



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 5, May 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.165



9940 572 462



6381 907 438



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Gesture Recognition Based Mouse and Keyboard

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ABSTRACT: Now a days computer vision has reached its pinnacle, where a computer can identify its owner using a simple program of image processing. In this stage of development, people are using this vision in many aspects of day-to-day life, like Face Recognition, Color detection, Automatic car, etc. In this project, computer vision is used in creating an Optical mouse and keyboard using hand gestures. The camera of the computer will read the image of different gestures performed by a person's hand and according to the movement of the gestures the Mouse or the cursor of the computer will move, even perform right and left clicks using different gestures. Similarly, the keyboard functions may be used with some different gestures, like using one finger gesture for alphabet select and four-figure gesture to swipe left and right. It will act as a virtual mouse and keyboard with no wire or external devices. The only hardware aspect of the project is a web-cam and the coding is done on python using Anaconda platform. Here the Convex hull defects are first generated and then using the defect calculations an algorithm is generated and mapping the mouse and keyboard functions with the defects. Mapping a couple of them with the mouse and keyboard, the computer will understand the gesture shown by the user and act accordingly.

KEYWORDS: Haarcascade Algorithm, Pyautogui Module, Hand Detector, SQLite.

I. INTRODUCTION

A mouse, in computing terms is a pointing device that detects two-dimensional movements relative to a surface. This movement is converted into the movement of a pointer on a display that allows to control the Graphical User Interface (GUI) on a computer platform. There are a lot of different types of mouse that have already existed in the modern days technology, there's the mechanical mouse that determines the movements by a hard rubber ball that rolls around as the mouse is moved. Years later, the optical mouse was introduced that replace the hard rubber ball to a LED sensor to detects table top movement and then sends off the information to the computer for processing. The process used for this keyboard function is a bit different than the convex hull process, here the hand position system is used that is, the video that is capturing used the position of the hand is captured by the computer. In the open video window a miniature virtual keyboard is mapped.

II. LITERATURE SURVEY

A research paper is a document of a scientific article that contains relevant expertise, including substantive observations, and also references to a specific subject of philosophy and technique. Use-secondary references are reviewed in literature and no current or initial experimental work is published.

“Research on the Hand Gesture Recognition Based on Deep Learning”

Authors: Jing-Hao Sun, Ting-Ting Ji, Shu-Bin Zhang

with the rapid development of computer vision, the demand for interaction between human and machine is becoming more and more extensive. Since hand gestures are able to express enriched information, the hand gesture recognition is widely used in robot control, intelligent furniture and other aspects. The paper realizes the segmentation of hand gestures by establishing the skin color model and AdaBoost classifier based on haar according to the particularity of skin color for hand gestures, as well as the denaturation of hand gestures with one frame of video being cut for analysis. In this regard, the human hand is segmented from the complicated background, the real time hand gesture tracking is also realized by CamShift algorithm. Then, the area of hand gestures which has been detected in real time is recognized by convolutional neural network so as to realize the recognition of 10 common digits. Experiments show 98.3% accuracy.

“Dynamic and Personalized Keyboard for Eye Tracker Typing”

Authors: Kadir Akdeniz¹, Zehra Cataltepe^{1,2}.

Patients who suffer from Amyotrophic lateral sclerosis (ALS) or stroke cannot talk and express their everyday basic needs and requests. They can communicate using eye trackers since they can still use their eyes and sometimes move their heads. This study suggests new methods for improvements in both speed and ease of use for eye tracker softwares. The first one is letter prediction to improve the speed, and second one is a new design that obviates the need of blinking with eye trackers, thus providing more comfortable and longer sessions of writing.

” Algorithm for decoding visual gestures for an assistive virtual keyboard”

Authors: Rafael Augusto Da Silva, Member, IEEE, and Antonio Claudio Paschoarelli Veiga, Member, IEEE.

Text production is one of the most frequent activities on a computer, a trivial task that can be limiting for individuals affected by severe neuromotor disorders such as Amyotrophic Lateral Sclerosis (ALS) that can lead to Locked-in syndrome (LIS). These individuals need augmentative and alternative communication tools, since they may have only the eye movements as a form of communication and interaction with the outside world. This work investigates methods of interaction based on eye movement tracking and presents a virtual keyboard that utilizes gaze detection as a text input. It describes the development of the shape detection algorithm for the assistive keyboard, typed word voting from a Brazilian Portuguese lexicon and preliminary results on the decoding algorithm

III. SYSTEM DESIGN

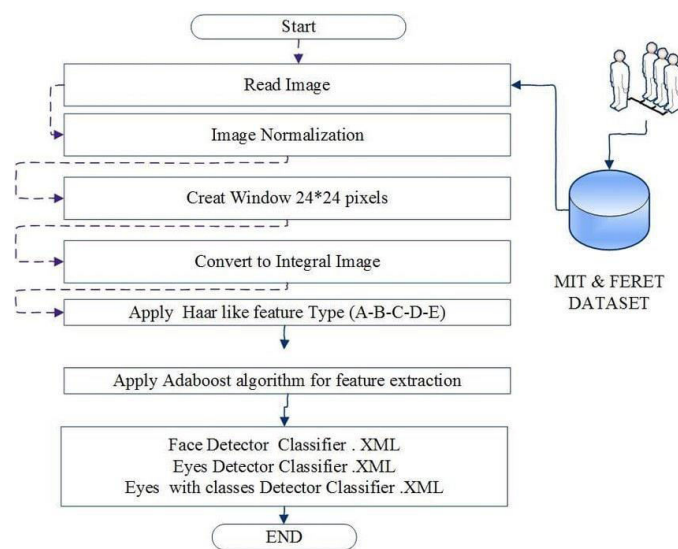


Fig 1: System Architecture

A system architecture is the conceptual model that defines the structure, behaviour, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system

IV. PROPOSED SYSTEM

The Mouse uses a convex hull process for its working, defects are captured or read, using this defect the functions of the mouse are mapped. The process of this image recognition process solely focuses on defects and conditional statements, the convex hull takes the gap of the fingers as defects, so it can be used for multiple gestures and mapping commands. The process used for this keyboard function is a bit different than the convex hull process, here the hand position system is used that is, the video that is capturing used the position of the hand is captured by the computer. In the open video window, a miniature virtual keyboard is mapped. Using the hand position technique, the keyboard functions can be selected which have been mapped and using this process the keyboard function executed, a math function is used to judge the position of the hand and turn it into a matrix location which makes the position recognisable for the computer.



V. CONCLUSION

This project is proposing a system to recognize the hand gesture and replace the mouse and keyboard function. That includes the movement of the mouse cursor, the drag and click with the keyboard features like printing alphabets and other keyboard functions. The process of skin segmentation is utilized to separate the colour/image of hand with its background. Remove arm method, which effectively solves the situation of taking into the whole body into the camera. In general, the proposed algorithm can detect and recognize hand gesture so that it can operate mouse and keyboard features and also create a real world user interface. 3d printing, Architectural drawings and even doing medical operations from anywhere to everywhere. This project can be easily applied and its application can be very vast in medical science where computation is required but couldn't fully be implemented due to lack of human computer interaction.

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SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

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