

Shape Detecting Robot Using Hough Transform

Shwetal Gondane^[1], Prerna Ambatkar^[2], Lina Bangde^[3], Surbhi Parmar^[4], Swati Pahune^[5]

^[1,2,3,4]Student of Electronics And Telecommunication, Smt Rajshree Mulak Collage Of Engineering For Womens Affiliated to RTM University, 440009 Maharashtra India.

Shwetalgondane95@gmail.com^[2], prernaambatkar@gmail.com^[1], lina.bangde06@gmail.com^[3], surbhiparmar1209@gmail.com^[4]

^[5]Assistant professor of Electronics And Telecommunication, Smt Rajshree Mulak Collage Of Engineering For Womens Affiliated to RTM University, 440009 Maharashtra India.

swati.pahune@gmail.com^[5]

Abstract

In this paper the Circle Detection using Hough Transform is used to select the circular object from the robot and pick it. The Camera will capture the images and find whether there are any circular objects in the images and accordingly the robot will pick those circular objects accordingly.

Keywords: Hough Transform, Robot Circle Detection, Camera

1. Introduction

Hough transform is the effective method of binary image detection on straight line, circle, ellipse and other graphics. It was proposed that generalized Hough transform can detect arbitrary shape graphics. Hough

transform is applied not only to graphical boundary recognition identification, it also in the biomedical, office document image processing, SAR/ ISAR image processing and the automatic interpretation of aerial images

Traditional Hough transform can achieve very exclusive good results in case of relatively simple image detection, but there is few drawbacks of the long computing time and the large cost of the memory space, which has been proposed lots of kinds of efficient solutions. Hough transform in the variety of computing models are suggested in the reference[3-15], reference[16-19] propose a variety parallel Hough transform algorithm based on the many special processor or programmable logic hardware .

2. Sequential Algorithm of Circle Detection

Circular contour detection plays the very important role in a field of image pattern recognition [22]. In the Circular Hough Transform (CHT), the centre and radius of the circle are the two basic parameters; CHT on the circle extraction is to use accumulation of the three dimensional parameter [23-24].

Under the normal circumstances, the circle in the image space after Hough transform method, which is a mapped onto the parameter space, and it is three-dimensional; therefore, it is needed to establish the three-dimensional accumulation array $A(a, b, r)$ in a parameter space for each edge point in the image to accumulate after the calculations.

The algorithm steps are as follows:

1. The image edge detection and binarization.
2. To calculate the minimum and the maximum values of parameters a, b, r according to the size of the particular image and to establish three-dimensional discrete parameter space, the size of the parameter space is determined by a minimum and maximum values of a, b, r .
3. To create the accumulator array A

(a, b, r) in a parameter space, and the each element set to 0.

3. Objectives

To develop software using Matlab for detecting shapes like circle, ellipse. To develop RF transmitter using the microcontroller 89c51 and RF module. To develop the robot to pick up a particular shape when it is commanded.

4. Block Diagram of the System

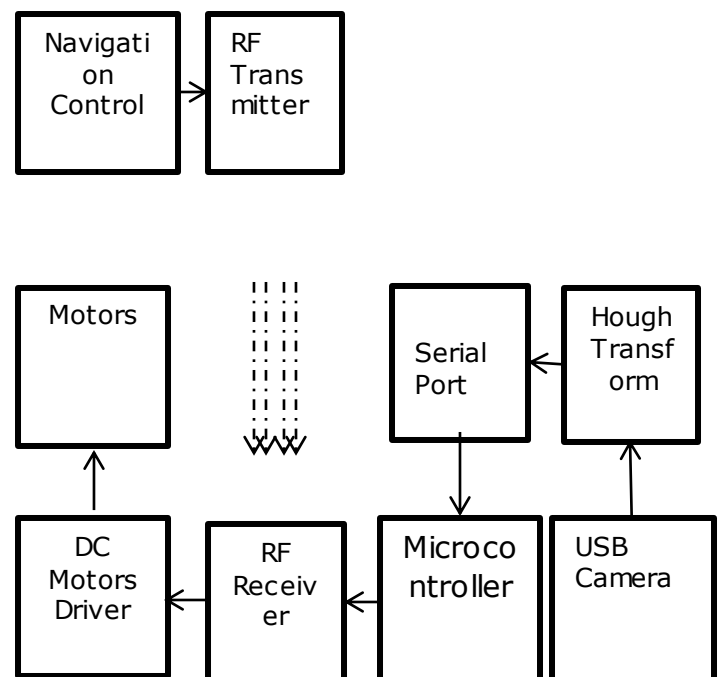


FIG 1

DESCRIPTION OF ABOVE DIAGRAM :

In the above block diagram the system is divided into two parts. The First is the Transmitter and the second is receiver part. The Receiver is connected with the Personal Computer through Serial Port. Also at receiver side the RF Receiver module is interface with the microcontroller. The RF receiver receives the signals from the transmitter and accordingly controls the robot. The Hough Transform application developed in Matlab Receives the video signals from the camera and accordingly detects the shapes coming from these images. If the application detect the

shapes like Circle, ellipse, etc., then the Robot pick only those shapes which has been given the command to it.

6. Flow Chart Diagram of Receiver Side

5. TRANSMITTER

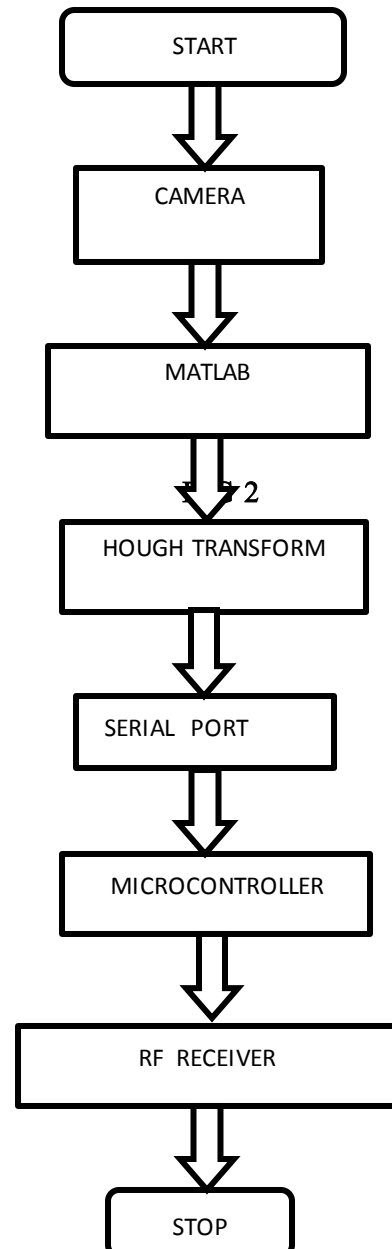
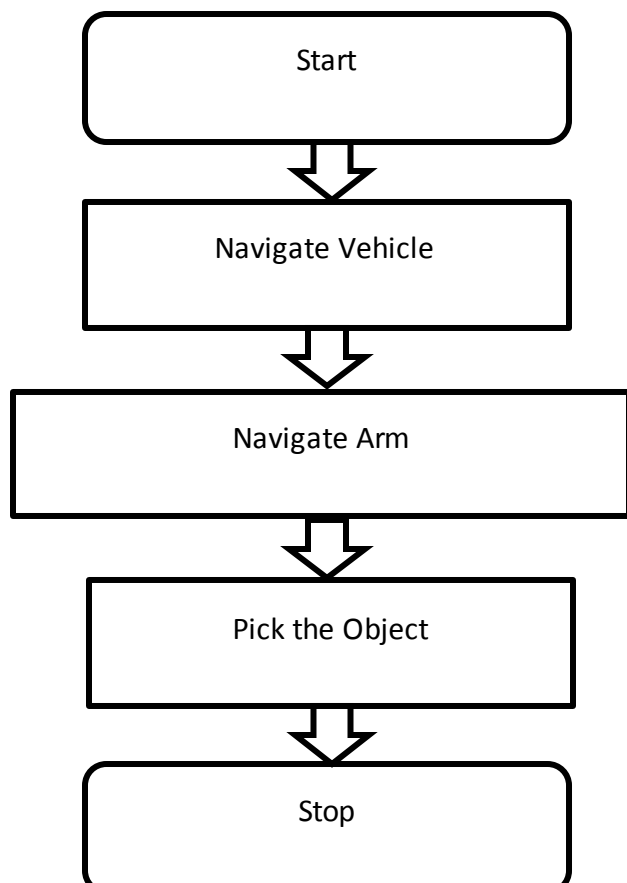


FIG 3

Circle, ellipse, etc. by using Hough Transform method. The Camera interfaced with the PC is read by the it, the images read by the PC are detected with the Hough transform to find the shapes in images.

7. Circuit Diagram for Receiver :

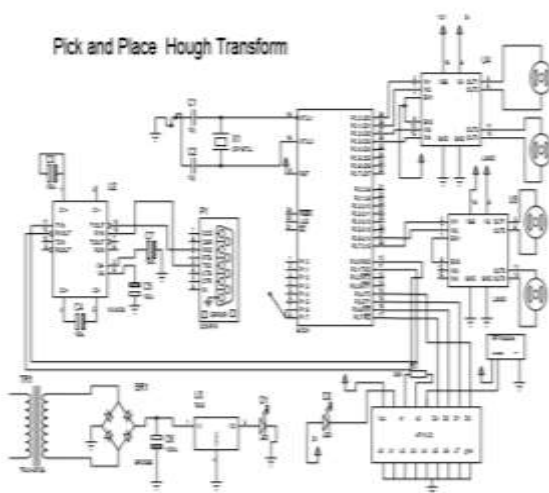


FIG 4

DESCRIPTION OF Fig 4 :

In the receiver circuit microcontroller 89c51 is used and interfaced with the PC. In the PC matlab is used for recognizing the shapes like Circle, ellipse, etc. by using Hough Transform method. The Camera interfaced with the PC is

In the receiver circuit microcontroller 89c51 is used and interfaced with the PC. In the PC matlab is used for recognizing the shapes like

In the receiver circuit microcontroller 89c51 is used and interfaced with the PC. In the PC matlab is used for recognizing the shapes like Circle, ellipse, etc. by using Hough Transform method. The Camera interfaced with the PC is read by the it, the images read by the PC are detected with the Hough transform to find the shapes in images. If user command to read only circles then the application accordingly detect the shapes from the image and accordingly told to the Robot to pick only circular objects. The microcontroller read these values through serial port and told the robot to pick the particular objects. The Application for this system is developed in Matlab at PC side and Ride C Compiler is used at microcontroller side. The Arm is attached with geared DC Motor. L293D IC is used for driving the DC motors.

8. Circuit Diagram Of Transmitter Side

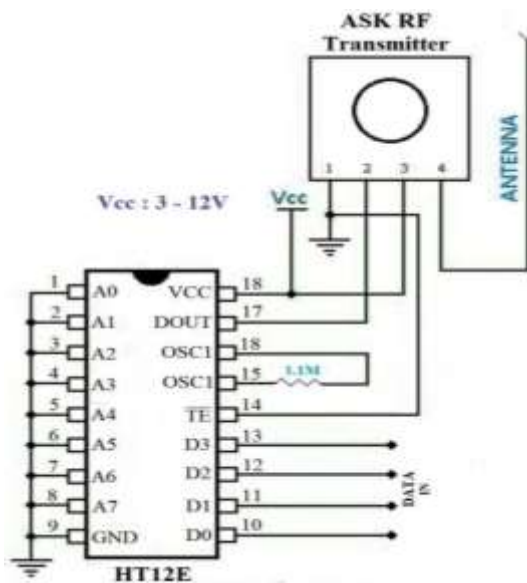
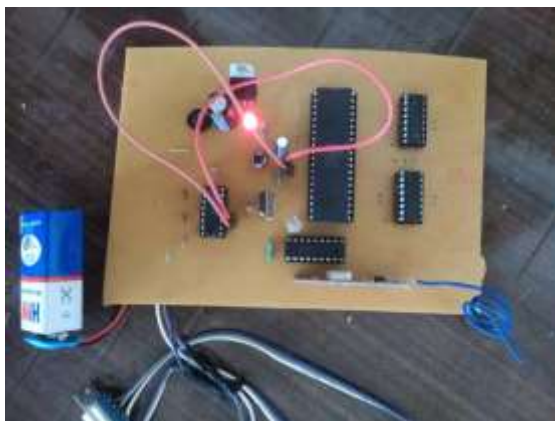


FIG 5

9. HARDWARE DESIGN:



DESCRIPTION OF HARDWARE DESIGN :

This is hardware which consists of one microcontroller IC 89s51 of atmel. It is the basic IC for the working of robot. Another IC for the motion and rotation of robot we have used L2d39 which is a motor driver driver IC.

Encoder and Decoder is used in it for decoding and encoding between robot and pc. One convertor IC is also used for converting the voltage from 12v to 5v i.e. 7805 IC.

CONCLUSION :

The transform method can be generalized and specialized in several ways. We note immediately that any parametrization of the family of straight lines can be used. As we have mentioned, Hough transform use the slope- intercept parameterization.

An important special use of the Hough transform method is to detect the occurrence of figure points lying on a straight line and possessing some specified property.

REFERENCE :

- [1] S. Marcin and D. B. Ignacy, "Circular Object Detection Using a Modified Hough Transform," Int. J. Appl. Math. Comput. Sci., vol. 18, no. 1, pp. 85–91, 2008.
- [2] K. Kourosh, "Extending Generalized Hough Transform to Detect 3D Objects in Laser Range Data," presented at the ISPRS Workshop on Laser Scanning 2007 and SilviLaser 2007, Espoo, Finland, September 12-14, 2007.
- [3] A. A. Abdallah, and A. A. Ayman, "Edge Detection in Digital Images Using Fuzzy

Logic Technique,” presented at the World Academy of Science, Engineering and Technology, vol. 51, 2009.

[4] V. Mittal, “Edge Detection Technique Using Fuzzy Logic,” presented at the Thapar University, Patiala, May, 2008.

[5] G. Sudhavani and K. Sathyaprasad, “Segmentation of Lip Images by Modified Fuzzy C-means Clustering Algorithm,” IJCSNS International Journal of Computer Science and Network Security, vol. 9, no. 4, April, 2009.