GESTURE CONTROLLED PICK AND PLACE ROBOT

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ABSTRACT

Robotic arms are being employed in a variety of applications, including military,defense, medical surgery, and pick and placefunctions in industrial automation. The robotic arm moves and does the task based on human hand gestures, and this systemmimics human hand activities. The arm is extremely adaptable and can be used in environments where humans are not safe,such as the fireworks production business orbomb disposal. The robotic arm can be controlled using a variety of methods. The purpose of this paper is to use accelerator-based gesture detection to control the movements of a robotic arm via wirelesscontrol utilising the zig bee protocol. Zigbee, Arduino, robotic arm, accelerometerare some of the terms used to describe this project.

Keyword *Arduino, robotic arm, accelerometer*

INTRODUCTION

Robotics has had a significant impact on ourcivilization in the modern period, and it nowhas a place in sectors such as engineering, medicine, and space science, among others.

Robots can be utilised in situations whenhuman life is at risk, such as bomb defusing and the fireworks industry. Any form of controller, such as microcontrollers, DSP controllers, Arduino controllers, and FPGA controllers, can control the robotic system [1]. When compared to microcontrollers andDSP controllers, the Arduino controller isone of the easiest ways to operate the systemand has more control ports. Arduino is a free and open-source electronics prototyping platform with adaptable hardware and software. The Arduino programminglanguage is used to programmed the board's microcontroller. The signals aretransmitted from one end to the other using wireless transmission. The most common wireless technology utilised is radio. Wireless communication involves the transfer of information between two or more sites that are not connected by an electrical connection. The wireless communicationmust be dependable and have a quickresponse time. Bluetooth, infrared, zigbee,and wifi technology are all options for wireless transmission. The Zigbee technology is employed because it offers a wide range of control and is inexpensive.

MOTIVATION

According to the 2011 Indian census, there are approximately 1.3 million people with "hearing impairment." In contrast, the National Association of the Deaf in Indiaestimates that 18 million persons – nearly 1% of India's population - are deaf. These figures provided the impetus for our endeavor. There is a need for a system since these speech impaired and deaf persons require an appropriate channel to communicate with regular people. Not everyone can understand the sign language of the disabled. As a result, our 5 project aims to transform sign language motions into text that can be read by ordinary people.

OBJECTIVES

Our goal is to make this device as simple and inexpensive as possible so that it may bemass-produced and used for a number ofapplications. The purpose of this project isto construct a car that can be operated by gestures without any difficulty. In thisproject, the user may control the car'sactions by wearing a controller glove and performing specific gestures. This might be used for a multitude of things, such as wireless controller car racing and so on.

LITERATURE SURVEY.

1. Rafiqulzaman Khan and Noor Adnan Ibraheem of the Department ofComputer Science, A.M.U. Aligarh, India, in the International Journal of Intelligence and Artificial Applications(IJAIA) in July 2012 proposed hand signal recognition: a survey of writing. They said the hand motion recognition framework had an amazing consideration in the couple of years because of their complex applications and the ability to interact with the machine effectively through human collaboration with the PC. They showed a review of the frames of recognition of last-minute movements. The key issues of the hand signal recognition framework are given the difficulties of the structure of the movement.

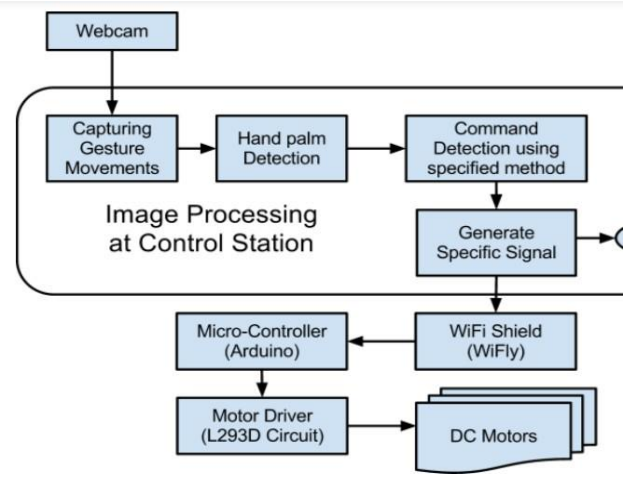
2. Wei Xansa, John Iachello, Steven Dow, yoichiroserita, TAZAMA St. Julian, Julien Fistre Faculty of Literature,Communication, Computer and Culture / GVU Center Georgia Institute of Technology proposed the continuous detection of gestures to control the audiovisual media. They represent how the detection of theincessant movement can be achieved by using low power remote sensing to improve the expressive control of the age constant of sound and visual supports

3. Rajesh Kannan mega lingam, saimanojprakhya, Nammily Ramesh Nair, Amrita Vishwa Mohan mithunvidya peetham, Amritapuri, Clappana, Kerala, Indian proposal for unconventional inland navigation: wheelchair control based on gestures. They say there are a lot of people on the planet with debilitating physical disabilities and the elderly facing criticalchallenges in executing particularly critical activities, such as speed, tospeak, to compose, etc. The most heavilyinfluenced physical test class is that of people who have proven incapable of a high level of their body, namely quadriplegic

line navigation (LFN) and location Aware and Remembering navigation (LARN). These strategies are basic and familiar with the financial situation of the place or of the internal itinerary.

4. Dr. R. V. Dharaskar S. A. Chhabria Sandeep Ganorkar proposed mechanical arm control using signals and voice inthe International Journal of Computers, Information Technology and Bioinformatics (IJCITB). They said that the human-robot voice interface plays a key role in many fields of application. Hand movement is an exceptionallynormal type of human communicationand can be used appropriately in the human PC connection (HCI). They propose a "Human Machine Int".5.N. Gopinath, j. Anuja, s. Anusha, v. Monisha, "a survey on hand gesture recognition using machine learning",international research journal of engineering and technology2020 Provides two-way communication which helps to interact between the impaired people to normal peoplewithout any difficulties Used cnn algorithm techniques for hand gesture recognition Nlp was used to feed the dataest results other than using the sensor for hand gesture recognition Steven Dow, yoichiroserita, TAZAMA St. Julien, Julien Fistre Faculty of Literature, Communication, Computer and Culture /GVU Center Georgia Institute of Technology proposed the continuousdetection of gestures to control theaudiovisual media. They represent how the detection of the incessant movement can be achieved by using low power remote sensing to improve the expressive control of the age constant of sound and visual supports
5. Banjul Anbu Malar M In this work, wehave created a rudimentary robotic chassis that can be readily operatedusing an accelerometer rather than abutton. The accelerometer is the mostimportant device here. The accelerometer is a three-axis estimation device with a range of +-3g. To quantify acceleration, this device is created with apolysilicon surface sensor and a signalregulating circuit. The accelerometer'soutput is analogue in nature andcorresponds to acceleration. When wetilt this device, it measures the staticacceleration of gravity. And it producesa movement or vibration as a result.

BLOCK DIAGRAM



this project, controlling of robotic arm is done via hand gesture through object recognition algorithm. The image of the hand is captured by web cam which is interfaced with the pc.

The image of the hand is appeared on thedisplay, so that the user may view and understand the image. The information from the pc sent to the wirelessly to the receiving unit of the node mcu. Here,wireless communication is done via tip- in, which is connected to both transmitting and receiving unit of the arduino Uno boards. The information that is received by the arduino node mcu is processed which is used to control the dc motor which is attached to the roboticarm. Signal acknowledgment is a theme in software engineering furthermore, language technology with the objective of interpreting human signals by means of numerical algorithms.Here,the motions can start from any movement of the body or normally start from the face or hand. A large portion of the signalacknowledgment is from face or handsignal. Clients can utilize the hand signalprocedure to associate with theframework or to control certain gadgets without actually contacting them. The vast majority of the hand signalprocedure utilizes camera and PC vision calculations to decipher sign language. Here, some recognizable proof and acknowledgment of stance, stride and proxemics, and surprisingly humanconduct are likewise subject of motion acknowledgment procedures. In our work we are utilizing hand signal acknowledgment method.

COMPONENT DETAILS

1.Arduino UNO (Uno)

1-Arduino is the first microcontroller. The Arduino board senses the world by accepting input from a variety of sensors and then controls lights, motors, and otheractuators to influence their surroundings.

The Arduino board is a microcontroller development platform that will be central When making something you will be building the circuits and interfaces for interaction, and telling the microcontrollerhow to interface with other component

Technical specifications

Microcontroller: Microchip ATmega328P.Operating **Voltage**: 5 Volts.

Input Voltage: 7 to 20 Volts.

Digital I/O Pins: 14 (of which 6 can providePWM **output**)
UART: 1.

I2C: 1.

SPPI: 1.

Analog **Input** Pins: 6.L293d:
Specification

Wide Supply-Voltage Range: 4.5 V to 36 V.

Separate Input-Logic Supply.

2.USB webcam

A USB webcam is a camera that connects toa computer, usually through plugging it in toa USB port on the machine. The video is fedto the computer where a software application lets you view the pictures and also transfer them to the Internet.

3. Motor Driver IC L293D

The 293D is a typical motor driver or motor driver IC that can drive a DC motor in eitherdirection. The L293D is a 16-pin IC that canoperate two DC motors in any direction at the same time. It means that a single L293D IC can operate two DC motors. Integrated circuit for dual H-bridge motor drivers (IC).The l293d can also operate small and quiet large motors; for additional information, see the Voltage Specification atthe bottom of this page. You can simplypurchase the L293D IC from any electrical store for roughly 70 Rupees (INR) or around $1 (approximate cost) or even less.

OPERATION OF ROBOTIC ARM

The system has two sides: one that sends data and the other that receives data. The data is wirelessly sent using the zigbee protocol. The system's general block diagram is shown below.

1. End of sending

We employ an accelerometer in the sending end to detect the 3-axis movement of therobotic arm (x, y, z). This accelerometer is attached to a sensor glove that will be worn by a person. Based on the movement of the human hand, this accelerometer produces three analogue values (x, y, and z). This accelerometer reading is sent to the Arduino Uno board's analogue input ports.

The sensor glove's fingers have slide potentiometers attached to them. They're also used as input to the Arduino board'sanalogue pins. The sliding potentiometer value varies as the fingers move, and thiscan be utilised to recognise finger actions. The Arduino b is equipped with a Zigbee module.

2. End of Receiving

The data is received at the receiving endusing a zigbee module connected to an Arduino Mega via a zigbee shield. The motors are then moved using the dataobtained from the zigbee with the help of an Arduino mega board. Servo motors are used in the actuation techniques. The PWMsignal for the servo motors is provided bythe Arduino Mega's PWM output ports. The PWM is determined by the values received from the associated zigbee module. Five 1kgmicro servo motors are used to actuate the robotic arm's fingers, and three 6kg servo motors are utilised to give the arm movement in all axes.

3. Design of Sensing Gloves

The slide potentiometer is mounted on a PCB and is powered by the Arduino board. Each slide potentiometer's variable pin is connected to the Arduino board's analogue inputs. The accelerometer is connected directly to the analogue pins of the Arduino.

Arduino boards supply 5V to both the accelerometer and the sliding potentiometer.The PCB with the slide potentiometer and the Arduino board are both coupled to the human-wearable glove [3].

4. Accelerometer

In tilt sensing applications, the accelerometer ADXL335 may measure the static acceleration of gravity as well as dynamic acceleration caused by motion, shock, or vibration. The accelerometer'sbandwidth is controlled by the capacitors on the XOUT, YOUT, and ZOUT pins. Micro machined sensor and signal conditioning circuitry to implement an openoutput signals are analog voltages that are

proportional to acceleration.

OTHER SPECIFICATIONS

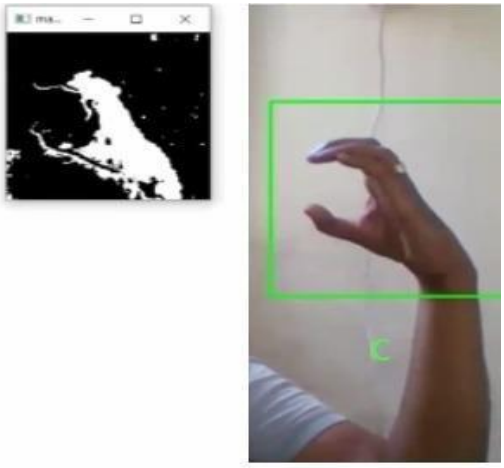
Advantages

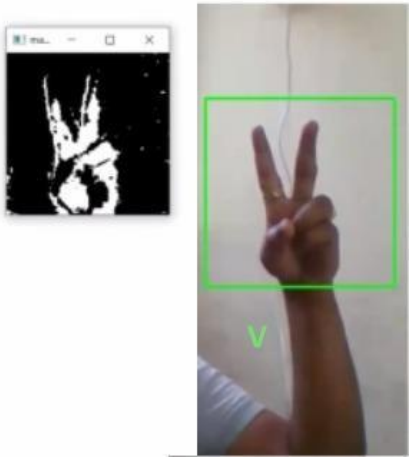
1. It saves time
2. Reduce human effort
3. Easy to operate
4. There is no need of experts

Applications

1. High cost
2. Complicated for multitasking robot

RESULT

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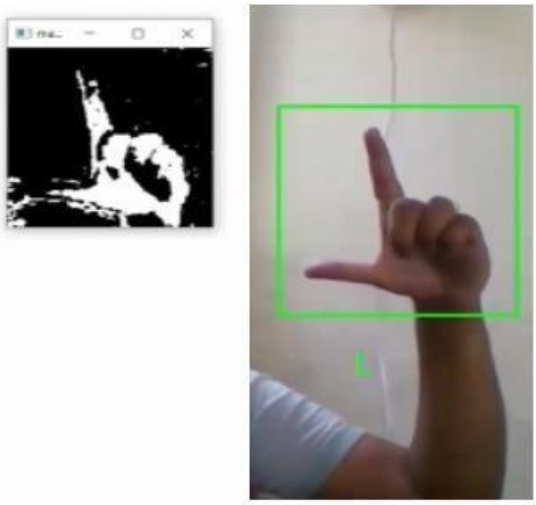
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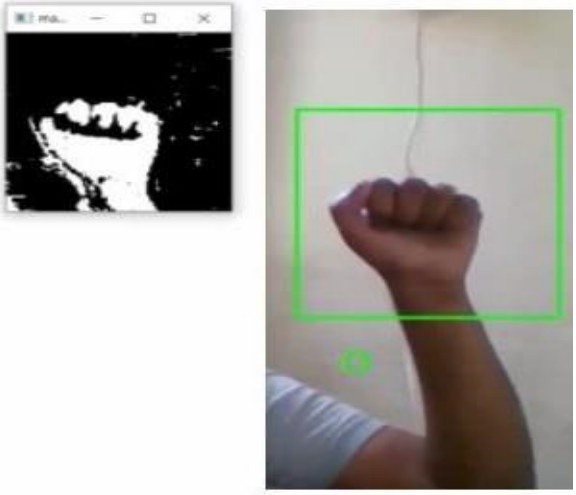

CONCLUSION

We have favored the framework which is helpful in numerous ways like in homegrown reason, modern reason and military reason to stay away from humandanger. The framework which we have proposed is very simple to utilize and easy to use approach to control the robot. Theframework isn't such a lot of cost influencing and is can be affecting to supplant other previous framework. The current framework gives the easy to understand power over robot.

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