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Gesture Based Vehicle Control Using Sixth Sense Technology

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Abstract:The manner in which person and robot interact has been developed using different techniques. Using gestures to control the robotic vehicle is main way to enhance interaction. The user does not need to have any physical contact with the device in this interactive technique. It helps bridge the interactive systems technological gap. The robotic vehicle is intended in this proceed by defining the users real-time motion instructions that are implement using image processing algorithms and integrated methods.

Keywords: Robotic Vehicle, Gesture, Image processing algorithm

1.INTRODUCTION

Human gesture intensity human-robot interaction by making it independent from input devices. Using gestures provides a more unpretentiously way of controlling and provides a rich and inborn form of interaction with the robot. The main purpose of gesture recognition research is to identify a particular human gesture and possible information to the user complexity to individual gesture , From the request of gestures, specific gesture of interest can be identified and on the basis of that, rapid command for execution of action can be given to robotic system.A prominent benefit is that it presents a natural way to send information to the robot such as forward, backward, left and right movements etc. In order to ease a transitivity for user friendly interface, user can give commands to a wireless robot using hand gestures. The early device was mainly for dead reckoning and controlling robot without any natural medium.This paper deals with interface of robots through gesture controller technique but far away from the user. This can be achieved through image processing technique.

2.Functional Flowchart

Inbuilt webcam of the system is used to capture the real time video of gestures. Colour markers are used to interpret the gesture movements. Figure.1 shows the basic flow of the system. To transmit the gesture commands wirelessly zigbee series2 module is used . Zigbee coordinator is connected to the serial port of the system through USB Explorer board. Zigbee router is mounted on the voltage regulator to regulate the voltage to 3.3V. In order to control the robotic vehicle ATMEL89c51 microcontroller is used.

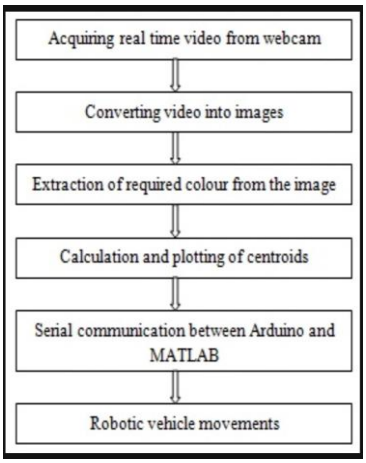

Fig1 .basic flow of system

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3. IMPLEMENTATION

A. Acquiring Image

The user gives the real-time video. At a specific frame rate, the video is divided into images. The obtained picture is transformed into a gray scale image to acquire the strength data.

B.RGB to Gray scale Conversion

The picture of RGB is transformed to a gray picture. It converts to the gray scale image the true colour RGB image. A digital gray scale image is an image in which a single sample is the value of each pixel, that is, it only carries information about intensity. Compared to a coloured image, gray image reduces computational complexity. After turning the picture to a gray scale, all the required activities conducted.

C. Extraction of Red Colour

The colour (yellow) is removed from the RGB picture by subtracting the picture. The colour object red, green and blue is detected by removing the suppressed RGB channel from the image of the gray scale. This produces a picture containing the item being identified as a grey area encircled by white room. To discover the characteristics of a monochromatic transformation to binary is needed.

D. Gray to Binary Scale Conversion

To find the region of the identified item, the grey region of the picture acquired after subtraction must be transformed to a binary image. A gray scale image is a matrix that contains each pixel's scores. Image thresholding is a straightforward yet efficient method to divide a picture into the foreground and context. Consequently, the resulting picture is a monochromatic image composed only of black and white colours. To find theproperties of a monochromatic image, conversion to binary is required.

E. Finding Centroid of an Object

It is necessary to determine a point whose coordinates can be sent to the cursor for the user to control the mouse pointer. The system can execute robotic movements with these coordinates. For the detected region, the centroid is calculated. The function output is a matrix that consists of the centroids X (horizontal) and Y (vertical) coordinates.

F. Serial Communication between MATLAB and Arduino

The number of centroids is transmitted via the system's COM port to the zigbee coordinator. In the wireless network, the zigbee router gets information from the assistant and transmits information to the arduino.

G.Controlling Robotic Vehicle

The arduino transmits command to robotic vehicle. Based on the commands appropriate movements like forward, reverse, turning left and right are performed. ”

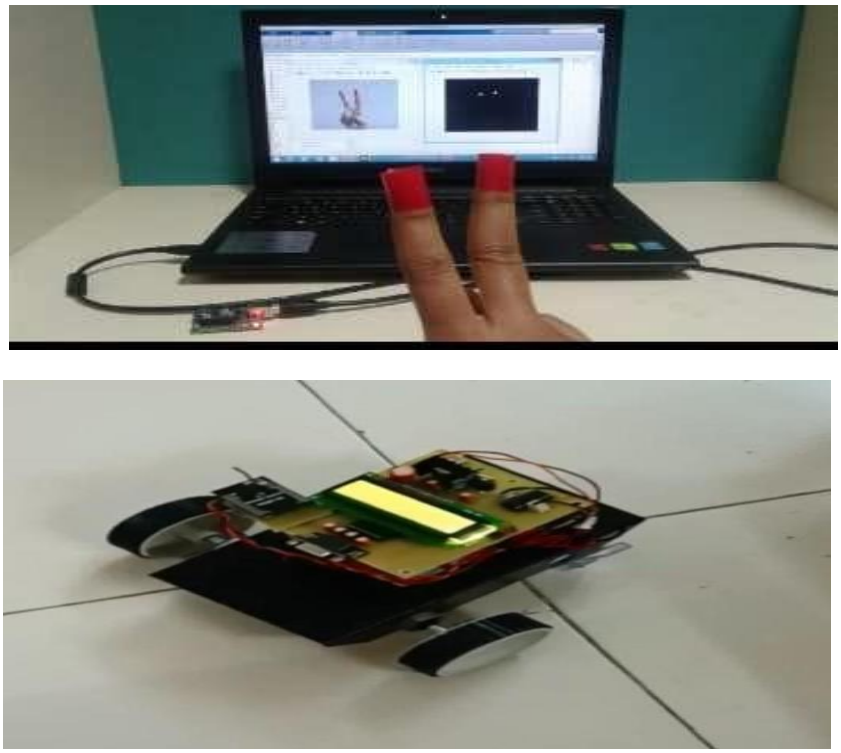

Fig 2.Robotic movement based on gesture.

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4.CONCLUSION

The gesture controlled robot system gives an alternative way of controlling robots. It makes the user to control smart environment by hand gesture interface. This gesture recognition technique demonstrates the use of MATLAB image processing tools to detect and count the number of centroids of gestural image. Since this technique makes use of gesture as input transmitted through zigbee, it improves the operating range of robot. It eliminates the use of external hardware supports like remote control in navigation of robot in different direction and reduces the human efforts in risky environments.We have used a developing technology known as the " Sixth- sense" technology or the 6G technology. This technique is helpful to control robot using matlab program. In future we will try to enhance this technique.

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