

REVIEW ON AN OBJECT FOLLOWING WIRELESS ROBOT

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Abstract

The project is on the robot which will be tracking a real time object it can be a ball of any size, any color etc. or it can be any other object also. This robot will work like a mouse of our computer. The object which the robot is going to follow will be moved by the user. The advantage of using such type of robot is that it can be used in making sculpture or making the outlines of the overall body which is to be sculpted.

Keywords– Red colored ball, Robot, Webcam, MATLAB

1. INTRODUCTION

Consider an open field is present and a farmer has to plough the land. So the farmer can easily do the work by simply having computer in front of him and moving the object in the particular direction where the work is needed to be done. As the object will move in a particular direction the robot which placed on the field will move in the same direction. In this way the whole work can be done in no time.

The basic idea of the operation of this tool is that it will track or follow the object of a particular characteristic which has been considered for the operation of this project in the same direction and with proportionate distance.

This project requires MATLAB programming for tracking the object and also controls the operations related to the directions and the distance it has to cover proportionately. The project requires two microcontrollers one in the transmitter side and another in the receiver side.

This project mainly divided into two parts one is Transmitter and another is receiver side. In the transmitter side the information related to the movement of the object in front of the camera and the receiver side will receive the data transmitted by the transmitter so that it will help in moving the robot in the particular direction.

2. SYSTEM ARCHITECTURE

Our system has two distinct parts:-

2.1 Hardware Part

The Hardware of this project is being divided into two parts they are:-

2.1.1 Transmitter

In this part the most important thing is the computer part which includes the webcam, microcontroller, encoder and the transmitter. The webcam will catch the snapshots of the object after every predetermined time which has been set by programming. After getting the information about the object the data will be processed by the microcontroller. This data includes the direction in which the object has moved and the total distance it has moved. After processing the data they are encoded in the suitable format and then the data is transmitted to the receiver side.

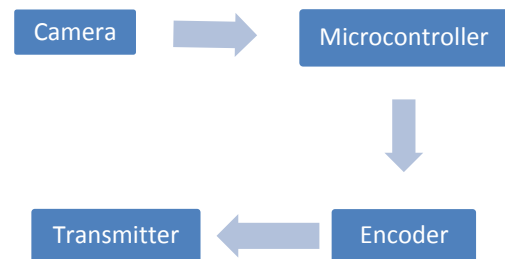


Fig 1 – Block diagram of transmitter part

2.1.2 Receiver

It consists of receiver, decoder, microcontroller, motor driver and the D.C. motor. In this part the encoded signal is received by the receiver which is being decoded in its original format. The decoded signal is then applied to the microcontroller so that it can control the data for providing the appropriate voltage to the motor driver for a particular period of time. The motor driver then amplifies the voltage to the suitable form so that it can make the D.C. motor to run in an efficient way. The D.C.

motor will make the whole robot to move in a particular direction and to cover a proportionate distance.

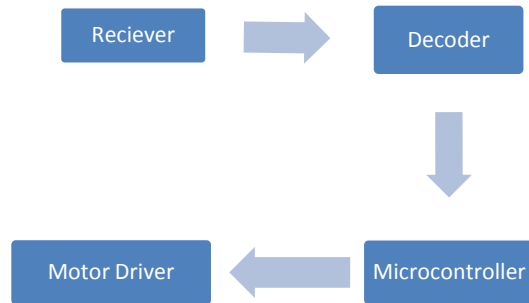


Fig 2 – Block diagram of receiver part

2.2 Software Part

Software which have used are:

2.2.1 MATLAB

In MATLAB the project requires image processing type of concept so that the webcam will be able to take the multiple snapshots in a very small duration. It mainly requires two programs one for taking snapshots of the object taken into consideration and providing a reference co-ordinate so according to which the object will be tracked. Whereas, another program is to provide various conditions or scenarios in which the motor is allowed to move at a proportionate distance in a particular direction.

2.2.2 Kiel

The microcontrollers which are being used in this project can be programmed by using this software. There are two number of programs in which one will be used in the transmitter side and another will be used in the receiver side. In transmitter side the microcontroller is programmed for making the data available in the digital form. The information includes the direction and magnitude specifications i.e. it defines each and every directions as well as the magnitude for the robot which is situated on the receiver side.

3. WORKING

The whole working of the project is divided into two parts:

3.1 Transmitter Part

In this the object is kept in front of the camera which is connected to the computer. The snapshots of the object are being taken by the camera and according to that the information about its current position is provided serially to the microcontroller. The microcontroller will process the data and will produce data in the parallel form which is being given to

the encoder so that it encode (or compress) the data and then it transmits the encoded data to the receiver side.

3.2 Receiver Part

Now after receiving the encoded data, the decoder will take the data in serial form and decode (or decompress) it so that the encoded data can be recovered to its original format. After decoding the data is given to the microcontroller in parallel form so that the processor can control the robot and will enable to move in a particular direction for proportionate distance depending on the delay introduced in the program part done for the microcontroller in the receiver side. The processed data will be now applied to the motor driver which will convert the voltage to the one which is sufficient for the D.C. motor to work efficiently and then the robot will move accordingly.

4. PROGRAM DOCUMENTATION

In this there are two programs are required, one for Image processing and another one is for microcontroller

4.1 For MATLAB

1. First run the MATLAB code.
2. Then a window will occur for capturing the snapshots of the object.
3. In the same window some details have to be filled like serial port number, baud rate, time after which a single snapshot will be taken.
(The figure is the pictorial description of the above two steps.)

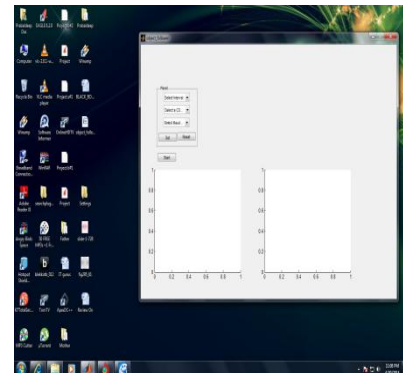


Fig 3- Window for capturing the image and representing the same in the form of co-ordinates

4. After finalizing the setting click “Set” and then click “Start”.
5. As the camera starts detecting the object it will run another program.
6. This program is for the identification of the correct object.

4.2 For Microcontroller

1. The program is to process the data for the current position of the object.
2. It includes the direction specification of the object.
3. It includes the magnitude of the distance travelled by the object.

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