

## Virtual Events using Laser Pointer

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**Abstract** - As technology advances people are inclined towards finding new ways to interact with computer devices. People have developed a great interest in Virtual Events. Our system introduces the use of Laser Pointer for performing Virtual Events. Here we can use any surface such as the base of the Virtual Events and a gesture by Laser Light will be equivalent of using a keyboard. The system powered by the Laser Pointer uses a webcam to monitor the selected area and detects the laser light on any segment of the area and depending on the gestures performs a function.

**Keywords:** Laser Pointer, Webcam, Gestures, Virtual, Interaction, Motion.

### 1.INTRODUCTION

Computer Systems are now days used by majority of people for work as well as for fun. Different types of input and output devices have been designed over the years with the main purpose of easing the interaction between computers and humans. In today's world the two most commonly known are the keyboard and mouse [4]. Every new device can be seen as an attempt to make the computer more intelligent and making humans able to perform more complicated communication with the computer. This has become possible only due to the efforts made by computer professionals for creating user friendly successful human computer interfaces. As the complexities of human needs have turned into many folds and continues to grow so, the need for intricate programming ability and intuitiveness are

significant attributes of computer programmers to survive in a viable environment. The computer programmers have been incredibly successful in easing the communication between computers and human. With the surfacing of every new product in the market; it attempts to ease the complexity of jobs performed. Computer programmers have been avoiding this type of complex programs as the inclination was more on the speed than other modifiable features. The idea is to make computers understand human language and develop a user friendly human computer interfaces (HCI). Human computing interaction (HCI) is one of the important area of research were people try to improve the computer technology [8]. Nowadays we find smaller and smaller devices being used to improve technology.

### 2.SYSTEM ANALYSIS

#### 2.1 Existing System

In existing system people use computers to perform an operation. At technologically advanced places there are systems such as Laser Keyboards but main drawback here is that such systems are very expensive for common people to use [7]. The currently developed system based on Laser Pointer is grid based which makes the system restricted to perform only limited operations [2].

#### 2.2 Proposed System

Our proposed system primarily allows the user to access the computer without having to be seated in front of the computer system. To make the system affordable to general

public we make use of low price webcam and a laser pointer to perform an operation. Our system would be capable to map any flat surface as virtual keypad and translate laser stroke as key press [2]. A camera is used to record the location of the laser pattern, and then the laser pattern is detected. Once a pattern has been detected its trace is recorded spatially until the laser pointer is switched off. According to laser pattern, the application will be communicated with the system, and the system will perform some operation regarding the pattern. The operation will be like handling the system’s applications [3].

### 3. MOTION DETECTION ALGORITHM

There are various approaches for motion detection in a continuous image stream. Every part of them are based on comparing of the current image frame with one from the previous frames. To perform frame by frame motion detection our system uses AForge.Net Framework. Here the motion detection algorithm helps our system to be aware of the direction the laser gesture is been made. The four main directions i.e Left, Right, Bottom and Top will be assigned to an adjacent operation which will be applied to the running System Based Application. The working of the algorithm is based on the time frame of 1000ms. After every 1000ms the system compares the current frame with the previous frame from start of the laser gesture to end of it. Thus recognizing the direction the application shows the result based on the pattern. AForge.Net Framework provides with libraries that are required and are suitable to make the operation performance successful in real time. Another way of performing motion detection is by building the background of the scene and comparing each frame with the background but as the system should work in any place, area and condition, background based motion detection won't be suitable here.

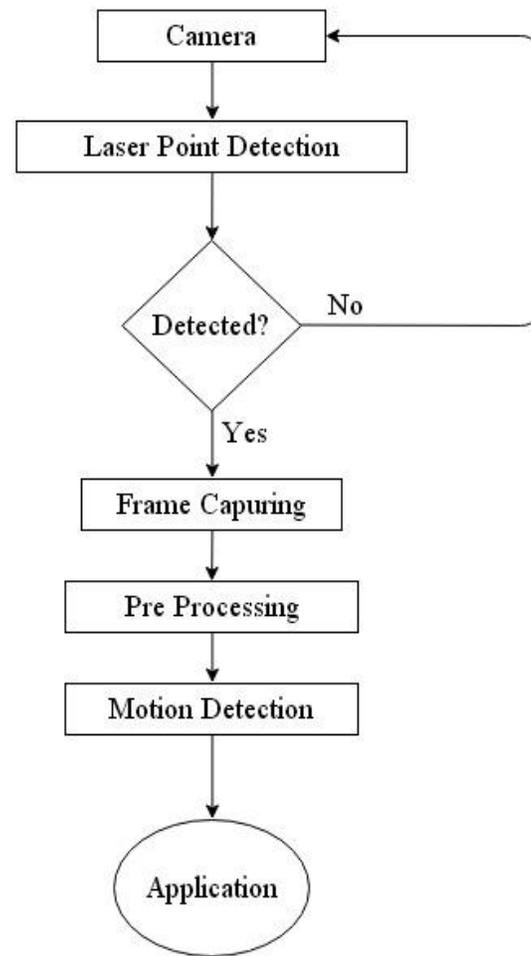


Fig. 1 Flow Chart

### 4.METHODOLOGY

#### 4.1 User Module:-

- The user runs the application
- The user does the laser gesture on Selected Area in Camera’s field view.

#### 4.2 Webcam Module:-

- The webcam will detect the gesture in real time[1].
- Our application does live capturing of the ongoing video and display it in the application frame.

- We can set the attributes for the camera and resolution settings or it would take directly from the video Properties file.

**4.3 Laser Point Identifier Module:-**

- Here the camera captures a scene which is segmented as frames.
- Every time next frame gets compared with the previous frame for the changes.
- In this module we write program for pixel colour change detection in frames.
- Here we analyse the base frame pixel colours and match with the next frame pixels.
- Because of the brightness of laser point it gets detected by our application.

**4.4 Application Module:-**

- The application will detect the pattern.
- After the detection of the pattern, some operations are performed on system.
- The operations like handling the system installed applications.

The User will start the application and then the Web Camera connects with the GUI which would be running on our motion detection algorithm from which the Laser point gesture is recognized [5]. Now the frame capturing is initialized and from the start point of the laser light till the end point where the laser pointer is switched off the direction of the gesture is known in real time.

The Background and then the color of the Laser is detected and separated from other light rays [6]. The separation of the laser with the background is done with the help of gray scaling. Thus the pattern of the Laser Gesture is matched and the action on the application is performed.

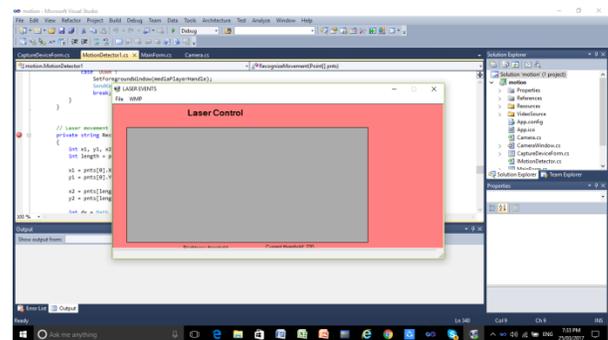


Fig. 2 The Main GUI of the system

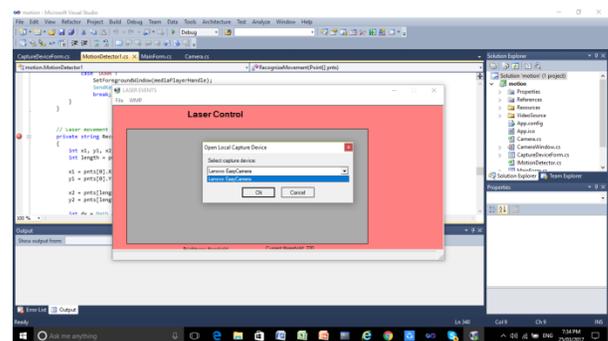


Fig. 3 Selecting file option, the user can select the camera which is connected to the computer system

**5.IMPLEMENTATION**

Our system uses internal camera of the laptop or an external webcam to monitor the selected area. The Camera detects if any laser light comes to any segment and captures the frame and through motion detection identifies the direction in real time and performs the designated function. The system is .NET oriented that using a webcam detects when a laser pointer is in a specified hotspot and then does the equivalent of pressing a specified keyboard key [2]. Thus we can control system applications. The hotspots can be set by the user as well as the actions taken. We can make our wall as a remote control.

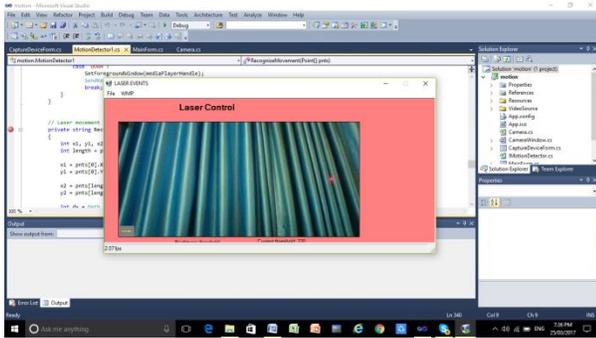


Fig. 4 The Camera starts and selects the area in the field view of the camera

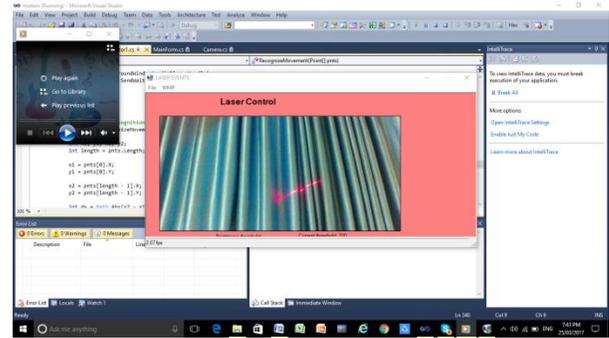


Fig. 7 Laser Gesture making the application stop the music.

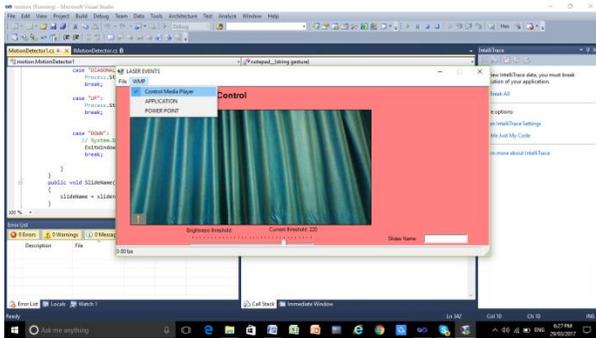


Fig. 5 The system applications to be controlled, this option should be selected.

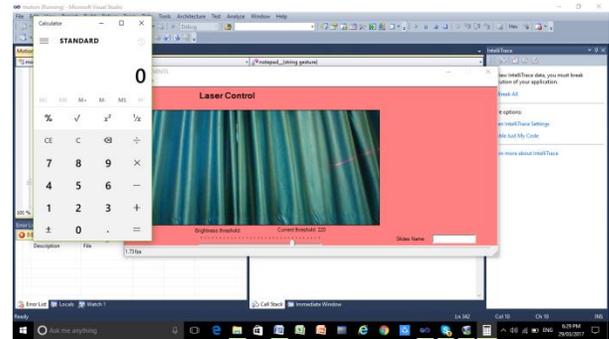


Fig. 8 By selecting application option, adjacent applications dedicated to a particular gesture can be opened

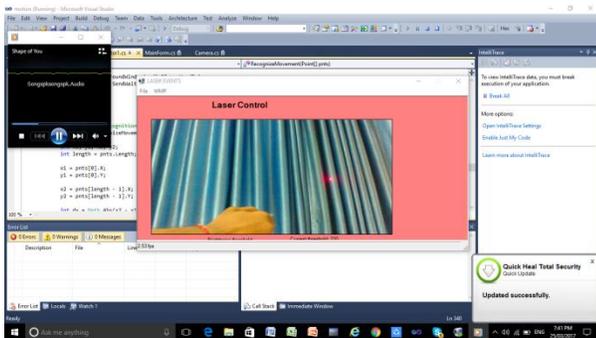


Fig. 6 Laser Gesture making the application play the music.

## 6.CONCLUSION

This application uses webcam to monitor the segmentation area, detects if any laser light comes to any segment and then does the equivalent of pressing a specified keyboard key. Here to interact, we use a webcam detects when a laser pointer is in a specified hotspot and then does the equivalent of pressing a specified keyboard key. Thus we can control various applications installed in our system. The hotspots can be set by the user as well as the actions taken. We can make our wall as a remote control.

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