



Windows 8 Gesture Based Interactive Experiments

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Abstract: *This project presents an approach to develop a real-time hand gesture recognition based in “Vision Based” that uses only a webcam and Computer Vision technology, such as image processing that can recognize several gestures for use in computer interface interaction. The applications of real time hand gesture recognition in the real world are numerous, due to the fact that it can be used almost anywhere where we interact with computers. An important application of this project is to simulate the mouse as a visual inputting device with all of its tasks such as left click, right click, double-click, dragging and dropping, and scrolling. Other applications that are applied in our project voice recognition for disabled people by using sphinx framework.*

INTRODUCTION

We propose a simple yet novel approach for Human Computer Interaction (HCI) where, we control cursor movement using a real-time camera. Current methods involve changing mouse parts such as adding more buttons or changing the position of the tracking ball. Instead, our method is to use a camera and computer vision technology, such as image segmentation and gesture recognition, to control mouse tasks (left and right clicking, double-clicking, and scrolling) and we show how it can perform everything as current mouse devices can. The software will be developed in JAVA language. Recognition and pose estimation in this system are user independent and robust as we will be using color tapes on our finger to perform action.

I. LITERATURE REVIEW

This method uses gesture based interactive experiment using finger movements to stimulate mouse operations. As compared with the traditional segmentation method this method has two benefits one is that it uses colored tape and another is that it requires no special object model with relative high performance. These two benefits make the system applicable to the augmented reality systems or other real-time systems. We propose a simple yet novel approach for Human Computer Interaction (HCI) where, we control cursor movement using a real-time camera. The experimental result shows the accuracy, performance and robustness of this method. The performance of the system is shown to be similar to state-of-the-art hand geometry authentication techniques but without sacrificing the convenience of the user. In the field of virtual reality and interactive graphics, communication between human and computer becomes more and more important. Wei Du and Hua Li presented a real-time system in “Vision based gesture recognition system with single camera” for human-computer interaction through gesture recognition hand tracking. Stable detection can be achieved by extracting two kinds of features: statistic-based feature and contour-based feature. Unlike most of previous works, our system recognizes hand gesture with just one camera, thus avoids the problem of matching image features between different views. This system can serve as a natural and convenient user input device, replacing mouse and trackball.

II. PROPOSE SYSTEM

Purpose

In this project we will be moving the cursor of PC using fore finger with Yellow tape movement. There will be a web camera installed on the PC and it will be capturing your image continuously. Image will be pixel wise scanned for YELLOW and RED tapes. In experiment we can change the color to any other distinct color tape. Once the color is extracted, we will check the position of yellow pixel in that image and accordingly simulate mouse on screen. If a person keeps his finger at the same position for more than 7 seconds, it will be considered as one of the mouse event (Click,Lclick,rClick) If the person moves the thumb towards fore finger- it will be considered as one of the mouse event.

Mathematical Model

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling.

Mathematical model consist of three parts:

1. Mapping
 2. State Diagram
 3. Set theory
- A. Mapping

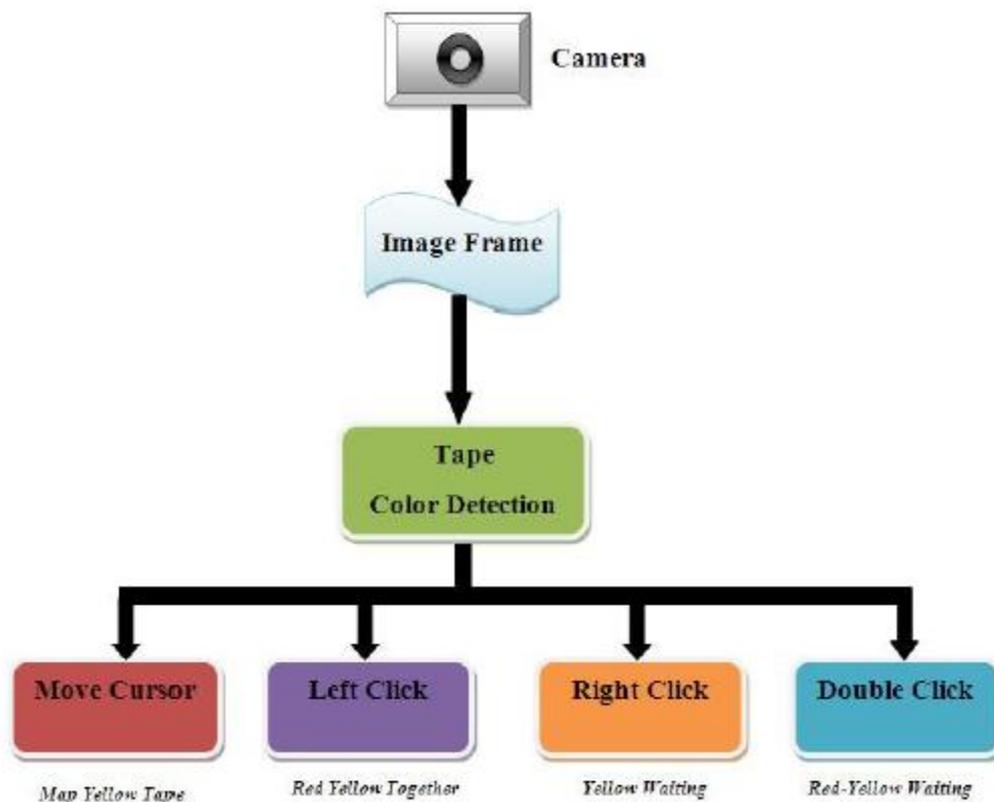


Fig. 1 System architecture

A mapping cardinality is a data constraint that specifies how many entities an entity can be related to in a relationship set. Mapping Cardinalities are useful in describing the binary relationship sets. For a binary relationship between two entity sets X and Y we have the following mapping cardinalities.

Types of mapping are:

1. One-to-one
2. one-to-Many
3. Many-One
4. Many-to-Many

In our project there 'N' number of users and system. Therefore our mapping is many to many. The users are represented as {U1,U2,U3.....Un }. And our system represented as {S1,S2,S3...Sn}.

User set: {U1,U2,U3.....Un}

System set: {S1,S2,S3...Sn}.

Relationship: Many to Many

III FEASIBILITY STUDY

Feasibility studies aim to objectively and rationally uncover the strengths and weaknesses of the existing business or proposed venture, opportunities and threats as presented by the environment, the resources required to carry through, and ultimately the prospects for success. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well-designed feasibility study should provide a historical background of the business or project, description of the product or service .Feasibility study is conducted after finding out the system's objectives. A feasibility study evaluates the project's potential for success; therefore, the perceived objectivity is an important factor in the credibility to be placed on the study by potential investors and lending institutions. It must therefore be conducted with an objective, unbiased approach to provide information upon which decisions can be based.

III. SYSTEM FEATURES

A. Functional Requirements

- 2.4 GHZ, 80 GB HDD for installation .
- 512 MB memory.
- Users can use any PC based browser clients with IE 5.5 upward.
- 30 FPS Webcam.

B. Non-functional Requirements

- Secure access of confidential data(user's details).
- Better component design to get better performance at peak time.
- Flexible service based architecture will be highly desirable for future extension.
- Ease of Use-flexibility, performance.
- High scalability.

IV. FUTURE SCOPE

Two-handed 3D: It would be possible to detect the gestures by both hands whilst both are in the frame in 3d (using more than one camera). A method would have to be devised to detect a gesture (or range of gestures) that is represented by a partially occluded hand. This method would be considered hard to implement because we need to process more than one frame at a time – from more than one camera- to recognize the gestures. We may use these gestures to apply them on the full American Sign Language.

This project has a vast arena of development, notably the Sixth Sense project of Pranav Mistry which completely revolutionizes the digital world. The code can be extended to incorporate mouse movements as well as still gestures. Further tweaks can be incorporated in the code to increase the efficiency of the gesture recognition process. The code can be improved for better interpretation and recognition of the gestures and newer gestures maybe incorporated for more functionality. The user interface for adding and checking gestures as well as running the program can be improved greatly.

V. CONCLUSION

In today's digitized world, processing speeds have increased dramatically, with computers being advanced to the levels where they can assist humans in complex tasks. Yet, input technologies seem to cause a major bottleneck in performing some of the tasks, under-utilizing the available resources and restricting the expressiveness of application use. Hand Gesture recognition comes to rescue here. Computer Vision methods for hand gesture interfaces must surpass current performance in terms of robustness and speed to achieve interactivity and usability. The goal of this project was to create a system to recognize a set of gestures oh one hand or both hands at real time, and apply the gestures in order to generate the appropriate events for our applications.

ACKNOWLEDGMENTS

We are greatly indebted to our college Padmabhooshan Vasantdada Patil Institute Of Technology that has provided a healthy environment to drive us to do this project and thankful to our management for their guidance.

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