Android Controlled Automatic Jack System for Vehicle

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Abstract: The concept of this work is to design and develop the automatic jack system using an android app. An automotive jack is a device used to raise all or part of a vehicle into the air in order to facilitate repairs. With the manually operated car jack most people are familiar with, that is still included as standard equipment with most new cars. Changing flat tire is not a very pleasant experience. Operating the manual car jack is quite difficult job. This purpose is to mainly encounter this problem. This paper presents the development of the car jack which is controlled by android app. A vehicle frame, also known as its chassis, is the supporting structure of a motor vehicle to which all the components are attached, comparable to the skeleton of an organism. Where the jack is placed in the middle of the chassis, to which the movement of the jack is control through the app. A car jack works on the 12V power supply which is obtained from the car battery itself. Operator only needs to press a button from the app without working in a bent or squatting position for a long period of time to change a tire. In order to fulfill the present car jack problem, some improvement in the present technology has to be made.

KEYWORDS: Automotivejack,jackscrew,arduinoUNO,blutoothmodule,DCmotor,Relay switch.

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INTRODUCTION:

During side road emergency like tire puncher, scissor car jack is required to lift the vehicle. A mechanical jack can lift all or part of a vehicle into the air for repairing breakdowns or vehicle maintenance. Changing the flat tire is a laborious activity. These days many varieties of car jack have been developed for lifting an automobile from ground. However, available car jacks are manually operated thus requires extra physical efforts from the user. It is difficult for elderly and handicapped to operate such jacks.jack connected with dc motor, the system which is connected to the arduino board. During the time of puncher where in the user have two options which are front and back, by pressing the front button the jack is being place in the between part of the front two tires, similarly with the back alignment. As the user press on front and back, there is an option called 'complete', as user press on complete jack will be placed in that position where the user is required. With the option OPEN and CLOSE the jack movement is controlled. With the option OPEN the jack lift the vehicle direction,with closed the jack lift the direction up. The automobile workstations are equipped with hi-tech car lifting system, where in car are raised and lowered through android controlled automatic jack system.

STRUCTURE OF PAPER

The paper is organized as follows: In Section 1, the introduction of the paper is provided along with the structure, important terms, objectives and overall description. In Section 2 we discuss related work. In Section 3 we have the complete information about image processing tools. Section 4 anlysis of load and time, its advantages and disadvantages. Section 5 tells us about the methodology and the process description. Section 6 tells us about the future scope and concludes the paper with acknowledgement and references.

OBJECTIVES

Automatic jack system is useful mainly for ladies and old peoples, during the time of puncher they can easily operate and change the wheel.

The objectives of design a car jack that is safe and efficient,reliable and able to function with easy operating.By using mobile easily lift the Heavy Utility vehicles (HUV) like crane,buses,auto and cars.

RELATED WORK

Components of Motorized Jack The main components which are essential for development of motorized scissor car jack are:

1.Arduino UNO
2.blutooth module
3.DC motor
4.motor driver
5.battery
6.wires
7.relay switch

Under favorable conditions, the jack can lift a vehicle chassis when it comes in contact with upper plate, which is caused by rotation of power screw through the electric power taken from car battery (12V) .Firstly motorized jack will be placed under car chassis with some clearance space between top plate and chassis. The movement of jack is controlled by the android app called "bluetooth controller" which is downloaded / available in the Google app called 'play store'. This is built by using "TheAppBuilder" software. The procedure to SIGN IN where this procedure helps for the user security, users will have the separate password where only the car owners can operate. And to log in there are two steps which are I) create my account II) Sign in, as two steps are completed the next pop ups with the system which is connected to the arduino board. During the time of puncher where in the user have two options which are front and back, by pressing the front button the jack is being place in the between part of the front two tires, similarly with the back alignment. As the user press on front and back, there is an option called 'complete', as user press on complete jack will be placed in that position where the user is required. With the option OPEN and CLOSE the jack movement is controlled. With the option OPEN the jack lift the vehicle, and with CLOSE the jack is placed in the vertical direction.

IMAGE PROCESSING

A screw jack is a type of jack which is operated by turning lead screw.it is commonly used to lift heavy weights such as foundation of house and heavy vehicles like cranes,cars.

Arduino UNO [4]

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), 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.

BLUETOOTH MODULE [5]

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier. The module communicates with the help of USART at 9600 baud rate hence it is easy to interface with any microcontroller that supports USART. We can also configure the default values of the module by using the command mode.

DC MOTOR [6]

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

DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range. A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source -- so they are not purely DC machines in a strict sense.

A DC MOTOR is any of a class of electrical machines that converts direct current electrical power into mechanical power. 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. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

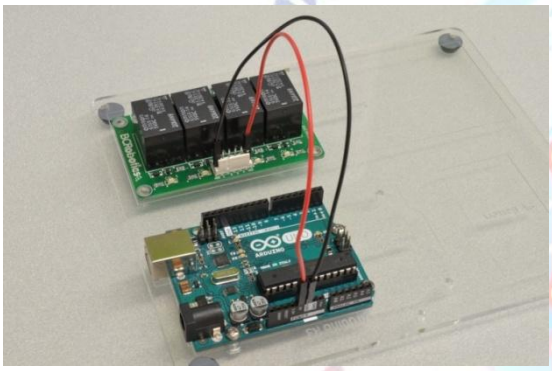
Battery

Batteries are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '-' side), a cathode (the '+' side), and some kind of electrolyte (a substance that chemically reacts with the anode and cathode

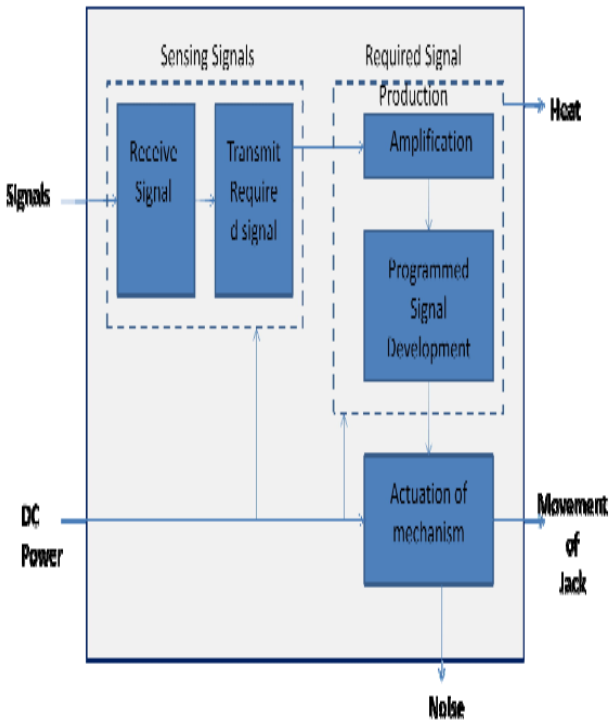
Relay switch

The four-channel can be used to switch multiple loads at the same time since there are four relays on the same module. This is useful in creating a central hub from where multiple remote loads can be powered. It is useful for tasks like home automation where the module can be placed in the main switchboard and can be connected to loads in other parts of the house and can be controlled from a central location using a microcontroller.

4 channels Relay Board is a Simple and Convenient way to interface 4 Relays for switching application in your project. Very compact design that can fit in small area, mainly this board is made for low voltage applications.



Detail block diagram



Calculation:-

Motor Speed 10 RPM

S/NO:-	WEIGHT(KG)	TIME(SEC)
1.	0	50
2.	1	1′20
3.	10	1′30
4.	100	2′40
5.	150	3′10

FUTURE SCOPE AND CONCLUSION

Automatic in built jacking system in automobiles will not only save the effort of a person.Butwillalsosaveone"sprecioustimeundercriticalcircumstances.

Thisconceptwilleliminatetheneedofcarryingaconventionalmechanicalscissorjackwhiletravelling.Itisaveryfeasibleconceptandifworkedovercautiously,will becomePopularverysoon.

The future scope,In our project we use normal screw jack further extension use different types of jacks like pneumatic jack,hydraulicjack,and strand jack.

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