Designing and Modeling of Remote Control Car Using Arduino

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Abstract-*Robotics is simple architecture so as to serve the students an elegant idea so that they can build their own robots at low cost and use them as a decent platform for experiments in several courses, also aid the robot's designer to focus on their research instead of Bluetooth connection infrastructure. Automated Guided vehicle have been used for transmitting materials and parts between the two workstation or points. This is used to reduce human effort and time. In this project we are making four wheeled prototype that can move along the path from one station to other station. The AGV uses hall effect magnetic sensor to follow the path, the is made up of the magnetic strip or simply magnetic tape. The controller used is arduino and motor driver IC L298N which controlls all the navigation of agv. No human intervention is required during its task execution. Safety measures are provided to agv by using fire sensor and obstacle detection with the help of buzzer.*

Keywords-Arduino Uno, Arduino IDE, Motor Driver, Magnetic sensor, Fire sensor, Obstacle sensor, Battery and Motor.

I. INTRODUCTION

Arduino is an opensource prototyping platform Based on easy-to-use hardware and software. Arduino uses an ATmega328 microcontroller. Since robotics has become a major part in our daily life and also in the engineering field and it plays a vital role in the development of new technology. This is a very simple and easy type form of remote control car, where the ordinary micro-controller has been replaced by Arduino and IR sensors has been replaced by a Bluetooth module. The remote can be any android or IOS cell phones. This project can be made in a bigger scale for real time vehicles.

The Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards. The L298 is an integrated monolithic circuit in a 15- lead Multi watt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage[1].

II. LITERATURE REVIEW

Tashi Rapden,Wang chuk[2] explained that the Arduino is an open source device that has been the brain for numerous projects. The Arduino has everything that is required by the user which includes its inbuilt converter, i/o pins etc. With the combination of Arduino, and the Bluetooth Shield we can control over many other things, like home Lightings, air conditioner and many more through our cell phones. The Arduino can also contribute at large for the Smart Home system. By doing this Project they found out a lot about the Arduino, and how it has made us easier to convert digital signals into physical movements".

Rajesh Bhatt and Subankar Roy[3] described that the Wireless control is one of the most important basic needs for all the people all over the world. But unfortunately the technology is not fully utilized due to a huge amount of data and communication overheads. Generally many of the wireless controlled robots use RF modules. But our project for robotic control makes use of Android mobile phone which is

very cheap and easily available. The available control commands are more than RFmodules.

Ms. S.T. Shibe and . Prof.S.S.Joshi[4]explained that the robotics and automation industry which ruled the various sectors from manufacturing to household entertainments robotics is widely used because of its simplicity and ability to modify to meet changes of needs. The project is designed to develop android application based a robotic vehicle for remote operation. This is a kind of robot can be helpful for mobility aid for elderly and disabled people.

Everton Rafael da Silva and Breno Lisi Romano [5] described that their project aimed to design an automated vehicle prototype built with Arduino and controlled with software developed on Android that can perform manual or automatic paths. Until now research and analyzing the simulation of experiments shown, it is believed that it is feasible to use the prototype designed to cognitive development, for future users can learn to insert custom paths that can process logic issues and more complex mathematics allowing the prototype perform the desired movements. Analyzing the financial costs of design, it is believed that it is feasible to construct this type of prototype because it presents a low cost of the components used, particularly if they choose in a large scale production. It is worth noting that both the Java programming language as the language for Arduino in development are free, not burdening additional costs for the development of the project, pointing out that this applies also the tools used for development.

III. METHODOLOGY

COMPONENTS USED

The various components used in our project are shown in figure 1:

- **Arduino Uno and USB cable**- It is a microcontroller board based on the AT mega 328. It has 14(of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and reset button.

- **Breadboard-**A breadboard is a used to build and test circuits quickly before finalizing any circuit design. The breadboard has many holes into which circuit components like ICs and resistor can be inserted.

- **100rpm dc motor**s- DC motor is a device which convert the mechanical power into DC electrical power. 100 rpm mean its rotor rotates complete 100 rotatation in one minute.

- **IR receiver(SM0038**)-An infrared receiver is a hardwerethst sends information from an infrared remote control to another device by receiving and decoding signals. In general, the receiver outputs a code to uniquely identify the infrared signal that it receives.

- **L293D motor driver IC-**It is a driver which allows DC Motor to drive on either direction. L293D is a 16 PIN IC which can control a set of two DC Motors simultaneously in any direction.

- **Jumper wires**-It is an electrical wire or group of them in a cable with a connector or pin at each end which is normally used to interconnect the components on breadboard wthout soldering.

- **Chassis and Wheels**-A chassis consist of an internal vehicle frame that supports an artificial object in its construction and use, can also provide protection for some internal parts.

- **9v batteries(2 nos)-**Batteries used in that as a power source.

- **Batteries clips**-Battery clips are designed to fit a variety of battery sizes. We use the style of clips according to the application requirement.

PROCEDURE

- First of all we fixed the wheel to chassis and attached motor to the back wheel. Make holes on chassis and fix the arduino using screws.
- After that we fixed the breadboard by using the double sided tape provided on it.
- Mounted the L293D on the breadboard.
- Made IR connections and saving the IR library.
- Found hexadecimal values of remote keys.
- After that we made the L293D connections.
- Interfaced the motors with L293D.
- Integrated everything and switch on the power supply.
- Finally we made the final programme on Arduino and run the car.

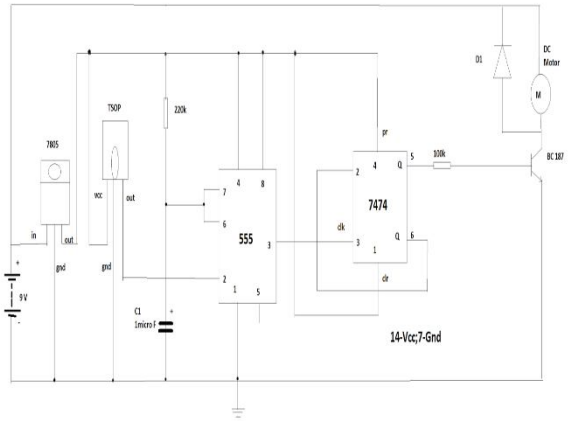


Figure 2.Circuit diagram of Arduino controlled car

ARDUINO CODING

```
 Constintpwm=2;
 Cons tint in_1=2;
Cons int in_2=9;
Void main
 {
pinmode(pwm,output);
pinmode(in_1,output);
pinmode(in_2,output);
   }
  Void main
   {
digitalwrite(in_1,HIGH);
digitalwrite(in_2,HIGH);
delay(1000);
digitalwrite(in_1,LOW);
digitalwrite(in_2, LOW);
delay(1000);
}
```

IV. ADVANTAGES& DISADVANTAGES

ADVANTAGES

- Debugging:-The arduino Environment provide easiest debugging environment which is cross-platform and is accepted by every member of the family.
- No programmer or dumping flash by dirty ways,With most of the companies already providing on-board debugger still compared to a lot of microcontroller(8051) upload is a click away.
- Every time you don't need to take datasheet out and figure what the architecture is what are the addresses of the microcontroller to write simple functions like delay or interrupt.
- Design of the board is very carefully crafted for beginners be it Moron Switch or ISP header to the polarity of power, The chances are steep that you would be blow it.
- Peripherals and Modular Design: Arduino Ecosystem has fantastic modular design, you can simply add the already designed shields to the board with out any wire, just plug and play with peripherals like motor shield, Bluetooth shield, Wifi and what not already made.
- Libraries: A lot of libraries and IC's have already been build for the same which is crucial a lot of times.

DISADVANTAGES

The structure of Arduino is its disadvantage as well. During building a project you have to make its size as small as possible. But with the big structures of Arduino we have to stick with big sized PCB's. If you are working on a small micro-controller like ATmega8 you can easily make your PCB as small as possible.

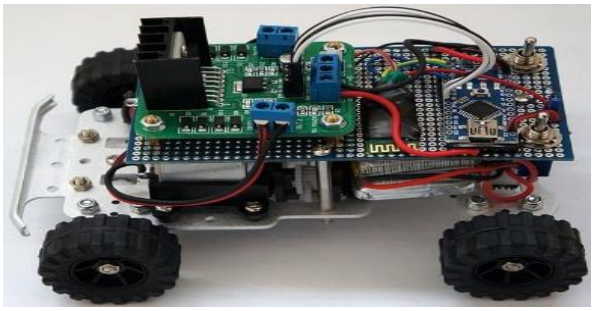
COST

The most important factor which you cannot deny is cost. This is the problem which every hobbyist, Engineer or Professional has to face. Now, we must consider that the Arduino is cost effective or not.

V. APPLICATIONS

- Industrial automation
- Service for disabled
- Vision system
- Planetary
- Mine site learning

Actual view of Project



VI. CONCLUSION

The Science is growing day by day and there has been lot of development in the field of an automated guided vehicle but the advancement has done in the increase of automated Guided vehicle(agv) cost. The manufacturer of agv faces many difficulties to develop an agv but always ready to face this challenges. Consider china is making their own agvs because of not to buy the product from outside of their country. The agv in this project developed for the small sized enterprises under the budget.

FUTURE SCOPE

What the Arduino platform has done is to take what was once a fragmented and expensive market for robotics and microprocessors and become the major platform, largely by virtue of much lower cost and ease of use, leading to higher volume and popularity, and community support behind it. Arduino has made it simple to program their boards with any computer via USB and simple to integrate with a wide array of sensors and devices.

The Arduino is great for hobbyists, prototypers, and people just starting out in robotics because of its low cost, ease of use, and large following online. It's easy to learn and teach people to be able to do basic things with the Arduino, yet it's capable enough to do fairly sophisticated things if you as a developer have the capability to take advantage of it. It's allowing people to develop projects inexpensively to build and control their own devices, such as sensors that send data to the Internet and control systems for all kinds of things. It's also reducing the cost of development by allowing companies to develop prototypes much more quickly and with less initial investment.

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