Marine and Land Based Arduino Boat

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ABSTRACT- Disasters are natural calamities which takes place accordingly across the world. Recently, in 2020, various disasters took place which affected the world in various scenarios. During these situations, emergency conditions take place which needs to be handled timely and carefully. So, if any technology contributes to these situations, proves to be a "Boon" for the world. To improve the performance of a vehicle designing is the important aspect for it. At the point when the vehicle runs over a channel at a fast pace, the medium will go along the vehicle in term of obstruction. The reason behind the vehicle going in the opposite direction, when the vehicle moves in at high velocity is because of the structure of the room as there is air space density inside the room. Other than that, the blueprint of the vehicle ought to have an air of fascination with individuals who look at everything about plan as far as inventiveness and aesthetical worth. The land and/or water capable automobile is a double reason vehicle which is described by velocity and intangibility on water, potability, and adaptability ashore and exceptional traffic flow capacity at the intersection of land and water. This project aims to make an Arduino based boat cum car which can highly contribute to disasters. The project would work both as a boat on one side and as a car on other side. These technologies can help people in various ways, for example, rescue operations, essentials delivery, roads having large distance than water and many more. People can use this technology according to the requirement, as a boat or as a car, as and when required.

KEYWORDS- Disasters, Arduino Boat, Marine Boat, Rescue Operations,

I. INTRODUCTION

Configuration of a vehicle or an automobile is a great angle to be looked over if there is an exhibition of different varieties of them. At the point when the vehicle goes over a medium at rapid, the medium will follow up on the vehicle in term of obstruction [1-4].

Vehicle fuel utilization is big factor which is considered while the vehicle is moving at high pace in the direction opposite to the air as the medium of air will help in the processing. The land and/or water capable vehicle is a double reason vehicle which can be described by quickness and imperceptibility on water, movability, and adaptability ashore and exceptional traffic capacity at the intersection of earth and water [5-8].

It has the highlights of boats yet destroys their cutoff points. This is a direct result of the assets of the land and/or water capable vehicle that numerous operations can be finished without the scaffolds worked by the organization of designers, which incorporates going across the streams, water nets and lakes consistently. Furthermore, it can execute seashore landing, flood help, and watch around, complete the battle duties that vehicles cannot trouble. In the meantime, it shows its tactical worth by the uncommon property of good intangibility, solid attack, just as landing and dispatching under the states of terrible climate and immense wave. D Tank was once designed as the amphibious one in England. The speed can reach 2.4km/h by the path on water [9-13]. The adaptability is the main strategic presentation marker of the land and/or water capable vehicle, choosing the front-line survivability. To accomplish better speed, the adaptability ashore and the speed on water ought to be improved consistently. Along these lines, the developments both ashore and on water have been given expanding consideration [3].

Therefore, 'Amphibious vehicle' is one of the attractive and useful design of vehicles. As the name suggests amphibian means which can travel in water as well on land so the transport vehicles are also named accordingly. It tends to be advanced for the commercialization reason regarding different applications like in the field of military and salvage activities. Specialists are chipping away at land and/or water capable vehicle with capacity to run in unfavorable conditions in productive way.

II. LITERATURE REVIEW

Author	Contribution	Method Used	Future
Balasubramanian Esakki, Surendar Ganesan, Silambarasan Mathiyazhagan [1]	Paper discusses design of Amphibious Vehicle and is expected to meet disaster missions	Design of Hovercraft, Selection of Hull material and Motors	Need to extend study for further utilize other Hardware Components
Ihsan, I., Ilham, D. N., Candra, R. A., Yunan, A., & Hardisal, H[3]	Making of Traditional boat which can turn on and off the water pump engine	Schema of Boat Drainage System with Water Pump Testing	essential need of testing some more components
Prof.Anup M.Gawande, Mr.Akshay P. Mali[6]	This paper proposed amphibious vehicles in detail and design of amphibious car	Fabrication and Modelling of a prototype of Amphibious car	Quite a simple prototype, need more design and modelling
S.Renuka , S.Nidish , A.Karan Raj Selvam[18]	The authors proposed establishment of technical aspects of photovoltaic (PV) system to enhance power generation	Operating model of Rectifier and Boost Controller	Need more study as, the current urgency requires an improved model with high-end performance accuracy

III. METHODOLOGY

A. About Arduino

Arduino is an open-source apparatus and programming association, undertaking, and client local area that designs and makes single-board microcontrollers and microcontroller bundles for building automated gadgets and knowledgeable articles with both physical and advanced detecting and control. Its products are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), allowing anyone to build Arduino boards and distribute software. Arduino boards are commercially available preassembled or as do-it-yourself (DIY) kits. It can also accept and send data over the internet with the help of numerous Arduino shields, which are covered in this paper. Arduino employs hardware known as the Arduino development panel as well as software known as the Arduino IDE for code development (Integrated Development Environment) [14-18].

Fig. 1: Arduino IDE

B. nRF24L01

The NRF24L01 [19-22] is a wireless transceiver that uses radio waves to send and receive data. It acts as both receiver and transmitter module with a single chip. It transmits data using the SPI protocol. It has a data transmission rate of up to 2Mbps. The NRF24L01 is commonly used for data transmission in industrial devices and projects. It is mostly used in computer, toys, remote control, games, and other electronic devices.

Features:

- True single chip GFSK transceiver
- Complete OSI Link Layer in hardware
- Enhanced ShockBurst
- Auto Acknowledgement & retransmit
- Computation of addresses and Cyclic Redundancy checksum
- On the air data rate 1 or 2Mbps

Fig. 2: nRF24L01-Wireless Transceiver

C. Rain Drop Sensor

To detect rain there is a tool named Raindrop Sensor. It is basically divided into two different parts: a rain board that detects rain and a control module that evaluates and converts the analog value to a digital form. The rain drop sensor module is an intelligent and low-cost rain sensor.
It consists of two sections: a pad that can sense rain and a board to control the device. The sensitive power of the sensing pad perceives any water present on it, whereas the control board orates and binarizes these signals. The rain drop module is widely used in the automotive industry. When rain is detected, it can be used to monitor the weather and send closure requests to shutters or windows. Raindrop sensors are castoff in the automotive industry to automatically control windshield wipers, in agriculture to detect rain, and in home automation systems.
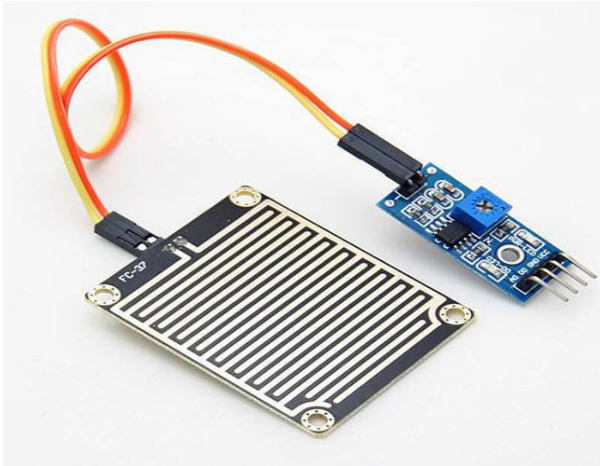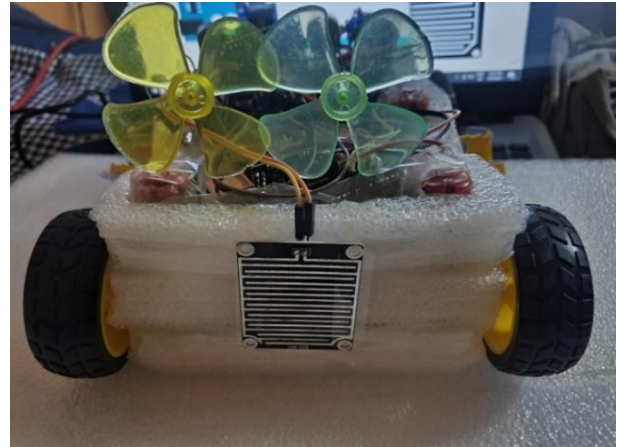
Fig. 3: Rain Drop Sensor

D. Block Diagram

Below presented is the block diagram for Marine and Land based Arduino Boat. There exists 4-motors for the car and 2-motors for the boat [23]. A servo motor is there which does the work of switching from car to boat and boat to car respectively. Receiver receives the radio frequency signals and then motor driver control the car.
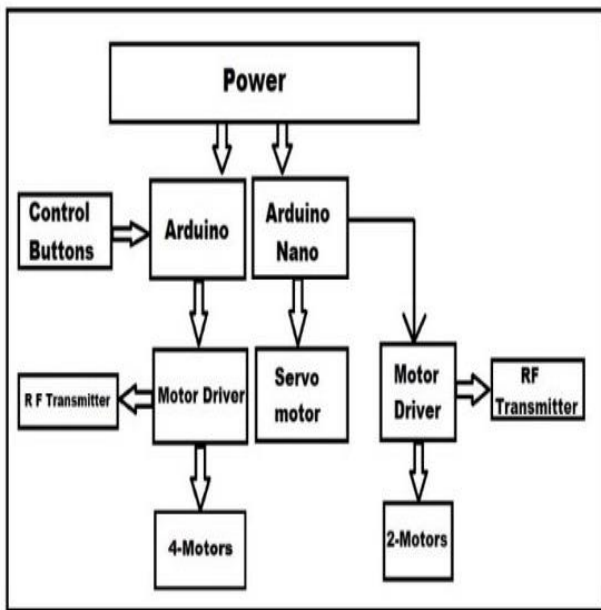

Fig. 4: Block Diagram for Boat

E. Results and Analysis

Fig 5 shows propellers of boat and rain drop sensor which senses water as soon as water encounters sensor and switches to boat automatically.

Fig. 5: Working Screenshot-1

Fig. 6 showing propellers started moving the time its rain sensor senses water and switched to boat automatically. In the screenshot it is moving towards left hand side because its right propeller is moving. If it will turn to right, then its left propeller will move automatically.

Fig. 6: Working Screenshot-2

Fig. 7 showing boat is changing its direction as it started moving. This is done with the help of joystick which can be operated from a distance. Screenshot showing both the propellers are moving because the boat is moving straight to the water.

Fig. 7: Working Screenshot-3

IV. CONCLUSION

Marine and Land based Arduino boat is operable from a distance with the help of a joystick so that it can also work out without human being physically present in vehicle. This can benefit in areas like essentials delivery in remote areas, rescue operations from where people can only sit and come without driving themselves and much more. There are challenges for amphicars but as such there are no disadvantages till now.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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