TELEMATIQUE Volume 21 Issue 1, 2022
ISSN: 1856-4194 1929 - 1936

Finge Recognition using Python

Dr P.RajiPandurangan[1], Vadlamudi Sai GuruKrishna[2], Golla Vinay Kumar[3], Theetla Raj Varun Kumar[4]

[1,2,3,4]Electronics And Communication Engineering department. Saveetha Engineering College

Received 10/07/2022; **Accepted** 06/08/2022

Abstract:
In this situation an easy set of rules for calculating fingerprints in real-time regarding one or more hands. Fingerprint counting is an easy Human-pc Interface method that could appear to be a clean way to put in interactive menus, small apps and interactive video games. This undertaking helps to calculate handwriting that may be used to provide directional enter and/or pace manipulate robotic, mouse cursor or slide presentation. whilst utilized by one person, with both palms, you can start ten extraordinary commands with the palms similarly to the hand role. via the use of a totally simple algorithm you operate very primary 2d coordinate geometry calculations and keep away from the commonplace use of calculus, concert events and convex hull. all of us who want a clean-to-use finger counting set of rules can refer to it.

Keywords: Human pc Interface CV, Hand sign, define, Convex-Hull, Convexity Defects**.**

1. INTRODUCTION

The hand gesture is not required not only for a stable transmission mode for computer interaction The keyboard, mouse, or touchscreen is part of a compound with a computer, but does not offer appropriate interfaces, but contains on the current system, and includes an interface for the desktop or laptop. You can create a gesture that is wearing a data glove or web chamber used to bind an image. The first step in this gesture recognition is grip and hand analysis. The sensor is used in the DataGlove method for initializing the movement and other sensors of fingers and programming the movement of the hand. The chamber compared to the 6-in-vision-based method requires the chamber
and the identification of the user and the actual interaction between the computer without using another device. calls in this system are constant background, sometimes people and lights. Here, we develop various procedures and algorithms used in this system, along with recognition methods. The method of finding connected regions of an image with specific specifications to which patterns and algorithms are tuned is known as segmentation, regardless of colour or intensity.

2. APPLICATIONS

A hand gesture recognition system, depending on its implementation, recognizes a shape and/or orientation, causing the system to perform some action. Gestures are a form of non-verbal information. A person can make multiple gestures at the same time. This is of great interest to computer vision researchers who, for example, perform actions based on human gestures, because humans recognize human gestures through sight, and in the case of computers, a camera is required. But. Virtual Presence: Occasionally, in situations such as machines, power outages, enemy emergencies, or some remote areas inaccessible to humans,

human operators may physically manipulate machines or work conditions can be very hazardous. B. Bomb Disposal:
Demining People are safer when they are replaced with manipulators that operate on the same principle as this system. This reduces risk to human life and encourages effective government.

3. TECHNOLOGIES USED

CV2 Open Source Computer Vision (OpenCV) is a highly adaptable software application library for modern computers. Originally developed by Intel, then maintained by the Willow Garage and then maintained by Issues (and later developed by Intel). OpenCV also supports detailed information frames.
NUMPY
This is a Python extension module, not another planning language. It provides fast and efficient functions for identical items of homogeneous data. Includes Python as an extension language for mathematical performance data such as MATLAB.
COLORS
MATLAB makes it easier to save and edit MATLAB files using packages. It helps to create a geographic name for a specific set of files it contains. A package is a special file that can contain class folders, files, tasks, class description files, and other symbols.

4. IMPLEMENTATION

A)HAND CAPTURE: A standard camera image usually includes colour pixels in RGB layout, where each pixel has integrity between '0' & '255' for each of the red, blue and green values. This data is stored in a matrix arrangement, where each component of the matrix exemplifies a pixel or picture element. Manual extracts are done by reducing the background. Assume that the first overhang includes only a static background. Here the changes are checked against the first background frame after subsequent frames. I use a 5x5 Gaussian blur for the background to remove some noise and show abrupt changes. Develops a binary image in the form of a black and white image from the hand that appears in the background. Hands are shown in white on a black background. Utilizing a 3x3 of linear blur and threshold image to assure that at a limited '7' of those '9' pixels are white images so that the central pixel is considered white. This is a reliable way to ensure that there are no noise spots unless the image is significantly implicated by noise due to considerable camera movement in the background. It also has a better view of the valley, so it's easier to find.

The left binary images are noisy images. The right binary images after application of noise reduction.

B)Centroid & Orientation:
Direction-finding is an important element of algorithms because it helps to correct the algorithm even if the hand is slightly tilted or bent rather than completely vertical. A very easy and main approach was used to determine the direction of the hand**.**

C) Calculating centroid
Finding the centroid of the white pixel by spatially averaging it along with the x and y directions by assigning each pixel the same unit weight.
Centroid(x, y) = ∑ x*i/ n, ∑ y*j/ n.
Where xj and Yi exemplify the x and y coordinates of the pixel in row I and column j. The total number of pixels is exemplified by n.

D) Finding orientation
Use lines that give you an idea of the direction of the hand. When an open palm hand is presented to the camera with the finger-pointing vertically upwards, the line
vertical to the hand, in this case, the horizontal line is called the baseline. Hereinafter, a baseline is used to indicate a line vertical to the hand or part of the hand. To learn the baseline, we accept the centre of gravity of all points on the shortest horizontal line. Then expose the line connecting the centre of gravity found in the section to the centre of gravity of the hand.

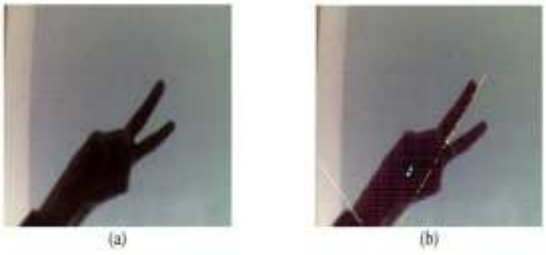


Figure 2. Images depicting orientation. (a) Camera image, (b) the processed image. White line representing the base line.

V. Block diagram

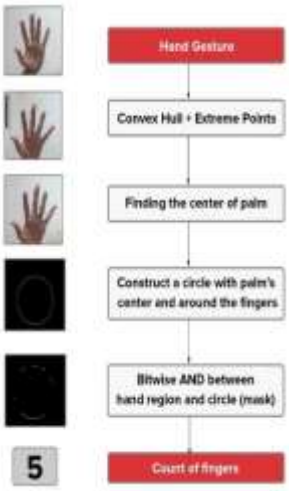


Fig. 2 – Working Diagram

5. HAND DETECTION

A) Going through split line

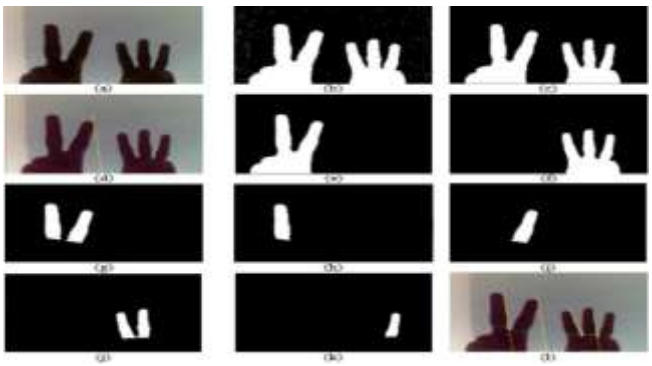
Given the actual valley points, there should be two non-overlapping white pixel matrices. Here

lines so that two non-intersecting matrices lie on these lines. We call this line the dividing line. This straight line goes through the valley point and there are no white pixels at the geometric position Start at a 180º angle and scan a line through the valley point to find such a line. Gradually decrease to 0º. Stop scanning as soon as it finds the dividing line. If the full scan does not find a dividing line, the goal point is discarded and the scan begins again to find a new goal point.

$ax + by + c = 0$ if,

$(ax_1 + by_1 + c / ax_2 + by_2 + c) > 0$

B) Recursion



Hand Detection

C) Fingers Finding:

As soon as we get an image that no more valleys, we must make sure that we have a finger regardless of what. First, reject any image that does not have a specific pixel threshold. This threshold number is calculated as a square value that can retrieve the valley point using the minimum number of pixels in the white zone. We find a white pixel that is lying on a line trajectory parallel to the baseline and passes the centre. Since the number of pixels is contiguous, it detects the number of white pixels that lie on the line perpendicular to the baseline and pass through the centre. The number of found pixels is H. I got that

H/W ratios greater than 1.3 gave poor results.

D) PERFORMANCE STUDY:

We examined people of different generation groups with different palm sizes. Although we did not find any age-related changes or inaccuracy in the age groups tested 14-52 years of age, differences in people's palm-size did work on the position of their hands on the camera. Herein we .tabulate category, we selected data from the five users with the largest differences in their readings. Users 1-6 are listed in the order of palm size. Due to the camera's automatic white balance, There was a lot of noise when posing with both hands. Therefore, users had to adjust their hand distance from the camera to minimize changes related to the white balance setting. Our code provided a visual response on the number of fingers recognised in each frame, allowing the user to easily adjust their hand for the best results.

6. APPLICATIONS IN TYPES

1. AUTOMOTIVE

The touch sensor explanation from Sony Depth-Sensing Solution has an aviation timer feature it calculates the time it takes for the action to proceed from the infrared sensor to the matter and rear. AI is educated to define large touches from touch noise and to perform under any light circumstances.

2. HEALTH CARE

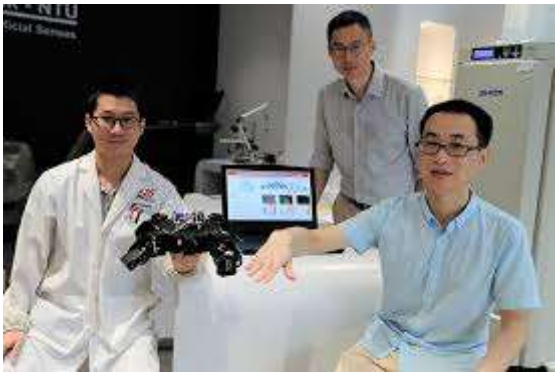
Emergency rooms and operating rooms can be unsettled by the noise of staff and equipment. In these cases, voice orders are less effective than body language. A touch screen is also an alternative, as there is a clear line between clean and non-clean. Still, as Microsoft has proven, HGR technology allows access to messages and photos during surgery or other manipulations. This gesture allows doctors to scan MRI, CT and other images with a simple, frictionless touch.

3. VIRTUAL

Leap Motion, acquired by Ultrahaptics, has released updated HGR software that allows users to track VR touch in addition to PC control. The Leap Motion controller is a USB device that uses 2 IR cameras and 3 infrared LEDs to view up to 1000cm. These controllers are used in medical, automotive and other inventions.

4. ELECTRONICS

From 2018 to 2022, the global touch recognition market is expected to grow to 162.42 crores in size, and companies are struggling to acquire the opportunity. The first Italian Linux uses a mixture of IoT and touches recognition to record sign language, clarify it into words, and then play it back on a smartphone using a speech synthesizer

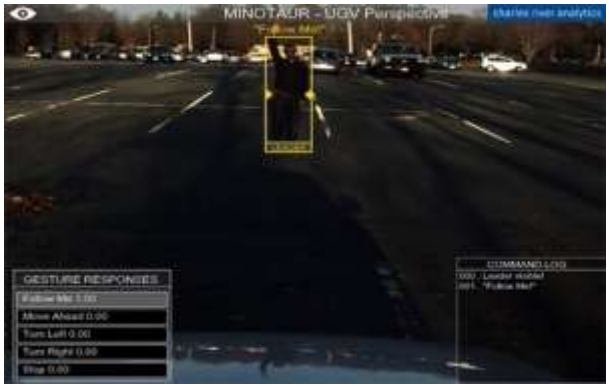


5. MILITARY PURPOSE

For military purposes, this will be useful in many ways. one way if any code the military people want to send they can send the message with hand gestures and configurations without knowing to other persons the matter that can be conveyed.

The process is that our hand gesture can be captured through the camera which captures our hand gesture by that we send messages from long distances.

Example: From the border to the military base.



7. CONCLUSION

Based on your observations, you can conclude that the results should follow For accurate analysis of gesture recognition the background of the picture must be solid.

1. The extra random control of minutes is useful to ensure that the layout image and the person image look the same

2. To maintain performance, you should have a small template image in your database. Implement the algorithm to observe the output:

8. REFERENCE

[1]. Bretzner, L., Laptev, I. and Lindeberg, T. (2002). Hand gesture recognition using multi-scale colour characteristics, hierarchical models, and particle filtering. Presentation of the 5th IEEE International Conference on Automatic Face Gesture Recognition.
[2]. Li L. and Zhang L. (2012). Angle hand gesture detection. TELKOMNIKA Indonesian Journal of Electrical Engineering, 10(8), 2088-2094.
[3]. Murthy G. and Jadon R. (2009). Vision-based hand gesture recognition overview. International Journal of Information Technology and Knowledge Management, 2(2), 405410.
[4]. Parvini, F., & Shahabi, K. (2007). An algorithmic approach to recognising static and dynamic gestures using mechanical and biomechanical properties. International Journal of Research and Applications of Bioinformatics, 3(1), 423.
[5]. Sturman, D. J. and Seltzer, D. (1994). Glove input overview. IEEE computer graphics and applications.
[6]. Vieriu R.L., Gorash B. and Gorash L. (2011). Static hand gesture recognition HMM. Paper presented at the ISSCS 2011 International Symposium on Signals, Circuits and Systems.
[7]. Van R.Yu. and Popovich J. (2009). Real-time hand tracking with coloured gloves. ACM trading (TOG) on the chart,