

GESTURE CONTROL ROBOT

Umesh Yadav¹, Ankur Tripathi², Sonali Dubey³, S.K. Dubey⁴

^{1, 2}(UG, Students of department of ECE, AIMT, Gr. Noida, India)

³(Assistant Professor, Department of ECE, AIMT, Gr. Noida, India)

⁴(Director, AIMT, Gr. Noida, India)

ABSTRACT

Today human-machine interaction is moving away from mouse and pen and is becoming pervasive and much more compatible with the physical world. With each passing day the gap between machines and humans is being reduced with the introduction of new technologies to ease the standard of living. Gestures have played a vital role in diminishing this abyss. In this paper, a rigorous analysis of “Human-Machine Interaction” using gestures has been presented. Gestures can be captured with the help of an accelerometer. This paper deals with the Design and Implementation of a “Wireless Gesture Controlled Robot. The system design is divided into two parts namely: Accelerometer part and robot part. It is basically an Accelerometer based system which controls a Robotic car wirelessly using a, small and low-cost, 3-axis accelerometer via RF signals.

Keywords: Gesture, RF Module, Accelerometer

1. INTRODUCTION

Humans are anxiously working on finding new ways of interacting with machines. However, a major breakthrough was observed when gestures were used for this interaction. A gesture is a form of non-verbal communication in which visible bodily actions communicate particular messages. It comprises of sound, light variation or any type of body movement. Based upon the type of gestures, they have been captured via Acoustic (sound), Tactile (touch), Optical (light), Bionic and Motion Technologies through still camera, data glove, Bluetooth, infrared beams etc. Motion Technology has succeeded in drawing the attention of researchers from different parts of the world.

The accelerometer circuit can be freely rotated in space, temporarily varying 3-dimensional signal data is obtained from the 3-axis acceleration sensor. This data is transmitted to a robot via RF Module. Further, it is processed by a microcontroller embedded on the robot for its desirable motions. In this context, a robot is an analogy for any machine that is controlled by man varying from a simple toy to heavy machinery. Robots have even replaced humans in performing various tasks that they are unable to perform due to physical disability, size limitation or extreme environments.

II. GESTURE RECOGNISATION

A Gesture Controlled robot is a kind of robot which can be controlled by hand gestures and not the old fashioned way by using buttons. The user just needs to wear a small transmitting device on his hand which includes a sensor which is an accelerometer in our case. Movement of the hand in a specific direction will transmit a command to the robot which will then move in a specific direction. The transmitting device includes a Comparator IC for assigning proper levels to the input voltages from the accelerometer and an Encoder IC which is used to encode the four bit data and then it will be transmitted by an RF Transmitter module.

At the receiving end an RF Receiver module will receive the encoded data and decode it by using a decoder IC. This data is then processed by a microcontroller and passed onto a motor driver to rotate the motors in a special configuration to make the robot move in the same direction as that of the hand.

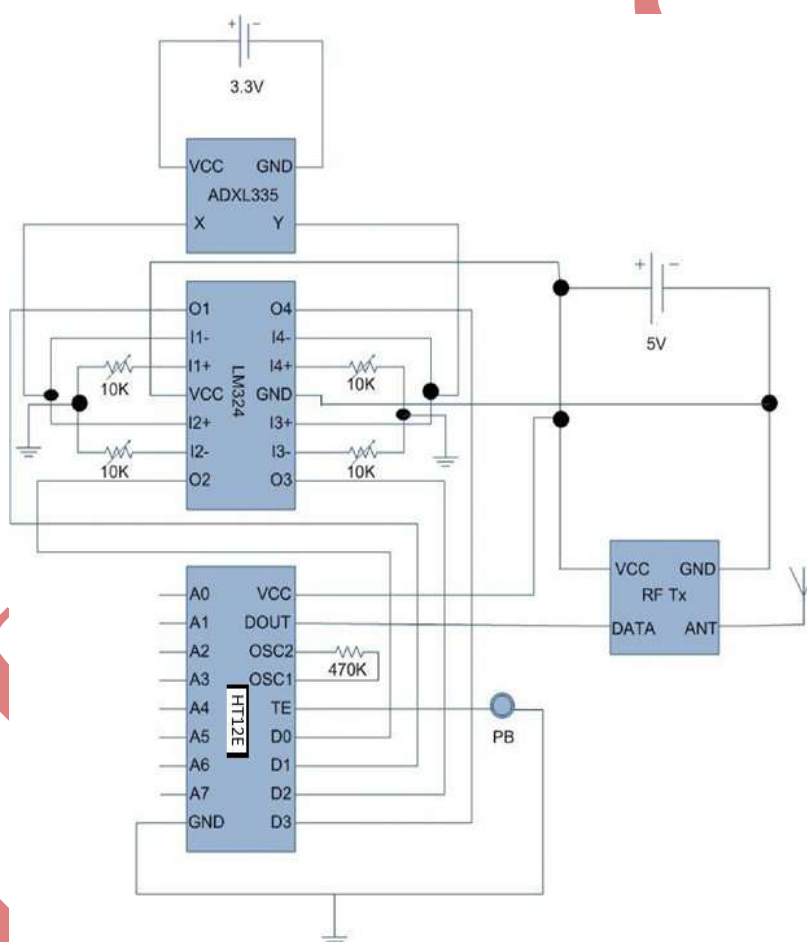


Fig.1 Transmitter circuit

III. APPLICATIONS

- Through the use of gesture recognition, remote control with the wave of a hand of various devices is possible.
- Gesture controlling is very helpful for handicapped and physically disabled people to achieve certain tasks, such as driving a vehicle.
- Gestures can be used to control interactions for entertainment purposes such as gaming to make the game player's experience more interactive or immersive.

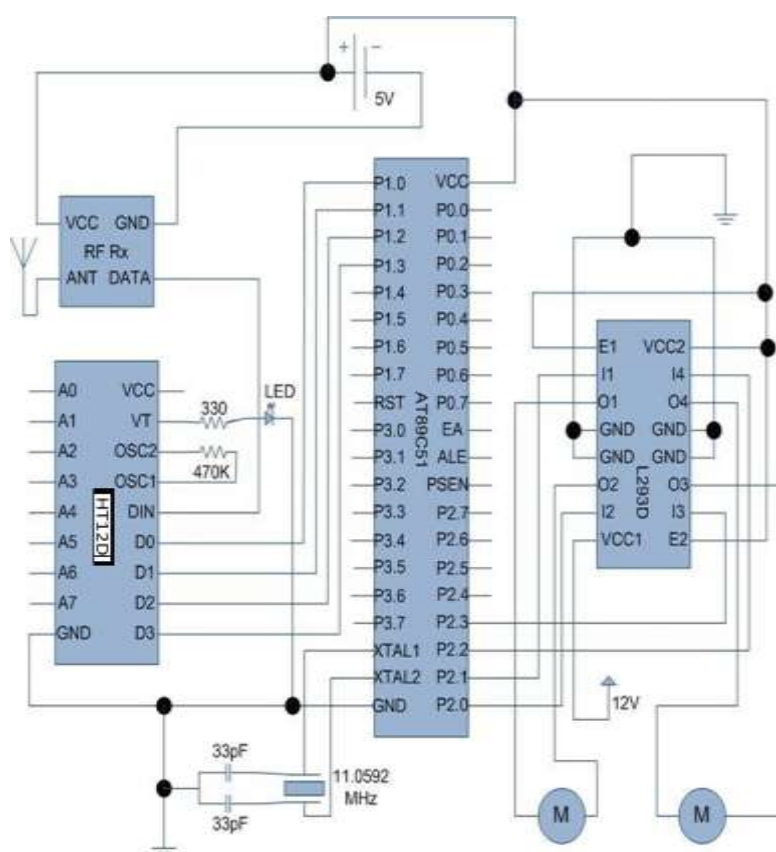


Fig.2 Receiver circuit

IV.CONCLUSION

Enormous amount of work has been done on wireless gesture controlling of robots. In this paper, various methodologies have been analyzed and reviewed with their merits and demerits under various operational and functional strategies. Thus, it can be concluded that features like user friendly interface, light weight and portability of android OS based smartphone has overtaken the sophistication of technologies like programmable glove, static cameras etc., making them obsolete. Although recent researches in this field have made wireless gesture controlling a ubiquitous phenomenon, it needs to acquire more focus in relevant areas of applications like home appliances, wheelchairs, artificial nurses, table top screens etc. in a collaborative manner.

V. REFERENCE

- [1] Waldherr, S., Thrun, S., and Romero, R., "A Gesture based interface for Human-Robot Interaction", Kluwer Academic Publishers, Netherland, 2000.

- [2] Liu, T., Guo, H., and Wang, Y., “A new approach for color-based object recognition with fusion of color models”, Congress on Image and Signal Processing Conference, Sanya-China, vol. 3, pp. 456-460, May 2008.
- [3] Wang, B., and Yuan, T., “Traffic Police Gesture Recognition using Accelerometer”, IEEE SENSORS Conference, Lecce-Italy, pp. 1080-1083, Oct. 2008.
- [4] Lalanne, T., and Lempereur, C., “Color recognition with a camera: a supervised algorithm for classification”, IEEE Southwest Symposium on Image Analysis and Interpretation, Tucson-Arizona, pp. 198- 204, April 1998.
- [5] Available: http://en.wikipedia.org/wiki/Gesture_recognition.
- [6] Cannan, J. and Hu, H., “Human-Machine Interaction (HMI): A
- [7] Survey”. [Online]. Available: [http://www.](http://www.dces.essex.ac.uk/staff/hhu/Papers/CES-508%20HMI-Survey.pdf)
- [8] [dces.essex.ac.uk/staff/hhu/Papers/CES-508%20HMI-Survey.pdf](http://www.dces.essex.ac.uk/staff/hhu/Papers/CES-508%20HMI-Survey.pdf)
- [9] Das, S., Toya, L., Green, Perez, B., and Murphy, M. M., “Detecting User Activities using the Accelerometer on the Smartphone”, Team for Research in Ubiquitous Secure Technology REU Research Program, July 2010.