(REVIEW ARTICLE)

Controlling media player using hand gestures with VLC media player

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Abstract

In today's international, anyone opts for instant interaction with complicated structures that ensure a brief response. Thus, with increasing improvement in technology, reaction time and ease of operations are the issues. Here is where human-computer interaction comes into play. This interplay is unrestricted and challenges the used gadgets consisting of the keyboard and mouse for input. Gesture recognition has been gaining tons of attention. Gestures are instinctive and are often utilized in everyday interactions. Therefore, communicating using gestures with computer systems creates an entire new trend of interaction. In this assignment, with the help of laptop vision and deep studying techniques, person hand movements (gestures) are used in real-time to manipulate the media player. In this project, seven gestures are defined to control the media gamers' usage of hand gestures. The proposed internet application permits the person to use their neighborhood device digicam to become aware of their gesture and execute the control over the media participant and comparable packages (with no extra hardware). It will increase performance and make interaction convenient through letting the user manage his/her pc/laptop from a distance.

Keywords: Computer Vision; Deep Learning; Hand Gestures Recognition; Media Player Control

1. Introduction

The sophistication is what has caused the development of Technologies. Everyone relies upon to carry out most of their responsibilities the usage of computer systems. The main input devices are the keyboard and mouse. But there are enormous forms of health problems that affect many human beings, due to the consistent and non-stop artwork with the pc. Direct use of fingers as an input device is an appealing approach for Human-Computer Interaction Since hand gestures are an absolutely natural form of communication so it does not adversely have an effect on the health of the operator as in the case of excessive use of the keyboard and mouse. The User interface has a very good understanding of human hand gestures. By using the gesture, Feelings and thoughts also can be expressed.

Users typically use hand gestures to specific their feelings and notifications in their thoughts. Hand gestures and hand posture are associated with the human palms in hand gesture reputation. In this paper, we're going to present software that makes use of dynamic hand gestures as input to govern the home windows media participant. We have considered unmarried-handed gestures and their directional motion defines a gesture for the software. In this utility, photograph acquisition is finished with the usage of a Webcam. Some functions in home windows media game enthusiasts are used more regularly and as a result, making use of controls windows media participant for those functions the usage of predefined gestures.

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1.1. Related works

1.1.1. A Dynamic hand gesture recognition system for controlling VLC media player

Manuj Paliwal, Gaurav Sharma (2020, IEEE)

A low-value device that makes use of dynamic hand gesture reputation method to govern the VLC media player. This software contains a crucial computation module that segments the foreground a part of the frame, the use of pores and skin detection, and the approximate median method. The popularity of gestures is done by growing a Decision Tree that uses various capabilities extracted from the segmented component. This hand gesture popularity approach introduces a new, herbal way to interact with computers. With the increase in the interaction of computer systems in our everyday existence, it'd be worth enough to get a Perceptual User Interface (PUI) [1, 2] to interact with computers as humans interact with each other. Vision-based gesture popularity is an important generation for the friendly human-pc interface and has received more and more attention in current years.

1.1.2. Implementation of media player simulator using Kinect sensors

Wen-Shyong Yu, Kuo-Yao Huang(2019, IEEE)

Implementation for media participant gadget by hand gestures using Kinect sensor. The hardware includes the Kinect for Windows with infra and coloration camera sensors to capture the depth and plane pictures, respectively, at the same time as the management software is written by using VC#. When users execute the managed software, the functions of the Media player machine can be managed without problems by using some easy hand gesture motions through the Kinect detection sensors to govern the rush-bottoms of the media player machine through a mouse or keyboard at the display. By capturing the hand waving speeds, the records to calculate the common hand movement speed are used to set up the velocity threshold because of the default in our system. In experiments, we examine the fingers' motion speeds sensing by using distinctive a while of users to reap the hand shifting average speeds and correct the brink velocity of the posture reputation on Kinect for the media player machine in Windows 7 running gadget.

1.1.3 Controlling Media Player with Hand Gestures using Convolutional Neural Network

Stella Nadar, Simran Nazareth, Kevin Paulson, NilambriNarkar(2021, IEEE)

Improvement in technology, response time, and ease of operations are the concerns. Here is where human-computer interaction comes into play. This interaction is unrestricted and challenges the used devices such as the keyboard and mouse for input. Gesture recognition has been gaining much attention. Gestures are instinctive and are frequently used in day-to-day interactions. Therefore, communicating using gestures with computers creates a whole new standard of interaction. In this project, with the help of computer vision and deep learning techniques, user hand movements (gestures) are used in real-time to control the media player. In this project, seven gestures are defined to control the media players using hand gestures. The proposed web application enables the user to use their local device camera to identify their gesture and execute the control over the media player and similar applications (without any additional hardware). It increases efficiency and makes interaction effortless by letting the user control his/her laptop/desktop from a distance.

1.1.4 Using Real-Time Gesture to Automotive Control

Shilpa Chaman, Jay Jani, Henson Fernandes, Rahila Dhuka, Dhanvin Mehta(2018, IEEE)

The system Real-Time Gesture to Automotive Control (G2AC) system is developed in this paper, using hand gesture recognition to handle the media player in automotive. The system presents fast gesture recognition with low complexity algorithms for controlling real-time media in automotive systems. In the proposed vision-based system two modules are interconnected: one module recognizes the hand gesture in the region of interaction and another module does the task of selecting music from the media player using Raspberry pi. The proposed G2AC system can recognize real-time hand gestures with 98 percent accuracy which is demonstrated using a hand gesture dataset collected under different settings of illumination variation, hand orientation, and occlusion.

1.1.5 Human-computer interface using hand gesture recognition based on neural network

H. Jalab, H. K. Omer(2015, IEEE)

Gestures are one of the most vivid and dramatic ways of communication between humans and computers. Hence,

there has been a growing interest in creating easy-to-use interfaces by directly utilizing the natural communication and management skills of humans. This paper presents a hand gesture interface for controlling a media player using a neural network. The proposed algorithm recognizes a set of four specific hand gestures, namely: Play, Stop, Forward, and Reverse. Our algorithm is based on four phases, Image acquisition, Hand segmentation, Features extraction, and Classification. A-frame from the webcam camera is captured, and then skin detection is used to segment skin regions from background pixels. A new image is created containing the hand boundary. Hand shape features extraction is used to describe the hand gesture. An artificial neural network has also been utilized as a gesture classifier. 120 gesture images have been used for training. The obtained average classification rate is 95%. The proposed algorithm develops an alternative input device to control the media player, and also offers different gesture commands, which can be useful in real-time applications. Comparisons with other hand gesture recognition systems have revealed that our system shows better performance in terms of accuracy.The automatic vision-based recognition of hand gestures for sign language and control of electronic devices, like digital TV, and play stations was considered a hot research topic recently. But the general problems of these works rise due to many issues, such as the complex backgrounds, the skin color and the nature of static and dynamic hand gestures

1.1.6 System application control based on Hand gesture using Deep learning

V Niranjani, R Keerthana, B Mohana Priya, K Nekalya, Anantha Krishnan Padmanabhan(2021, IEEE)

The Human-Computer Interaction progresses toward interfaces that seem to be natural and intuitive to use rather than the customary usage of keyboard and mouse. A hand gesture recognition system is one of the crucial techniques to build user-friendly interfaces, because of its diversified application and the potential of interacting with machines proficiently. Hand gestures including the movement of hands, fingers, or arms are considerable for interaction. The proof levels of the hand gesture are perceived from the level of static gesture to the dynamic gestures or intricate foundation through which the communication of human feeling with computers succeeds. The proposed solution is framed by the identification of hand gestures as it possesses the perk of being used effortlessly and does not require an intervening medium. The existing system for the application access is inflexible and arduous for people with blindness and hand deformity regarding the human-computer interaction. A deep convolutional neural network (DCNN) is put forward in this paper, to use hand gesture recognition and immediately classify them by preserving even the not-hand area without any detection or segmentation process. Hence the proposed objective is to use different hand gestures via an integrated webcam with the aid of deep learning concepts beneficial for the visually impaired and people with a hand disability.The two approaches are static hand gestures and dynamic hand gestures. The predetermined gesture is entirely recognized by the static hand gesture method. While on the contrary in the dynamic method of gesture recognition, the meaning of the gesture is unclogged via its movement. The static gesture is contrary to the dynamic gesture and is less practical, though it possesses the perk of being a method with fewer difficulties.

1.2. Proposed method

The design for the proposed device is to stumble on hand gestures and control the media participant without touching the keyboard. OpenCV is used to get admission to the video from a webcam. PyAutogui is used to configure the media player with the python code. This works properly with VLC media players and as a result, it's miles counseled to use VLC. Get the video the usage of the cv2 video capture feature. Then follow blur and try to put off the noise from the historical past; the usage of cv2 gaussian blur. Dilate and erode are used to filter out the history noise. It hit upon a variety of fingers with the usage of angle ninety. Pyautogui is used to combine gestures with the keyboard. Data acquisition: Done by using an in-constructed webcam at the computer. Segmentation: there are kinds of strategies used. Skin detection version for detection of hand place. Skin detection model for detection of hand region.- Approximate median technique for the subtraction of history.Recognition phase: choice tree turned into used as a class tool. Windows interplay: deliver the suitable command to the windows participant in keeping with the regarded gesture

1.2.1. Proposed Workflow

The system is divided into four modules. The overview of the system workflow emphasizes the gestures and their corresponding controls.
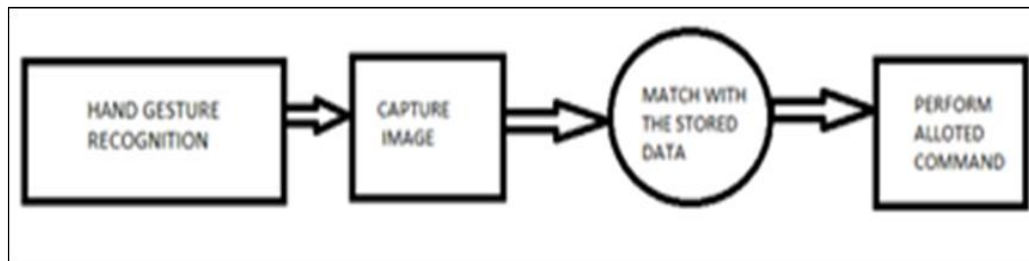
Figure 1 Modules

2. Hand gesture recognition

The Gesture popularity presents real-time records to a computer to make it satisfy the user's commands. Motion sensors in a tool can track and interpret gestures, using them as the primary supply of facts input. A majority of gesture recognition solutions function as an aggregate of 3D intensity-sensing cameras and infrared cameras together with system gaining knowledge of systems. Machine getting to know algorithms are trained primarily based on classified intensity snapshots of arms, allowing them to apprehend hand and finger positions. The device attempts to find patterns based totally on the amassed information. When the system reveals a match and interprets a gesture, it performs the activities related to this gesture. Feature extraction and class inside the scheme implement the recognition capability.

3. Capture image

Python provides various libraries for photo and video processing. One of them is OpenCV. OpenCV is a large library that offers diverse features for image and video operations. With OpenCV, we will capture a video from the camera. It helps you to create a video seize item that is useful to seize movies via a webcam and then you may carry out preferred operations on that video. Steps to seize a video: Use cv2.VideoCapture () to get a video capture item for the digital camera.

4. Match with the stored data

The machine identifies the wide variety of angles underneath ninety° from the gestures shown. The number of angles determines the actions to be done as a consequence. Hand gesture popularity is glaring to discover the hand vicinity by way of disposing of all the other undesirable quantities within the video collection. This may seem to be frightening before everything. It can be plenty simpler using Python and OpenCV.

5. Perform allotted command

Based on the number of angles it plays the corresponding movements ie. Play or pause or ahead or extent up or quantity down from the information which has been fed.

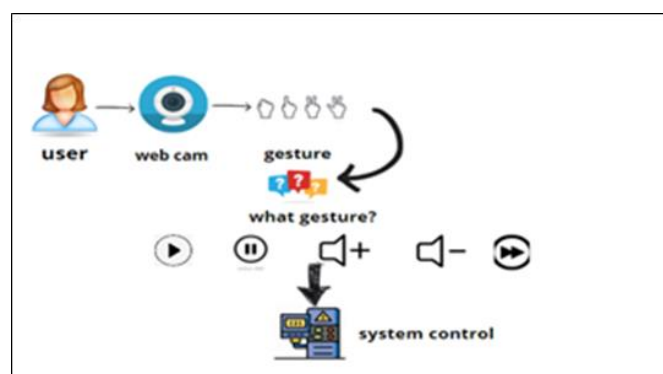### 5.1. System Architecture

Figure 2 Architecture

The gadget structure consists of the user offering gestures to the webcam which captures the gestures using OpenCV. It then classifies the gestures because of the variety of angles located. Specific quantities of angles carry out particular duties for that reason. Pyautogui is used to configure the media player with the python code. This mission aims to hit upon hand gestures and control media without touching the keyboard.

5.2. Outcomes

The model weights are loaded to predict the hand gestures. The PyAutoGUI that's used for Keyboard key integration with hand gestures and Streamlite that's used to create a person interface also are imported. The wide variety of presses is assigned as 1, so whenever a gesture is expected the included manipulate feature is finished as soon as. The consumer can go out the gadget with the aid of urgent the get away with the keyboard key. The video body will show the gesture expected and the motion being performed each time the consumer is the use of the machine to govern the media participant. The following conditional statements are used to perform the moves as shown in Table 1.

Table 1 Gestures and Their Respective Actions

Predicted Gestures	Actions
One	Volume Up
Two	Volume Down
Three	Play
Four	Pause
Five	Forward

5.3. Experimental results
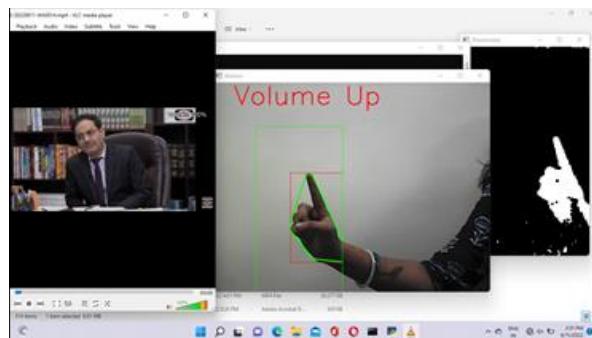

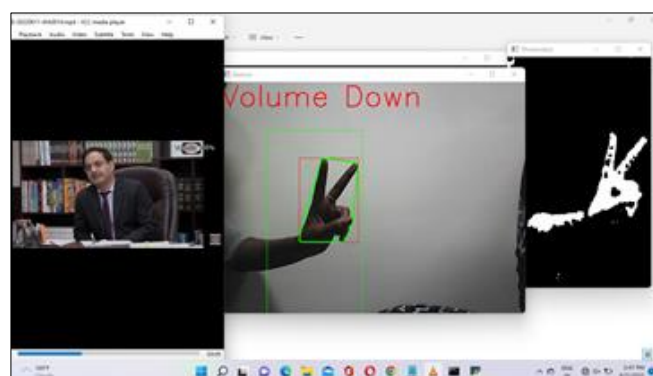**Figure 3** Volume up operation

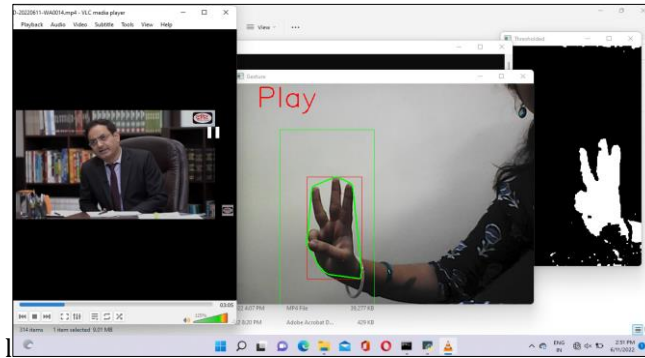**Figure 4** Volume down operation
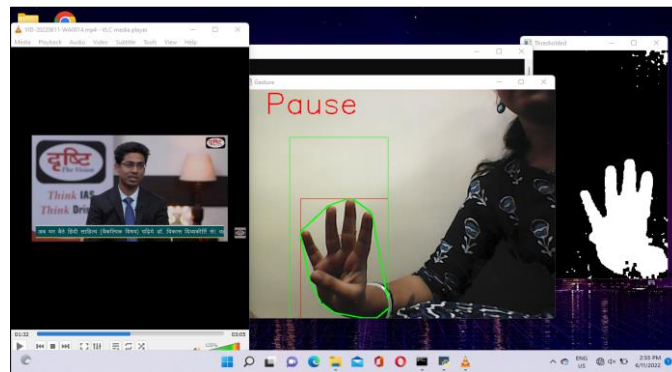
Figure 5 Play operation

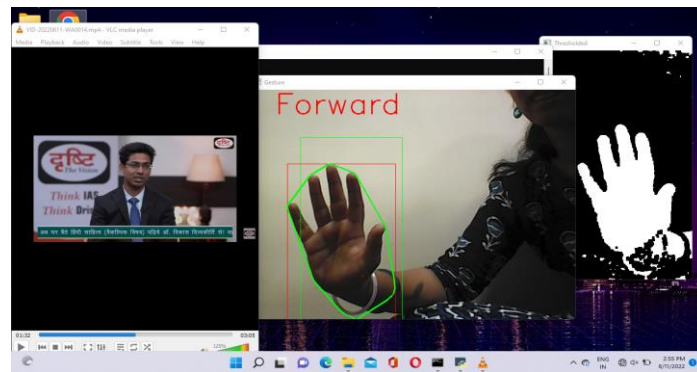**Figure 6** Pause operation

Figure 7 Forward operation

6. Conclusion

In the cutting-edge global many centers is available to provide input to any software with or without bodily touch (speech, hand gestures, and so forth.). The gesture would function as the direct command for operations consisting of play or pause the video based on the person's gestures onto the display. The user will offer a gesture as an entry in line with the interesting characteristic. The Hand Gesture recognition is moving at incredible velocity for the futuristic services and products and main businesses are developing technology-based at-hand gesture devices.

Future enhancement

The Hand Gesture reputation is transferring at amazing pace for the futuristic products and services and important groups are growing generation based totally on the hand gesture gadget and that includes agencies like Microsoft, Samsung, Sony and it includes the devices like Laptop, Hand held gadgets, Professional and LED lights. The verticals consist of where the Gesture technology is and will be obvious are Entertainment, Artificial Intelligence, Education and

Medical and Automation fields. And with a lot of Research and Development in the subject of Gesture Recognition Field, its use and adoption will become greater cost-powerful and inexpensive. It's a great characteristic of turning information into features with a blend of technology and Human wave.

Compliance with ethical standards

Acknowledgments

Disclosure of conflict of interest

All authors declare that they have no conflicts of interest.

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