HAND GESTURE INTERFACE FOR CONTROLLING VLC MEDIA PLAYER

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ABSTRACT

The project on the basics of Arduino and python language.in that the Arduino is separated operating system. The Arduino is used to is separated language its basic language is c, c++, etc. in that we use two ultrasonic sensors that detect the hand gestures. the sensors sense the object up to 40 to 50 cm. In that IOT based project our topic is smart screen. If we want to detect the long-distance object than we use different sensors.by using python code we can communicate with Arduino.

In Arduino we give some condition that can be used to detect the hand gestures like play, pause, volume up, volume down, forward backward apply on VLC Music player and web browser.

The advantages of this project that if we want to change slide or scroll up or scroll down than we want to use remote or any device that carry anywhere but by using this IOT based smart screen project we cannot carry remotes or any devices And by using this project our money is also reduces means if we want to use gesture control laptops or LCDs than their cost is very high that is not suitable for peoples.

Then after we use these sensors that code is inbuilt like python 3.8 is free ware means open source and Arduino is less costly. Because of this project any people can use this project in low cost.

Keywords: IOT, Hand Gesture, VLC Media Player, Python, Arduino Uno.

INTRODUCTION

In today's world, everyone is surrounded by machines and gadgets at all times. The use of mobile phones, tablets, computers and smart watches has increased manifold due to creative new technology and Internet use. The system that contains a combination of hardware and software for communication between the user and the computer or machine, makes up the human computer interface (HCI). Normally, switches, touch screens and control elements are used. An easier way of communication is through the touchless user interface, which could be through voice or gesture input. Since, voice input has already been applied extensively in every field, this project focuses on gesture input. Instead of using a mouse or keyboard, users can show hand gestures to perform operations or control certain functions of the computer. This could include playing a video, scrolling through a document or opening an application. This project aims to focus on the field of gesture recognition. Through this application, users will be able to control multimedia on the system using hand gestures. The input is taken through the ultrasonic sensors placed at the top of the monitor and connected to an Arduino Uno board. The hardware is connected to the system via USB port. The programming languages used are Arduino and Python. A common scenario where this application will be able to help users is in the kitchen, where users may not be able to touch device screens or press buttons with their hands while cooking. Another scenario is devices used at the beach or poolside, where users will have their hands too wet or sandy to type. Some of the other common applications are in automated homes, driving safety, television control and much more. With upcoming IoT (Internet of Things) devices, it is possible to switch off lights, control surround sound systems, access devices and change room temperature through the connected devices. Many of these devices use gesture recognition and voice input. Gesture recognition

is the process by which systems can see, recognize and respond to gestures shown by the user. This perceptual user interface provides a way for users to communicate with the system without the need for clicking. Gestures can come from any bodily motion or state. Usually, they come from the hand or face. Currently, there is a lot of focus on understanding emotions from the facial expressions and gesture recognition through hand movements. To interpret sign language, there are many approaches that have been made by using computer vision techniques. Gesture recognition can also be seen as a way for systems to understand human body language. This will help to build a better bridge between humans and machines, compared to GUIs (graphical user interfaces) or text user interfaces, which limit the input to mouse and keyboard. Using this concept of gesture recognition, it is possible to make conventional input to systems redundant, and bring newer technologies into the light to increase user productivity as well. The problem with traditional systems can arise in many ways. Firstly, for people with disabilities, it is not possible to click buttons or type for every operation. Secondly, if some part of your computer is not working properly, it is not possible to rely on the traditional use of mouse and keyboard for all inputs. Thirdly, even if people are able and have systems that are usable, nowadays, every part of life is being automated and simplified. Therefore, people prefer it if there is a way to sit back and relax without having to control the laptop through usual methods every time. Whether it is while watching a movie, or listening to songs, or reading a PDF, users prefer touchless engagement with the screen and control through intuitive, new and creative ways. Many such techniques require complex algorithms and lot of packages. But in this project, an attempt to create a simple, yet powerful tool is made. Traditionally, computer vision is used to handle gesture recognition. However, there are easier ways to do the same operations. Since Python is taking over the programming world from all aspects, it is the best way to start. Using the automation techniques available in Python, it is possible to perform system operations.

SYSTEM DESIGN

1. SYSTEM ARCHITECTURE

The process of designing the system architecture focuses on the break-down of a system into various components and their interactions, that satisfy functional and nonfunctional requirements. The inputs for software architecture design are the requirements and the hardware architecture. This project has no peripheral hardware devices, so the software components only interact with the system microphone and display.

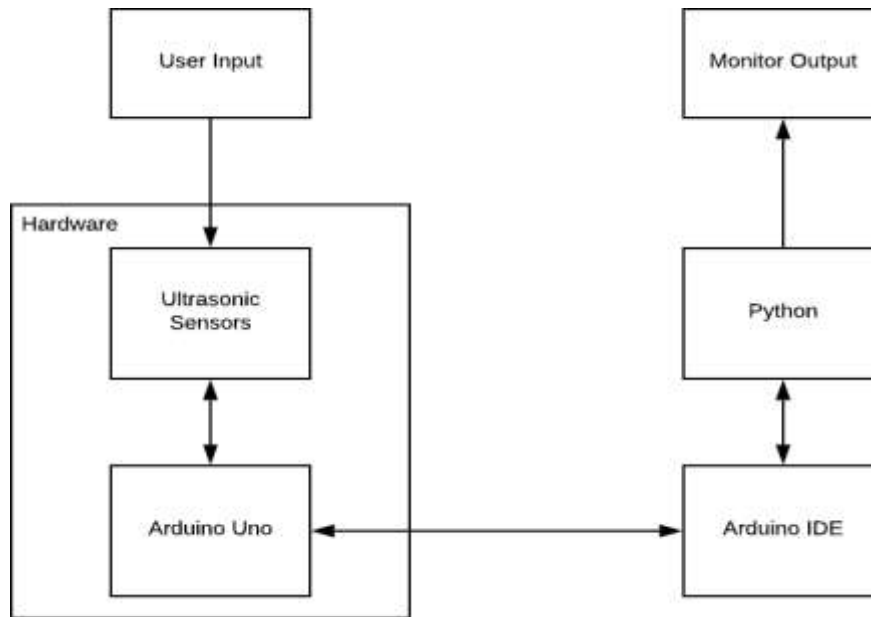The system architecture of this application is as follows:

Fig.4.1. System Architecture

2. *DATA FLOW DIAGRAM*

A data-flow diagram (DFD) is a way of representing a flow of a data of a process ora system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow, there are no decision rules and no loops [4] There are two popular notationsfor DFDs, Yourdon & Coad and Gane & Sarson. There are slight variations in the symbols used in these two types.

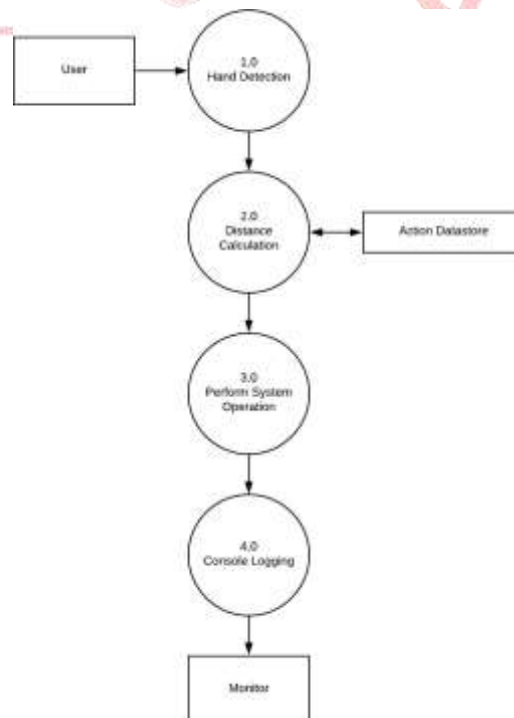The data flow diagram of this application is as follows:

Fig.4.2. Data Flow Diagram

3. SEQUENCE DIAGRAM

A sequence diagram (SSD) is a UML diagram that shows all the events that aregenerated by external agents in a sequential order along with the response of the system.

They are a way of summarizing visually what happens in a single use case. They containthe actors, system and messages sent between them.
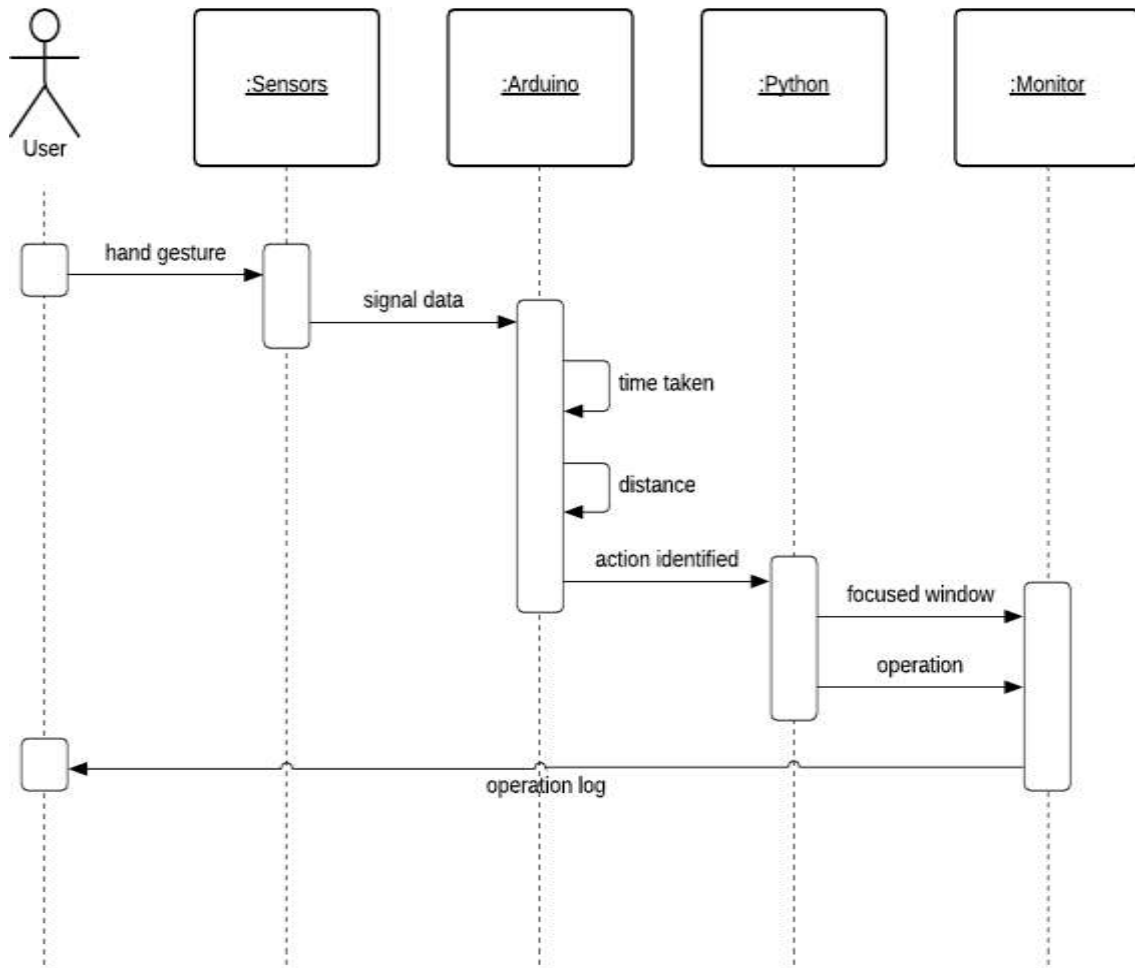
Fig.4.3. Sequence Diagram

4. USE CASE DIAGRAM

Use case diagrams are used generally to model the functionality of a system. A usecase is a system response to an event that an external agent (actor) triggers. The use casediagram shows the various actors, use cases and their interactions. The symbols used in the use case diagram are: stick figures to denote the actors, ovals to define the use cases, connecting lines to show the interaction and an automation boundary to encompass all the use cases

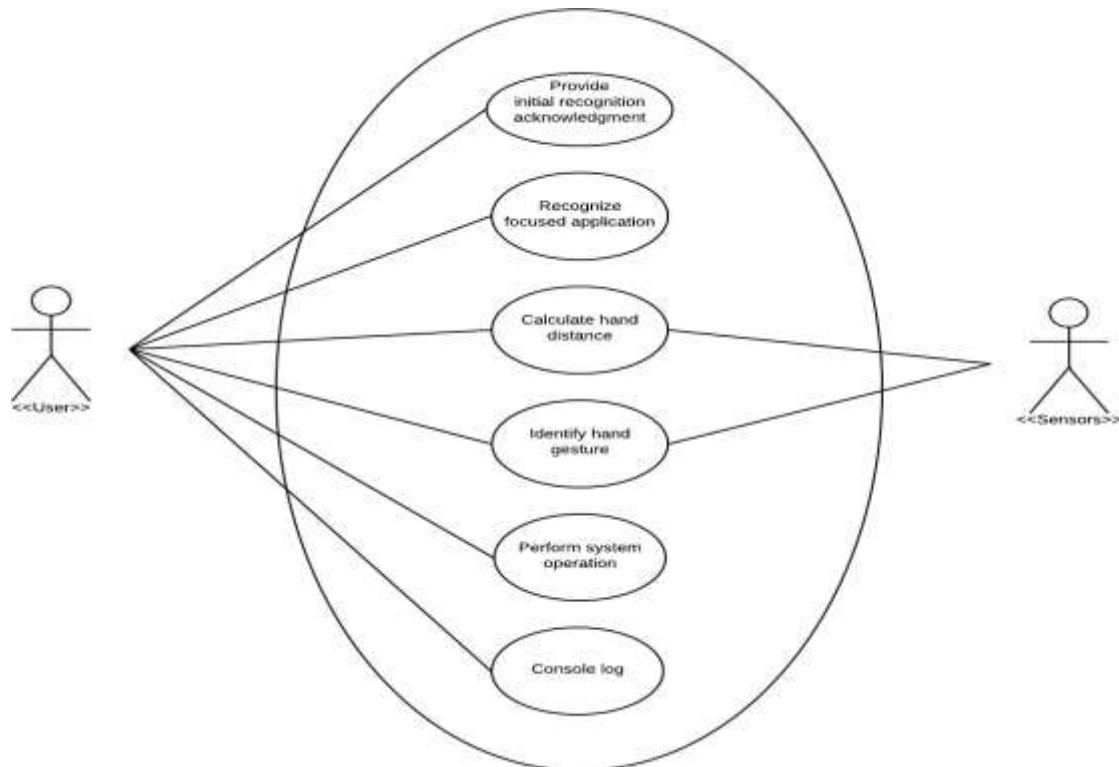A simple use case diagram of this application is given below:

Fig.4.4. Use Case Diagram

OTHER SPECIFICATION

1) ADVANTAGES OF GESTURE RECOGNITION

- Natural form of interaction
- Powerful and intuitive
- Helpful for people with disabilities
- Can work even if keyboard or mouse is unavailable or not working
- Convenient

2) DISADVANTAGES OF GESTURE RECOGNITION

- Fatigue
- Hard to achieve with 100% accuracy
- Not available in many devices
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LITERATURE REVIEW

Literature survey is a section of a project report that represents in detail all the research papers and journals that are consulted and analyzed in order to fulfill your project requirements. This portion takes all the parameters of the project into consideration and then, puts the project in the big picture, in relation to the context of the main domain. The concepts of gesture recognition are discussed in detail below.

- Controlling media player using hand gestures with VLC media player (2022)

In the cutting-edge global many centers is available to provide input to any software with or without bodily touch. 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.

- Face and Hand Gesture Recognition System for Controlling VLC Media Player (2021)

    A better way of controlling media player is implemented. Instead of using keyboard and mouse to control a media player, user controls media player by recognizing the gestures.

- Hand Gesture Recognition Based on Computer Vision (2020)

    Controlling things by hand is more natural, easier, more flexible and cheaper, and there is no need to fix problems caused by hardware devices, since none is required.

- Adaptive Hand Gesture Recognition System Using Machine Learning Approach (2020)

    From past years we analysed that dynamic hand gesture recognition has been proven a complex challenging issue, in so many areas and hence our research work is a bit ahead solution for these issue towards gaining the desired result in ongoing research field.

- Gesture and Voice Control of Internet of Things (2016)

    Han The work presented in this paper shows that effective and efficient gesture and voice control systems can be developed and applied to monitor and control IoT functioning in appropriate environments.

- Hand Gesture Recognition with Depth Images (2012)

    In this paper this survey summarizes the techniques that have been used for hand localization and gesture classification in the gesture recognition literature, but shows that very little variety has been seen in the real-world applications used to test these techniques

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

The presented approach proves that it is possible to use inexpensive ultrasonic range-finders for gesture recognition to control the video. This fact seems to be important because these sensors are easily available and no additional ultrasonic system is needed to be constructed.

Unfortunately, a set of gestures which can be recognize in this way is very limited. Nevertheless, they are useful for extension of communication channel between a human and a machine. In this context the obtained results are preliminary and show that recognition of some class of gestures is possible by using very simple range-finders.

Hand gesture laptop uses an Arduino Uno, Ultrasonic sensors and a laptop to carry out the operation of controlling media playback and volume. It is mainly aimed at reducing the effort of interaction with computers through input devices using simple gestures. It is also done to increase the interactivity with computers.

This type of technology can be used in classroom for easier and interactive learning, immersive gaming, interacting with virtual objects on screen. It will become more effective if merged with completely developed hologram technology. We will be able to interact with virtual 3D objects in the physical world in real time.

1. This project can be further implemented on platform like AVR, ARM microcontroller etc.

2. We can add many video controlling features just by modifying the python code.

3. We can integrate this type of module for many applications like browsers, designing and editing applications.

Hand gesture technique is not only limited to gaming, using basic function of computer it can be useful for medical applications . Hand gesture technique can work as input method between medical instruments and human body as proposed. It can be used for operating each and every functions of computer. In this project, I have implemented Arduino based Hand Gesture Control of Computer, where few hand gestures made in front of the computer will perform certain tasks in the computer without using mouse or keyboard. Such Gesture based Control of Computers is already present and a company called Leap Motion has been implementing such technology in computers. This type of hand gesture control of computers can be used for VR (Virtual Reality), AR (Augmented Reality), 3D Design, Reading Sign Language, etc.

This project can be extended for several applications that involves hotkeys operations and as well are responsive while execution. Also mouse control can also be achieved using US sensors that can show like less distance then move down or more distance then move up.

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