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A Brief Discussion on Gesture Controlled Robot

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***Abstract*—** The model discussed here is a gesture controlled robot having two wheels on either side just like a car. The key features described in the model are i) controlling the movement of the wheels using an embedded system ii) using the concept of image processing hand gestures are analyzed and according to the gestures the robot moves.[1]The embedded system used here is an Arduino Uno board. It is a microcontroller[9](Atmega328) based The PYTHON program and the Arduino program are merged using Serial import interface. board having 14 digital pins (out of which some are PWM pins) and 6 analog pins. The Arduino have been programmed using JAVA. Two driving motors have been connected with each of the wheels and hence a motor driving circuit (IC no. L239D) has been used. The gesture detection part has been done using PYTHON programming.

***Keywords*—**[4]Arduino uno; L239D; Image processing; Open Cv; PYTHON programming;

I. INTRODUCTION

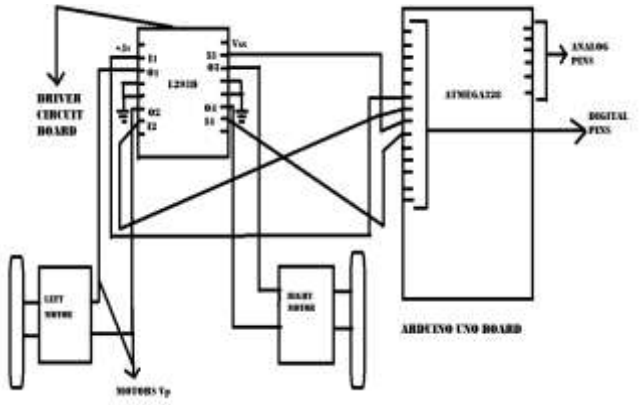
We have often seen children playing with remote controlled cars or computer games, in which buttons are pressed to control the movement of objects. So here we have tried to depict the movement of objects process of the two rectangular metal pieces was executed. [2]The Arduino Uno board and the motor driver circuit (IC no.- L293D) board were fitted on the top of the metal chassis. After the construction of the robot two programs were written. The program to control the motion of the wheels was written in [3]Arduino software which is freely available. . The second program to implement gesture tracking was written in PYTHON language and the two programs were merged together using the concept of serial import interface.

II. METHODOLOGY

This model mainly comprises of two parts: [8]The Embedded Systems part and the Image Processing part. The first part is used for the purpose of motion control of the robot and the second part is for the detection of coloured objects and accordingly gesture control.

A. Embedded System Part

[10]This part comprises of the Arduino Uno board, the driver circuit board and the two motors.



[5]Figure 1. Connection between the Arduino board, the driver circuit and the motors

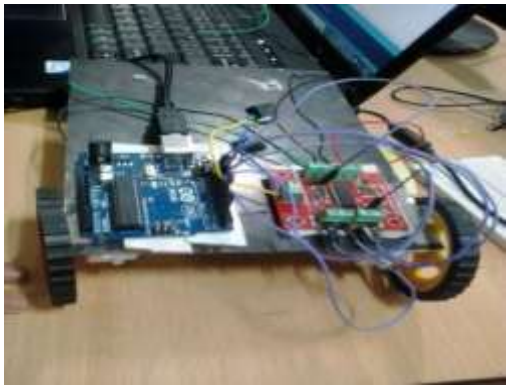


Figure 2. The wheeled robot that we had built.

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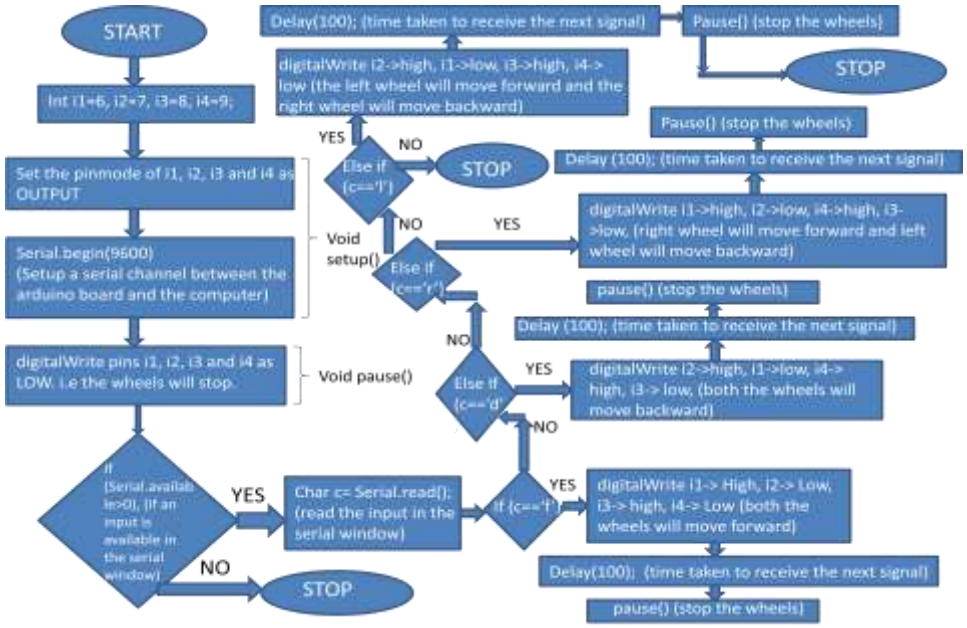

Figure 3. Flowchart of the Arduino program

B. Image Processing Part

This is the part of the model in which gesture controlling have been done. PYTHON language has been used to code this part. A module known as OpenCV has been used. This OpenCV or Open Source Computer Vision is a collection of different programming functions assigned to do certain things. OpenCV has many applications such as face recognition, gesture tracking, motion tracking, 2D- 3D features, etc. Since here we have used the concept of gesture tracking, we have imported the OpenCV module/library. OpenCV is also considered as image processing software, hence OpenCV is the base of the model.

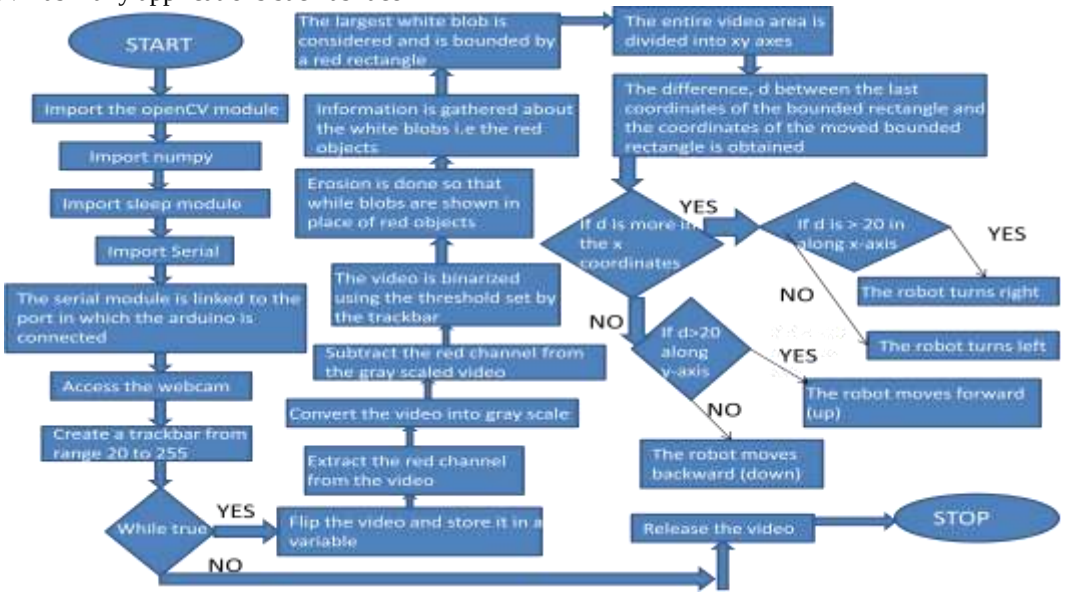

Figure 4. The flowchart of the PYTHON program

III. RESULTS AND DISCUSSION

After the PYTHON program is executed, the webcam will be accessed and the red coloured objects will be shown as white blobs and will be bounded by a rectangle. The robot will move according to the movement of the red object.

Figure-5. The screenshot of the program execution. As we can see the red object is detected as a white blob and simultaneously is bounded by a rectangle and the movement is printed in the PYTHON shell

IV. CONCLUSION

The model gave us a lot of first hand experience of using the combined concept of both image processing and embedded systems. [6]This is just the basic part, this model can be further improved by making use of a Bluetooth module and hence making the entire model wireless. Considering the image processing part, here we have detected a red object, similarly blue and green objects can also be detected by slight modification. [7]The more advanced concept can be used in the gesture controlling part such as instead of detecting any coloured object the program will detect the movement of the human eyeball

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REFERENCES

[1] Kadam Shah, Prakash Savaliya and Mitesh Patel, "Automated roomlight controller with bidirectional visitor counter", IJICTRD – International Journal of ICT Research and Development | Vol-1 Issue-4 | ISSN: 2395-4841

[2] Bader M. O. Al-thobaiti, Iman I. M. Abosolaiman, Mahdi H. M. Alzahrani, Sami H. A. Almalki, Mohamed S. Soliman, "Design and Implementation of a Reliable Wireless Real-Time Home Automation System Based on Arduino Uno Single-Board Microcontroller", International Journal Of Control, Automation And Systems Vol.3 No.3 July 2014 IsSN 2165-8277 (Print) ISSN 2165-8285 (Online)

[3] Alicia M. Gibb, "New Media art, Design, and The Arduino Microcontroller a Malleable Tool", A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science, February 2010, unpublished.

[4] Chinmay Kulkarni, Suhas Grama, Pramod Gubbi Suresh, Chaitanya Krishna, Joseph Antony, "Surveillance Robot Using Arduino Microcontroller, Android APIs and the Internet", 2014 First International Conference on Systems Informatics, Modelling and Simulation.

[5] Drew Newell "Method for Powering Arduino Microcontroller and Shield using a Battery", unpublished.

[6] Pavel Vařacha , Nicos Mastorakis , Roman Jašek , Martin Pospíšilík, Bronislav Chramcov , David Sámek, "Technical Devices for Supervising of a Household via Interned Based on Arduino Microcontroller", unpublished.

[7] Mejdl Safran and Steven Haar, "Arduino and Android Powered Object Tracking Robot", unpublished

[8] Deepti Malviya, Suman Sharma, "Design And Development Of Walking Bipedal Robot With The Help Of Arduino Controller", Issn: 2277-9655 (I2or), Publication Impact Factor: 3.785 (ISRA), Impact Factor: 2.114

[9] Rodriguez, K., Crespo, J, Barber, R.,"An android interface for an arduino based robot for teaching in robotics", The 6th international conference of education, research and innovation, at sevilla.

[10] Justus Beyer, Richard Varbelow, Jan-Niklas Antons , Steffen Zander ,"A Method For Feedback Delay Measurement Using a Low-cost Arduino Microcontroller", unpublished.

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