

Interactive Projector

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Abstract – Aim of the project is to provide graphical interface on the projector screen. User will be able to draw on the projector by using laser beam. Presenter can handle the presentation from any location where projector is placed. It is easy to express his views by highlighting the points which is simple to understand the presentation. The basic idea of the interactive projector is to process the image which is captured by web camera, it find the position of the laser beam and use this position to determine where to place mouse cursor on screen.

Keywords – Laser Beam Interaction, Camera-Tracked Interaction.

I. INTRODUCTION

In day to day life multimedia presentation is widely used. The idea of this project is to high light the points on projector screen using laser beam from any location that user not tying to one location so the presentation make more interactive.[1]

A. Comparative study

There are various interactive projectors and interactive pens are available in market for making presentation more interactive. Projector technology has also been enhanced over the years to incorporate the need for interactive presentations. New interactive projectors essentially turn any wall into an interactive whiteboard. With the use of a special wireless interactive pen, a presentation can be projected and altered from up close or from a distance. It makes for a whole new experience in presenting. [6]

Flaws in Present System:

Today's projector is not so interactive. When user is using projector, he/she will capable of controlling it using remote control or computer attaches to it.

A.1] Lack of interaction in projector presentation:

Presenter can only change slides operate computer on projector on screen.

A.2] Presenter cannot highlight, mark on the slide:

For pointing any content on screen operator has to use either laser or wooden scale. Presenter cannot highlight, mark on the content. Using interactive projector presenter can point out and highlight content on slide or screen.

In our application we use a laser beam to make a presentation more interactive by providing features like highlighting and underlying the contents while presentation.

II. OVERVIEW

We are using the laser beam to draw shapes or high light points on PPT. We are using web camera, projector and laser beam. [3]

The fig 1 shows the architecture of the Interactive projector. Camera will continuously capture the image of the projector screen and save it on file system. On

captured image we are applying image processing techniques like noise removal, grayscale and thresholding. After image pre-processing green beam detection technique is used. Once the pixel is detected on image, calibrate the same to desktop screen. [5]

We make use of two additional useful facts:

1. Normal pocket touch lights (or any incandescent lamp for that matter) actually emit several times more infrared light than visible light, and so works better as IR point source than a visible light source.
2. most webcam are able not only to detect visible lights (red, green and blue, etc) but they can also detect infrared (IR) lights – for example as emitted by the IR LEDs commonly found on TV remote controls – which are invisible to the human eyes. So if we can somehow use the webcam to capture only the infrared lights from our light source and reject the surrounding visible lights, we will be ensured of a very reliable system.

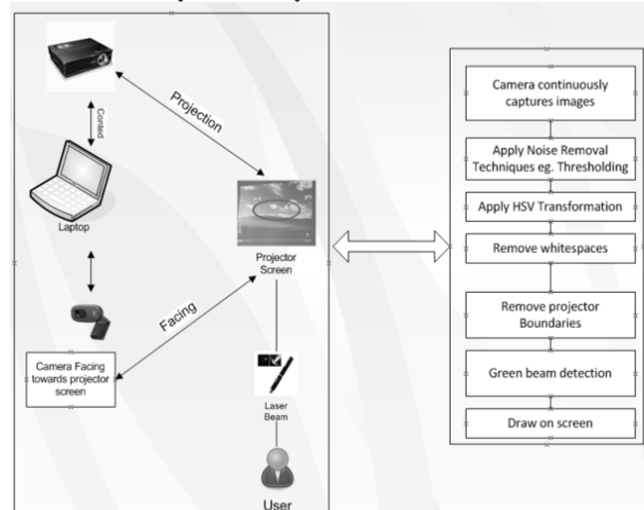


Fig.1. Scenario of the interactive system

III. IMPLEMENTATION

A. Capture image

Camera will continuously capture the image of the projector screen and save it on file system. [7]

B. Apply pre-processing

B.1 Apply noise removal techniques

In these techniques white space and projector boundaries are removed.

B.2 Grayscale image

Gray level pixel may reduce and simplify some image processing operation such as pattern recognition and classification.

B.3 Thresholding

Thresholding is conversion between a gray-level image and binary level image.

C. Detect green beam

To detect the green beam we are using processed image and on that we are applying the HSV and RGB filtering to get the actual value of RGB and HSV for more precise beam. Once the pixel is detected on image calibrate the same to desktop screen. If the laser beam is constant for 1 second, it is consider as start point .And then line is drawn as the laser move on the screen. If the beam goes out/switched off it is consider to be clear start point condition.



Fig.2. Green Beam Detection

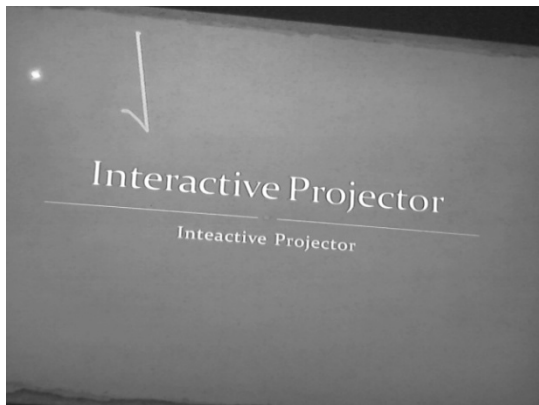


Fig.3. Draw object on desktop

D. Draw on desktop

In this module we are finding centroid of the detected region and detected pixel from step C drawn on screen.

E. Operating modes

We are providing following two modes to highlight the points:

E.1 Line Mode

E.2 Draw Shapes (freehand Drawing). [4], [8]

IV. CONCLUSION

In this project we propose an interactive projector to make presentation more interactively in low cost. Web camera will continuously capture the image and we are applying custom transformation like RGB, HSV filtering to detect laser beam accurately .Detected pixel calibrate on the desktop screen. In this way presenter can effectively draw shapes on slides without using any writing device like marker or pen, no pointing tool is required and no external hardware is required.

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