

Design and Fabrication of Amphibious Vehicle

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Abstract –A detailed design of an autonomous amphibious vehicle (AAV) capable of traversing across aquatic and terrestrial environments is presented. The vehicle features a unique suspension system built into the two segment body, whereby a joint allows each segment to pitch and roll independently of one another while traveling across uneven terrain. Four driven paddle wheels propel the vehicle while on-land and on-water. Modular buoyancy attachments have been used in order to allow the AAV to float on water as necessary. A control algorithm has also been proposed to allow the AAV to travel from its current location to another location specified with latitude and longitude coordinates.

Index Terms – AAV, amphibious, Bluetooth HC05.

1. INTRODUCTION

Vehicle body design is one of the important aspects for the performance of vehicle when the vehicle across a medium at high speed, the medium will sets on the vehicle body in term of resistance. Air is one of the medium of space that provide resistance when vehicle travelling at high speed due to air space densities. This contributes to the consumption of fuel use of for vehicles Besides that, the design of the vehicle body should have an aura of attraction vehicle for ensuring that the vehicle is able to float on the water, Among the criteria required material for manufacture of the vehicle in that it must be durable, has good properties of waterproof, easy to people who sees every details of design in terms of creativity and aesthetical value Therefore, in this paper designs process are documented according to stage which the design is start from scratch Selection of materials for the manufacture of basic materials is an important to set up and easy to do the repairs in the event of damage and maintenance work.

In this project, fiberglass is used to fabricate the body due to the lightweight and the strength of the material Fiberglass is also a material that an absorb sound effectively due to the properties of the material that has good damping capacity for noise absorption. Fiberglass is most commonly used material for body building of bouts or vehicles to cross water due to its mechanical properties and have a good waterproof properties compared to other materials in composite the vehicle body with fiberglass, there are several techniques can be used and Hand cost and less used of machine which are conventionally

executed layup techniques is once of the famous technique that widely used due to it minimum family.

2. RELATED WORK

All the related works that have been done by other researchers that are related to the current research problem are summarized in this section.

2.1. Design and operation of a land-water car

The paper presents the selected problems of design and operation of amphibious craft for rescue purposes. The results of research on the amphibious rescue units allowed formulating the general conclusions with respect to the proper selection of the main design parameters, program of model tests and full scale trials for the amphibious craft. The most important design problems related to the water characteristics are presented and discussed.

2.2. Bluetooth Remote Controlled Car using Arduino

This Work is based on Arduino, motor driver and Bluetooth module. 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.

3. PROJECT SCOPE

The purpose is to make Land-Water vehicle that can be put forward for the purpose of commercialization, especially in the field of military and rescue operations .This work is based on Arduino, motor driver and Bluetooth module. Arduino is an open source prototyping platform based on easy-to-use hardware and software. This helps in developing the hybrid nature of the vehicle .The scope is to design a Land-Water vehicle for the purpose of commercialization, especially in the field of military and rescue operations. This project aims in recovering the usage of fuels and consumption of other

chemicals which leads to pollution. By adding the extra float support materials in order to provide proper buoyancy of the vehicle.

4. TECHNOLOGIES USED

Arduino UNO R3

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins.

Bluetooth Module HC-05

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

Lithium-ion battery

A lithium-ion battery or Li-ion battery (abbreviated as LIB) is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging. Li-ion batteries use an intercalated lithium compound as one electrode material, compared to the metallic lithium used in a non rechargeable lithium battery. The electrolyte, which allows for ionic movement, and the two electrodes are the constituent components of a lithium-ion battery cell.

Gear Motor/Brushed DC

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

H bridge

An H bridge is an electronic circuit that enables a voltage to be applied across a load in opposite direction. These circuits are often used in robotics and other applications to allow DC motors to run forwards or backwards.

Speed Control of DC Motor by Android Application

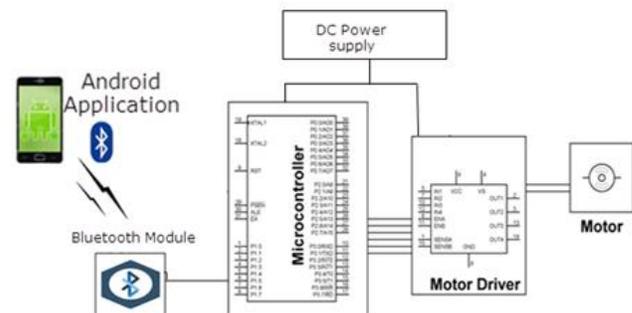


Fig 1 Block Diagram

5. PROPOSED PROJECT

The software implementation part of voice recognition based home automation system implemented using the Arduino controller. It consists of training of voice recognition module. The voice recognition module needs to be trained first with the voice commands before it can be put to recognizing function. The voice recognition module training program is loaded into the Arduino and then trained with the voice commands. This shows the training process of voice recognition module using the Arduino IDE. The main code for the home automation system is written in C++ language in Arduino IDE. Upon successful recognition of voice command the control action corresponding to that command is taken.

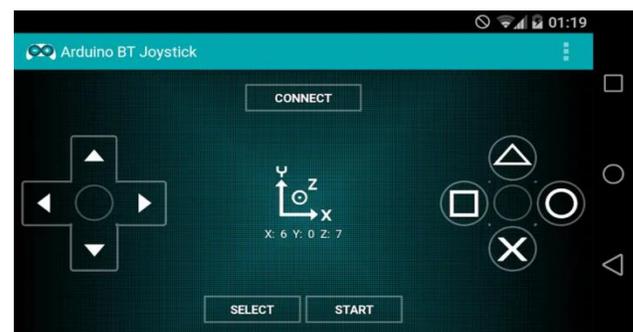


Fig 2 Arduino App

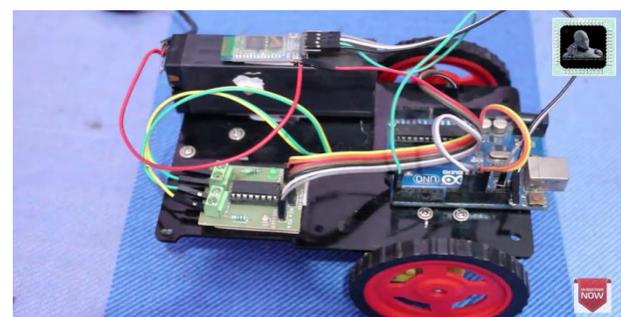


Fig 3 Amphibious Vehicle

6. CONCLUSION

The entire project design will be carried out with the large and real database connection and thus will enhance the whole project Bluetooth module can be replaced with another component that can provide wider range of accessibility.

REFERENCES

- [1] Jadhav Snehal Balasaheb, Supekar Bhagyashri Sitaram, Wakode Vrushali Khushalrao, Vasaikar Nikita Ashok, Mandlik Priyanka Bhausahab 'Home automation System' in IJEDR -2014
- [2] Jianye Liu, Jiansha Yu, 'Vehicle using Arduino and Bluetooth' in Fourth International Conference on Intelligent System -2011