

Arduino Based Automatic Truck Controller With Regenerative Braking

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ABSTRACT: The vast majority of the electric vehicles require continuous charging and demands greater investment for charging. To keep away from this charging time and to keep away from the utilization of battery in the electric vehicle the cross breed electric vehicle has been planned using our project arduino based automatic truck controller(ATC) with regenerative braking. The half breed electric vehicle comprise of the dynamo and the driving engine which are the principal part for the mixture electric vehicle. This circuit mix assists us with keeping away from the utilization of battery in the ordinary electric vehicle. The dynamo supplies the important voltage to the electric vehicle engine which drives the electric vehicle. The created energy is the free energy. The created free energy is provide for the electric vehicle through Regulated power supply to charge the battery.

Keyword: electric vehicle engine, dynamo, free energy, gearmotor, Arduino.

I. INTRODUCTION

With the creation of Gas powered Motor by Nicolas Otto, there was upheaval in Auto field. Later on, Petroleum and Diesel turned into the principal wellspring of fuel for these vehicles. This innovation put forth Human Attempts exceptionally simple through commercializing on the lookout[1]. As, the world went through twentieth Hundred years, there happened numerous headways for making this innovation productive and financially savvy [3]. Due, to which it turned into the business achievement [4] and its utilization in the everyday period expanded. Individuals could arrive at large number of kilometers/miles in hours with the assistance of this innovation. As we know the whole thing has its own +ve and -ve side. In the present quick creating world, air contamination is quickly expanding and influencing a large portion of the significant [5] urban communities of the world. These expanded is basically because of the emanation of carbon dioxide and other poisonous gases from the vehicles which prompts steady expanding in a dangerous atmospheric deviation. And furthermore interest for use of petroleum derivatives is expanding at a more prominent rate as the utilization of vehicles [2] is quickly developing An electric vehicle is an auto that is impelled by at least one electric engines, utilizing energy put away in battery-powered batteries. Electric vehicles are regularly fueled by ready battery packs, and as such are battery electric vehicles (BEVs) [4]. Albeit electric vehicles frequently give great speed increase and have commonly satisfactory maximum velocity, the less fortunate energy limit of batteries contrasted with that of petroleum products implies that electric vehicles have generally unfortunate reach among charges [6], and re-energizing can take huge timeframes. Notwithstanding, for regular use, as opposed to long excursions, electric vehicles are exceptionally pragmatic types of transportation and can be modestly re-energized for the time being. Vehicles are perilous machines. What makes them perilous is their size, their weight, their speed, their force and fuel (gas), a substance that might possibly burst into flames and spark off. This is one manner by which simply electric vehicles are unmistakably more secure than vehicles with gas powered motors: They convey no gas. Yet, they add a completely new component to the security condition.

A battery electric vehicle (BEV), unmodified electric vehicle, just electric vehicle or all-electric vehicle is a sort of electric vehicle (EV) that only purposes substance energy put away in battery-powered battery packs, with no optional wellspring of impetus (for example hydrogen power device, gas powered motor, and so forth.). BEVs utilize electric engines and engine regulators rather than gas powered motors (Frosts) for impetus. They get all power from battery packs and hence have no gas powered motor, energy component, or gas tank. BEVs incorporate - however are not restricted to - cruisers, bikes, bikes, skateboards, railcars, watercraft, forklifts, transports, trucks, and vehicles.

Explicit Qualities: Unadulterated electric power train. Battery re-energizing at the power lattice. Options: extra sequential burning motor (range extender) or switchable batteries.

Battery Capacity Limit in Kilowatt Hours: 15 to 20 for city vehicles, up to 60 for enormous vehicles.

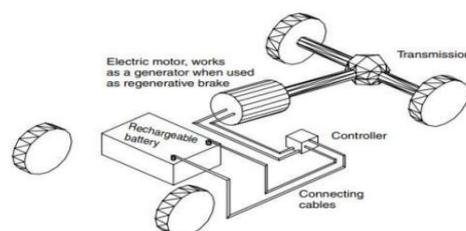


Figure 1. Layout of Battery Electric vehicle

II Existing System:

In existing system, most of the vehicles are operated with support of fuel (Petrol, Diesel or gas) or battery power. If the vehicle operated with support of fuel following problems takes place.

1. Day by Day increasing fuel cost
2. Atmospheric pollution
3. Shortage of fuel

An another hand, we have electric vehicle which was operated with support of battery. The battery is charged by wired power system. One of the major drawbacks in wired power system is the losses taking place during the transmission and distribution of electrical power. The approximated measure of force misfortune during dissemination and transmission is 26%. The fundamental justification behind this power misfortune is the opposition of wires that are utilized for framework.

DISADVANTAGE

- Charge moment in time is more
- Low effectiveness
- In service cost is too high
- High temperature arise in cable
- Low trustworthiness

III Proposed System:

This examination paper connects with the working of an electric vehicle with self charge using alternator to the battery. The alternator delivers the power while the wheel is moving, permitting the alternator to move with the wheel contact. In our idea, we take every one of the parts of alternators that incorporate a DC converter, engine, battery and regulator. Alternator gets the drive from contact. Here the alternator can create the 12V DC, which is straight forwardly associated with the DC converter all through the battery. The DC converter can move forward to the 50V and that is sufficient to charge four batteries which are associated into the series association that delivers the 48V inventory. The regulator gets associated with the battery, engine and another association.

ADVANTAGE

- No emission
- No gas or oil changes
- Ability to easily charge at time of operation.
- quick and smooth increase of velocity
- Minimal expenses for operation

IV BLOCK DIAGRAM:

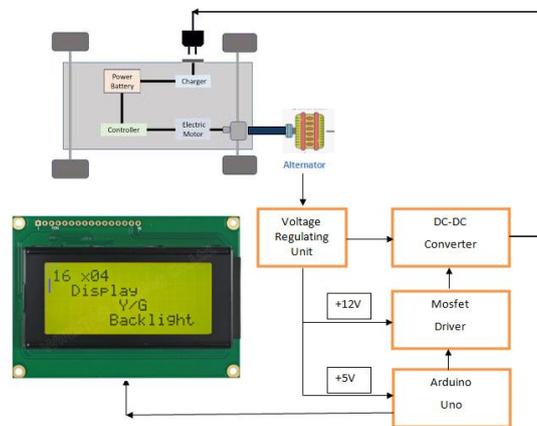


Figure 2 Block Diagram of Vehicle

This paper's primary objective is to use dynamos to power electric cars. The most significant drawback of an electric vehicle is that it must be stopped or parked in an area where it is easy to get current because the battery's charge, which supplies the motor, depletes. But the biggest problem is that you can't get to your palace if the car loses all of its charge while driving in an area where the current can't be taken easily or there isn't any current there. To solve this problem, dynamos are used. A dynamo is a device that can convert mechanical energy into electrical energy. Because of this property, the issue can be resolved. This method is described as a cyclic process in which one dynamo is placed in each wheel and each dynamo generates a charge through the car's wheels' rotator motion. These charges are stored in a separate battery and can be used in an emergency. The dynamo will continue to work even if the car loses charge while running on the dynamo's charge; instead, it will produce another charge so you can travel a greater distance.

IV COMPONENT DESCRIPTION

1. DYNAMO/DC Motor

Geared DC motors can be thought of as an extension of the DC motor, whose Insight details were already explained in this article. A gear assembly is attached to the motor of a geared DC motor. The gear assembly aids in increasing torque and decreasing speed, and the motor's speed is measured in terms of shaft rotations per minute (RPM). A gear motor's speed can be reduced to any

desired level by using the right combination of gears. Gear reduction is the idea that gears increase torque while decreasing the vehicle's speed. The gear head and, as a result, the operation of a geared DC motor will be examined in detail in this Insight.

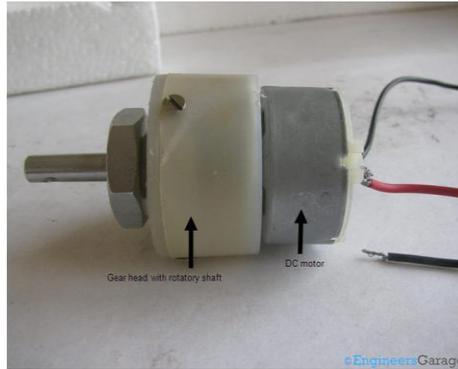


Figure 3 Dc Gear Motor/Dynamo

2. DC-DC CONVERTER

There are numerous applications for switched mode supplies, including DC to DC converters. Even if a dc supply, like a battery, is available, its voltage is often insufficient for the system being supplied. For instance, the motors that power electric cars need much higher voltages than what a battery can provide on its own. Even if a bank of batteries were used, it would be too heavy and take up too much space for it to be useful. Using a boost converter to raise the available dc voltage to the required level and using fewer batteries is the solution to this issue. One more issue with the batteries, enormous or little, is that their result voltage shifts as the accessible energize is utilized, and sooner or later the battery voltage turns out to be excessively low to drive the circuit being provided. However, the battery's lifespan can be extended if the low output level can be raised again using a boost converter to a level that is useful.

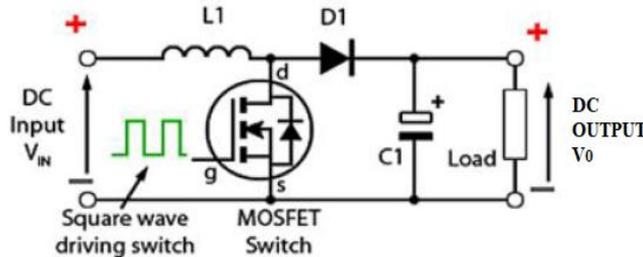


Figure 4 DC-DC CONVERTER CIRCUIT

3. LCD

LCD (LIQUID CRYSTAL DISPLAY) screen is an electronic showcase module and track down many applications. A 16x4 LCD show is extremely essential module and is ordinarily utilized in different gadgets and circuits. These modules are liked north of seven portions and other multi fragment LEDs. The reasons being: LCDs are practical; effectively programmable; have no limit of showing extraordinary and even custom characters (in contrast to in seven portions), activitys, etc.

A 16x4 LCD implies it can show 16 characters for every line and there are 2 such lines. In this LCD each character is shown in 5x7 pixel framework. This LCD has two registers, in particular, Order and Information.

The order register stores the order guidelines given to the LCD. An order is a guidance given to LCD to do a predefined task like instating it, clearing its screen, setting the cursor position, controlling presentation and so forth. The information register stores the information to be shown on the LCD.



Figure 5 LCD DISPLAY (4*20)

4. BATTERY

A battery-powered battery, capacity battery, or optional cell (officially a kind of energy gatherer), is a sort of electrical battery which can be charged, released into a heap, and re-energized commonly, instead of an expendable or essential battery, which is provided completely energized and disposed of after use. It is made out of at least one electrochemical cells. The expression "gatherer" is utilized as it collects and stores energy through a reversible electrochemical response. Battery-powered batteries are delivered in various shapes and sizes, going from button cells to megawatt frameworks associated with settle an electrical appropriation organization. A few distinct mixes of cathode materials and electrolytes are utilized, including lead-corrosive, zinc-air, nickel-cadmium (NiCd), nickel-metal hydride (NiMH), lithium-particle (Li-particle), lithium iron phosphate (LiFePO4), and lithium-particle polymer (Li-particle polymer).

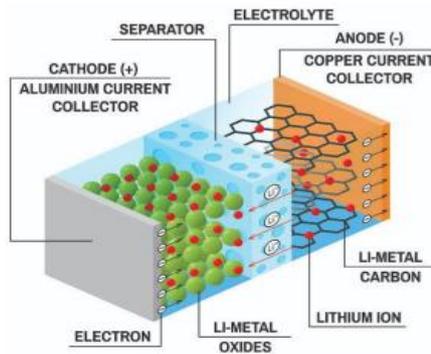


Figure 6 LEAD ACID BATTERY INTERNET DIAGRAM

5.Arduino uno

Arduino UNO depends on an ATmega328P microcontroller. It is not difficult to utilize contrasted with different sheets, for example, the Arduino Super board, and so on. The board comprises of advanced and simple Info/Result pins (I/O), safeguards, and different circuits.

The Arduino UNO incorporates 6 simple pin inputs, 14 computerized pins, a USB connector, a power jack, and an ICSP (In-Circuit Sequential Programming) header. It is customized in light of IDE, which represents Coordinated Improvement Climate. It can run on both on the web and disconnected stages.



Figure 7 ARDUINO UNO

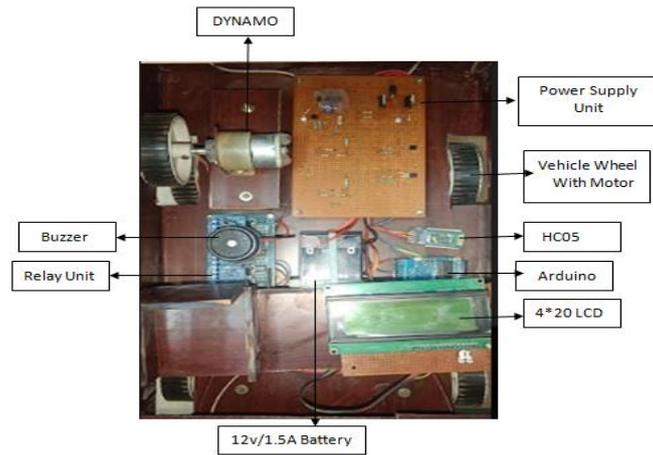
Tech specs

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader

**V RESULT & DISCUSSION:
HARDWARE IMAGE:**



INTERNAL HARDWARE IMAGE:



IGNITION ON :



FORWARD-REVERSE:



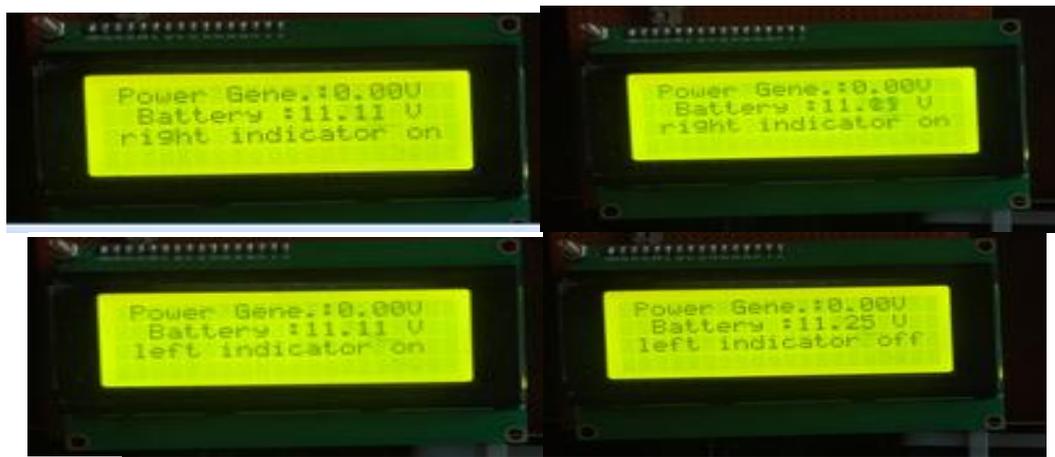
RIGHT- LEFT:



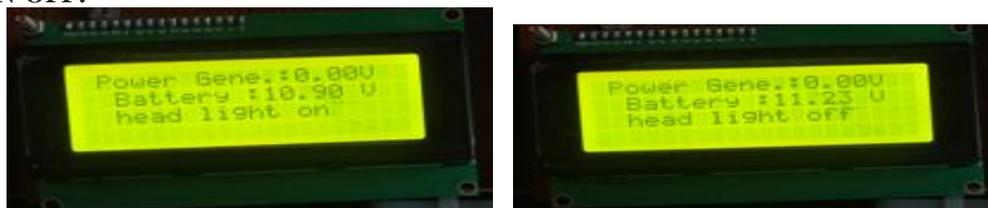
STOP:



RIGHT & LEFT INDICATORS (ON-OFF)



HEADLIGHT ON-OFF:



V1. Conclusion

A low-cost regenerative braking system for electric vehicles is developed in this thesis. Electronic commutation, silent operation, and other advantageous features have recently led the vehicle system to favor DC motors. Regenerative braking, which stores energy during braking, is not part of the current system. Additionally, the use of a boost converter in some systems, including this one, results in an increase in both system size and price. As a result, an adaptable approach to avoiding the use of this system is suggested and experimentally proven.

To demonstrate the basis for the thesis, the motivation and overview have been discussed in the first chapter. The disadvantages of the conventional braking system as well as the price point are brought up in a clear and comprehensive discussion. Even though only a small amount of energy is used, this regeneration is worthwhile because it eliminates the energy waste of the conventional braking system. The system that is proposed and the various parts that went into making it are discussed. In addition, the operation of the various units and the system as a whole are depicted. After that, the fundamental characteristics and operation of each component used in the implementation are shown. The microcontroller unit generates pulses, and then the inverter output is seen. Additionally, the required pulse width modulated speed control signal is generated. Following the simulation, the hardware implementation begins. In particular, the gate driver circuit is included in the design of each and every component of the circuit. The motor is turned on and tested on each unit separately. A flywheel is arranged to support the motor's load behavior. Finally, the braking current at various speeds and the braking current time are recorded at various duty cycles of the PWM signal. Regenerative braking will undoubtedly reduce the amount of electricity required to charge the battery from the supply and will charge the battery while the vehicle is moving along the road.

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