface. This LASER light produced is the keyboard. It creates detectable surface onwhich user don't need to press the key like normal keyboard, when a user touches the surface covered by animage of a key, the device records the corresponding keystroke.

II. PROPOSED METHOD

Figure 2 shows the physical setup of the system. The 3D range camera is placed several centimetres over theinput surface, with a well-defined angle facing the working area. The proposed system consists of three mainhardware modules. The display projector is mounted on the camera, facing the same area, which would generatethe visual feedback for the keyboard and input information.

II.a Prototype



The proposed prototype is shown in the above figure. The left side shows the front view of the device while the right side of the figure shows the side view of the device.

The three components :

1. Camera
2. Laser Projector
3. IR emitter

are arranged as sequentially as shown in the figure above.

2.1 sensor module

The sensor module serves a eye of keyboard perception technology. The sensor module operates but locating user's fingers in 3-D space and tracking the intended keystrokes. Keystroke information is processed and can then be output to host device via a USB or Bluetooth.

2.2 IR source (illumination module)

The infrared light source emits a beam of infrared light. This light beam is designed to overlap the area on which the keyboard pattern projector. This is done so as illuminate the user's fingers by infra-red light beam. This helps in recognizing the hand movements and pressing of keys. The light beam facilitates in scanning the image. Accordingly information is passed on sensor module which decodes information.

2.3 pattern projector

The pattern projector presents the image of keyboard. Thus image can be projected on any flat surfaces. This projected image is that of standard QWERTY keyboard, with all the keys and control functions as in the keyboard. The projector features a wide-angle lens so that large pattern can be projected from relatively low elevations. In some type of virtual keyboard, a second infra-red beam is not necessary. Here the projector itself takes the input, providing dual functionally. A sensor or camera in projector picks up finger movements, and passes the information on sensor modules. A virtual keyboard system based on a true-3D optical range camera is presented. Keystroke events are accurately tracked independently on the user. No training is required by the system that automatically adapts itself to the background conditions when turned on. No specific hardware must be worn and in principle no dedicated goggles are necessary to view the keyboard since it is projected onto an arbitrary surface by optical means. The feedback text and/or graphics may be integrated with such projector,thus enabling truly virtual working area. Experiments have shown the suitability of the approach which achieves high accuracy and speed. People with bigger fingers may find the keyboards on smart phones and PDAs too small. To make up for this, some manufactures have developed special virtual laser keyboards to accompany handheld devices.

III. WORKINGOF VIRTUAL LASER KEYBOARD

3.1 Template projection

A template produced by a specially designed and highly efficient projection element with a red diode laser is projected onto the adjacent interface surface. The template is not however involved in the detection process andit is only used as a reference for the user. In a fixedenvironment, the template can just as easily be printed onto the interface surface. Figure 2 shows projection of template (keyboard).Various types of projection elements are available in market.

3.2 Reference plane illuminations

An infra-red plane of light is generated on the interface surface. The plane is howeversituated just above andparallel to the surface. The light is invisible to the user and hovers a few millimetres above the surface. When akey position is touched on the surface interface, the light is reflected from the infra-red plane in the vicinity ofthe key and directed towards the sensor module.

3.3 Map reflection coordinates

The reflected light user interactions with the interface surface is passed through an infra-red filter and imagedon to an image sensor in the sensor module. The sensor chip has a custom hardware embedded such as theVirtual Interface Processing Core and it is capable of asking a real time determination of the location fromwhere the light was reflected.

3.4 Interpretation and communication

The sensor module receives the positional information corresponding to the light flashes from the sensorprocessing core, interprets the events and then communicates them hrough the appropriate interface to externaldevices. By events it is understood any key stroke, mouse or touchpad control. Most projection keyboards use ared diode laser as a light source and may project a full size QWERTY keyboard. The projected

keyboard size isusually 295 mm x 95 mm and it is projected at a distance of 60 mm from the virtual keyboard unit. Theprojection keyboard detects up to 400 characters per minute.

3.5 Image Processing with MATLAB

Images are everywhere, from everyday devices like cameras and smart phones to specialized devices formedical imaging, automotive safety, industrial automation, and more. Each of these uses for image processinghas unique challenges. MATLAB and Image Processing Toolbox provide a flexible environment to explore design ideas and create unique solutions for imaging systems. Matlab toolbox used in our project are as follows

1. Image acquisition Toolbox.
2. Image processing toolbox
3. GUI build.

III. ALGORITHM

1.ycbcr2rgb - to convert ycbcr image into rgb.
2.color based thresholding.
3.Find the logarithmic values of color.
4.Blob detection algorithm - to detect rgbcolor blob (stickers).
5.Divide keyboard image into a sector.
6.Positioning the stickers with sectors.
7.Identifying the word of sector.
8.Display the output on command window

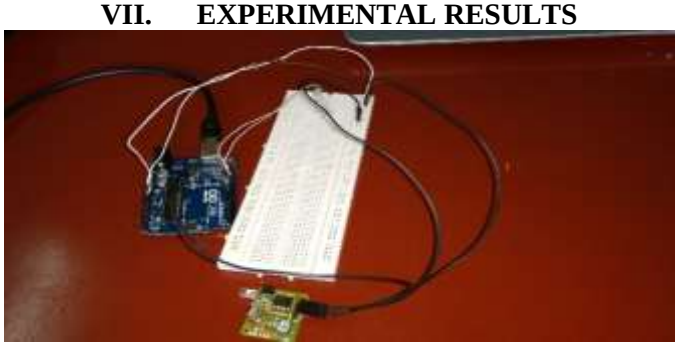
V. APPLICATION

The device can function in many ways ranging from its use in Smart phone, PDAs, e-mails, word processing,and spread sheet task. Also it is equally beneficial in Gaming control application. It is also useful in High-techindustrial sectors.

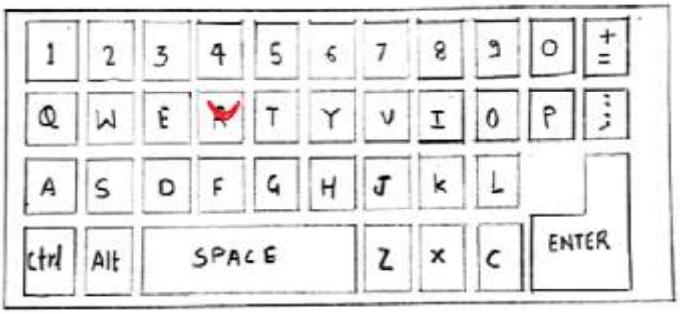
VI. CONCLUSION

A virtual key boards claim to provide the convenience of compactness with the advantages of a QWERTYkeyboard. It is a system based on 3-D camera. Thus virtual keyboards will make typing easier, faster, andalmost a pleasure.

VII. EXPERIMENTAL RESULTS



- Detection of keystrokes with the help of IR sensor module



- Detecting the illuminated fingers on the keyboard pattern.

- and getting the output by identifying the co-ordinates of individual keys

REFERENCES

[1]. http://www.nytimes.com/2002/09/19/technology/no-keys-just-soft-light-and-you.html
[2]. http://www.laserkeyboard.com/virtualprojection-keyboards
[3]. https://en.wikipedia.org/wiki/Projection_keyboard
[4]. http://www.instructables.com/id/How-to-make-laser-projection-virtual-keyboard-1/
[5]. http://electronics.howstuffworks.com/gadgets/travel/virtual-laser-keyboards.htm