

Hand Gesture Recognition Using Virtual Canvas

Mr. Ram M. Deshmukh
2nd sem M.E. Computer Science & Engg.
PRMIT&R, Badnera

Prof. P. D. Lohiya
Asst. Professor, Computer Science & Engg.
PRMIT&R, Badnera

Prof. F. M. Shelke
Asst. Professor, Computer Science & Engineering
PRPCE&M, Amravati

Abstract— Computer vision based hand tracking can be used to interact with computers in a new innovative way. The input components of a normal computer system include keyboard, mouse, joystick are avoided. Gesture recognition pertains to recognizing meaningful expressions of motion by a human, involving the hands, fingers, arms, head, and/or body. It is of utmost importance in designing an intelligent and efficient human-computer interface. The applications of gesture recognition are manifold, ranging from sign language through medical rehabilitation to virtual reality. In this paper, we provide a survey on gesture recognition with particular emphasis on hand gestures and facial expressions. Existing challenges and future research possibilities are also highlighted. Gestures are expressive, meaningful body motions involving physical movements of the fingers, hands, arms, head, face, or body with the intent of conveying meaningful information or interacting with the environment. A gesture may also be perceived by the environment as a compression technique for the information to be transmitted elsewhere and subsequently reconstructed by the receiver

I. INTRODUCTION

Our project is for recognizing the alphabets from the gesture given. The gestures are captured from the webcam and then recognizing the meaning of gesture.

Computer is used by many people either at their work or in their spare-time. Special input and output devices have been designed over the years with the purpose of easing the communication between computers and humans, the two most known are the keyboard and mouse. 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.

The idea is to make computers understand human language and develop a user friendly human computer interfaces (HCI). Making a computer understand speech, facial expressions and human gestures are some steps towards it. Gestures are the non-verbally exchanged information. A person can perform innumerable gestures at a time. Since human gestures are perceived through vision, it is a subject of great interest for computer vision researchers. The project aims to determine human gestures by creating an HCI.

Digital cameras are now integrated into personal computers, mobile cellular devices and handheld computers. These devices usually include a powerful microprocessor, capable of performing millions of computations per second. As microprocessor and digital camera technologies advance, it is now possible to use these resources in order to create new human computer interfaces that are based on recognition of users' gestures. Gesture recognition interfaces can be used as a natural communication channel between humans and machines and give rise to applications such as hardware-free remote controls, sign language interpretation and other human welfare applications.

In order to be applicable to current PCs and mobile devices, a gesture recognition system should be based on existing and common hardware such as low-resolution web

cams or mobile-integrated cameras. It is also desired that the system will be able to operate under non-uniform background, lighting and noise conditions. Another requirement for the gesture recognition system is to be computationally non-intensive in order to be suitable for real-time classification. Most common forms of gesture recognition involve Sign Language Interpretation. Sign Language Recognition implies conveying meaningful information through the use of hand gestures. Our focus is on American Sign Language (ASL). ASL is the language of choice for most deaf people.

II. BASIC CONCEPT

2.1 APPLICATIONS

A gesture recognition system could be used in any of the following areas:

- **Man-machine interface:** Using hand gestures to control the computer mouse and/or keyboard functions. An example of this can be controls various keyboard and mouse functions using gestures alone.
- **3D animation:** Rapid and simple conversion of hand movements into 3D computer space for the purposes of computer animation.
- **Visualization:** Just as objects can be visually examined by rotating them with the hand, so it would be advantageous if virtual 3D objects (displayed on the computer screen) could be manipulated by rotating the hand in space.
- **Computer games:** Using the hand to interact with computer games would be more natural for many applications.
- **Control of mechanical systems** (such as robotics): Using the hand to remotely control a manipulation.

2.2 Performance

- The hand gesture recognition system shall be able to provide continuous results of every gesture made by user.

This involves image processing and optimized scheduling algorithm.

- The hand gesture recognition system shall be able to provide the user with the information that contains in system.

2.3 Maintainability

- The hand gesture recognition system shall not need more than 3 hours of monthly maintenance.
- The hand gesture recognition system shall not need more than 7 days of annual maintenance (system maintenance different from weekly maintenance).

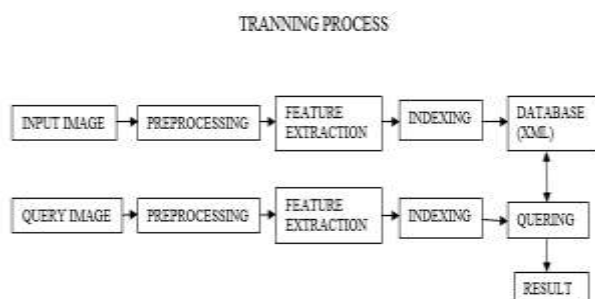
The idea is to make computers understand human language and develop a user friendly human computer interfaces (HCI). Making a computer understand speech, facial expressions and human gestures are some steps towards it. Gestures are the non-verbally exchanged information. A person can perform innumerable gestures at a time. Since human gestures are perceived through vision, it is a subject of great interest for computer vision researchers. The project aims to determine human gestures by creating an HCI.

2.4 Environmental

- The hand gesture recognition system shall not cause physical harm to users and non-users.
- The hand gesture recognition system shall not cause interference to external systems or any type of misbehavior.

2.5 System for project

Given an acquired image that contains a hand gesture, the hand gesture recognition algorithm performs two stages. The first is the preprocessing phase, where the hand shape and other distinguishable features are extracted from the image using noise reduction, filtering and several other image processing techniques. The second stage involves the classification of the features set to the appropriate gesture using the trained classifier that was computed in the setup stage. So, first step is acquiring an image using webcam and then apply pre-processing steps for extracting features.



IDENTIFICATION PROCESS

III Technologies Used

1. Microsoft Visual Studio

C# (MS Visual Studio 2010)

About Visual Studio

The Microsoft Visual Studio development system is a suite of development tools designed to aid software developers—

whether they are novices or seasoned professionals—face complex challenges and create innovative solutions. Every day, software developers break through tough problems to create software that makes a difference in the lives of others. Visual Studio's role is to improve the process of development to make the work of achieving those breakthroughs easier and more satisfying.

How Visual Studio improves the process of development:

Productive

Visual Studio-branded tools continually deliver better ways for software developers to do more with less energy wasted on repetition and drudgery. From efficient code editors, IntelliSense, Wizards, and multiple coding languages in one integrated development environment (IDE) to high-end application life-cycle management (ALM) products in Microsoft® Visual Studio® Team System. New versions of Visual Studio keep bringing innovative tools to help developers focus on solving problems, not waste time on minutiae.

Integrated

With Visual Studio, software developers benefit from an integrated product experience that spans tools, servers, and services. Visual Studio products work well together—not just with one another, but also with other Microsoft software, such as Microsoft server products and the Microsoft Office system.

IV CONCLUSION

This article gives a brief introduction to the Hand Gesture Recognition System. And combine it with real time systems. The article provides a new way to interact with machines. By implementation of the recognition system, we confirmed the feasibility of this approach.

V REFERENCES

- [1] Digital Image processing by Rafael C. Gonzalez, Richard E. Woods.
- [2] Hand Gesture Recognition Using Computer Vision By Ray Lockton ,Balliol College Oxford University
- [3] A Study on Hand Gesture Recognition Technique By SANJAY MEENA
- [4] John Canny. A computational approach to edge detection. Pattern Analysis and Machine Intelligence, IEEE Transactions on, PAMI-8(6):679–698, Nov. 1986.
- [5] Advanced Image Processing by Scott Smith(2011)