International Journal of Engineering Inventions
e-ISSN: 2278-7461, p-ISSN: 2319-6491
Volume 12, Issue 2 [February. 2023] PP: 94-97

Hand Gesture Controlled Robot Car Electronic and Communication Engineering Department, ABES Engineering College Ghaziabad

MEHUL KUMAR SINGH |*1900320310091* | *mehul.19b311086@abes.ac.in*
PRASHANT SINGH| *1900320310114*| *prashant.19b311127@abes.ac.in*
PRAKHAR DIXIT|*1900320310115*|*prakhar.19b311051@abes.ac.i*

ABSTRACT
The Hand Gesture Controlled Robot Car is a project that utilizes hand gestures to control the movement of a robot car. The project incorporates computer vision technology to detect and interpret hand gestures, which are then translated into commands for the robot car. This innovative method of control allows for a more intuitive and user-friendly interface, eliminating the need for buttons or remote controls. The project has potential applications in entertainment, education, and research, paving the way for new possibilities in human-robot interaction.

Date of Submission: 14-02-2023 Date of acceptance: 28-02-2023

I. INTRODUCTION

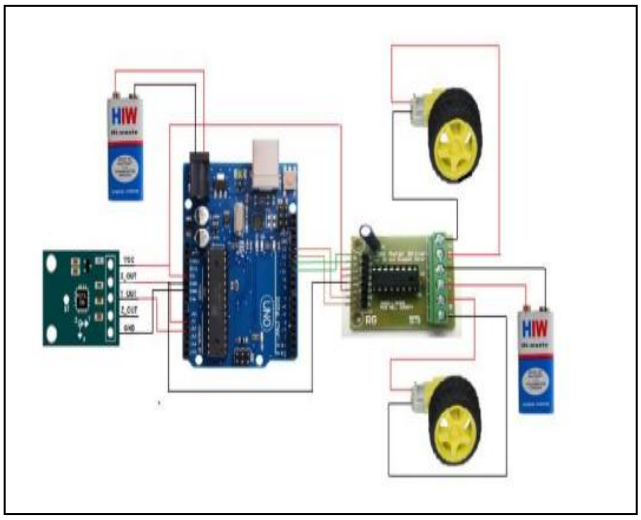
The Hand Gesture Controlled Robot Car is a innovative project that explores the possibilities of using hand gestures as a means of controlling a robot car. The traditional methods of controlling a robot car such as buttons or remote controls can be limiting and not very user-friendly. With the increasing popularity of gesture-based interfaces in consumer electronics, it is natural to explore the use of hand gestures in controlling robots as well.

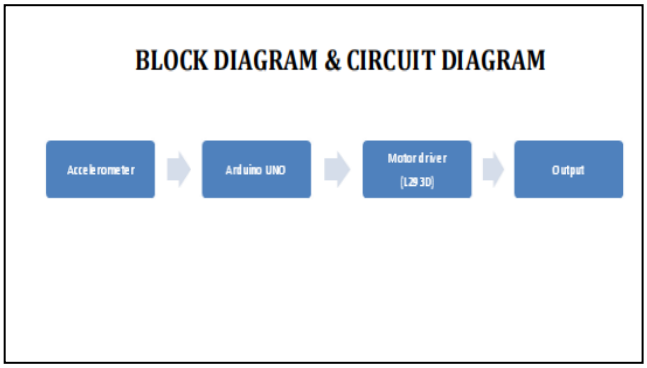
This project makes use of computer vision techniques to recognize and interpret hand gestures, which are then translated into commands for the robot car.

II. LITERATURE SURVEY

The creation of a hand gesture recognition sensing element supported AN measuring device and rotating mechanism for remotely commanding underwater mechanism hands. In this paper, the measuring device and rotating mechanism square measure used because thehand gesture sensing element. The sensing element referred to as a rotating mechanism is employed to record the placement of the operator's hand whereas he's operating in AN operative vehicle and is mounted to a hand. whereas the joystick is straightforward for the older operator to use to manage the system, it's a touch tougher for novice users. The user will operate the hands of the mechanism at the ground station, that options a hand gesture recognition sensing element, and therefore the ground station, that is that the major part of the system. Here, the hand joints square measure equipped with AN accelerator and a rotating mechanism.The physical interaction during this case must be properly designed as a system that's simple to use, interacts naturally, and reduce repulsion. The experiments embody physical tests. a person and a android mechanism interacting. After testing, it provides the foremost favourable outcome among all the factor. easy and straightforward to use.

BLOCK DIAGRAM & CIRCUIT DIAGRAM





ARDUINO

Arduino is an open-source electronics platform based on simple, easy-to-use hardware and software. It is designed to make it easier for individuals to get started with electronics and programming, without needing a deep understanding of electronics.

Arduino boards consist of a microcontroller and a number of input/output (I/O) pins, which can be used to interface with sensors, actuators, and other devices. The software development environment provided by Arduino allows users to write code in C++, upload it to the board, and interact with the connected devices.

Arduino is widely used in a variety of projects, ranging from DIY hobby projects to commercial products. It is popular among makers, hobbyists, and students due to its ease of use, affordability, and vast online community. With its large library of pre-written code and tutorials, it is an excellent starting point for anyone interested in learning about electronics and programming.

ACCELEROMETER

An accelerometer is an instrument that measures acceleration, which is the rate of change of velocity of an object. It is commonly used in a variety of applications, such as determining the orientation of a device, detecting vibrations, and measuring tilt and shock.

Accelerometers consist of microelectromechanical systems (MEMS) sensors that detect acceleration in one, two, or three dimensions. They typically work by measuring the displacement of a proof mass within the sensor, which is proportional to the acceleration being experienced. The output from an accelerometer can be in the form of electrical signals or digital data.

DC MOTOR

A DC motor (direct current motor) is a type of electric motor that runs on direct current (DC) power. Unlike AC motors, which require a complex system to convert AC power to DC power, DC motors can operate directly from a DC power source.

DC motors typically consist of a rotating armature that is surrounded by a stationary magnetic field. The armature is connected to the power source through a commutator and brushes, which allow the motor to switch the direction of current flow and maintain the magnetic field. The interaction between the armature and the magnetic field causes the motor to rotate.

WORKING AND IMPLEMENTATION

Implementation of the Transmitter Circuit and Receiver Circuit are the two key sections of the working procedure. The initial stage in a transmission circuit is to recognise and detect hand movements. Here isemploying an accelerometer, model ADXL335. Using an X and Y scale, the position of the hand is determined. This information is given to the Arduino Lilypad. The Arduino IDE Software can be used to programme the ATMEGA 328 microcontroller that is a part of the Arduino platform.

TO MAKE CAR STOP MOVING

One of the most approachable interactive interfaces for controlling objects is the somatosensory interaction.We attempt to create an interface that enables a user to control a car-robot in a somatosensory interactive manner, inspired by the concept of a Wiimote. Directly using a Wiimote to drive a car-robot is a simple method, but Wiimotes are not cheap and are not very compact. As a result, the interface we created uses a tiny accelerometer module rather than the standard Wiimote.

Gesture	command
	turn right
	Turn left
	Go straight
	Go Back
	rotate
	STOP

CONCLUSION AND FUTURE WORK

In this paper, we demonstrate the hardware and software implementation of a glove-based system, which the straightforward hand-gesture control interface based on techniques for recognising gestures using

fuzzy finite state automata. These flex sensors, inertial IMU, and wearable gloves with gesture recognition techniques were utilised to control a quadcopter.model in the V-Rep simulator, displaying effectivecontrol of the quadcopter's position and orientation in real time using six different dynamic gestures. This approach is grounded in fuzzy c-means.(FCM) clustering algorithm using squared sumMeasurement of mistakes (Devyatkov and Alfimtsev,2007), which increases the distance between cluster centres while minimising the distance between cluster points. Hardware and software from these glove-based systems can also be applied to a variety of applications to build human-computer interfaces. When there are many gestures and the trajectory is just as significant as the final position, such as in a teaching context, the software solution may be useful for checking the accuracy of the gestures.

ACKNOWLEDGEMENTS

We would like to sincerely thank the professors at the ABES Engineering College Ghaziabad's Department of Electronics and Communication Engineering for helping to guide our project. We have the chance to complete the project work under their guidance. We sincerely appreciate your support, encouragement, and advice. We also want to express our gratitude to our guide for helping us complete the project with his collaboration and support. Lastly, we would like to express our gratitude to the Department of Electronics and Communication Engineering for providing the necessary infrastructure to complete our research.

REFRENCES

[1]. Tanveer Patel, Sandesh Vakale, Ashish Shinde, and Riyaz Mansuri, "Hand Gesture Control Robot Vehicle," IJECT, Vol. 4, Issue SPL-Jan.-Mar. 2013, pp. 77-80.

[2]. Human Gesture Recognition for Real-Time Control of Humanoid Robot, Aswath S, Chinmaya Krishna Tilak, Amal Suresh, and Ganesha Udupa, International Journal of Advan

[3]. Dr.C.K.Gomathy,K.Bindhusravya,P.Swetha,S.ChandrikaAr\sticle:ALocationBasedValuePredictionforQualityofWebServi \sce,PublishedbyInternationalJournalofAdvancedEngineering Use of Arduino and Android should be avoided (IRJET) Volume: 06 Issue: 06 | June 2019

[4]. Dr.CKGomathy,Article:AnEffectiveInnovationTechnology\sInEnhancingTeachingAndLearningOfKnowledgeUsingIctMe \sthods,InternationalJournalOfContemporaryResearchInCom\sputerScienceAndTechnology(Ijcrcst)E-Issn:2395-5325Volu \sme3,Issue4,P.No-10-13,April'2017

[5]. recognising and performing basic tactile motions. Advances in Tactile Sensing and Touch Based Human-Robot Interaction, in Proceedings of IEEE International Conference on Human-Robot Interaction Workshop, Boston, Massachusetts, March 2012, doi: 10.13140/2.1.3165.344

[6]. "Hand Gesture Control Robot Vehicle," IJECT, Vol. 4, Issue SPL-2, pp. 77–80, 2013. Riyaz Mansuri, Sandesh Vakale, Ashish Shinde, and Tanveer Patel.

[7]. "Human Gesture Recognition for Real-Time Control of Humanoid Robot", International Journal of Advance in Mechanical and Automobile Engineering (IJAMAE), Vol- 1, Issue 1, pp. 96-100, 2014. Aswath S, Chinmaya Krishna Tilak, Amal Suresh, and Ganesh Udupa.

[8]. "Gesture and speech controlled mobile tribot robot employing Kinect sensor", IEEE, pp:33-34, 2015; G. Baron, P. Czekalski, M. Golenia, and K. Tokarz.