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Bluetooth Controlled Car Jack

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Abstract: *Now a days,peoples are interested in luxury and modified life,comfort and safety is main purpose for life of peoples.Lives provided with money and technology available with the mankind and using atomized this project purpose is to reduce the physical effort by humans to lift an automobile by remote control automation this reduce the accident and workers safety.*

In this project we use the human safety with comfort as main criteria. In the present era an AUTOMOBILE has become the part and parcel of our life even after the Introduction of new range of tubeless tires a most common problem with us is the punctured wheel which is really a cumbersome &tedious task and the most tiring amongst the whole process is placing jack and lifting it. But what if this tiring task is done by the just one click. The titled "DESIGN AND FABRICATION OF MOBILE CONTROLLED SCREW JACK"is the solution for the same.in this we have primarily designed a screw jack and then by assembling motors and other components we have also simulated the design on the same which give the exact and virtual idea of our project. After successful design and procurement of the materials all the necessary components were manufactured and assembled. The entire assembly is controlled by an android mobile. The moment of the jack done by the assembly of an DC motors and lifting operation is obtained..

Keywords: *AUTOMOBILE*

I. INTRODUCTION

In recent years, the development of smart automotive accessories has grown rapidly with the integration of wireless technologies and embedded systems. Vehicle breakdowns and tire punctures are common problems faced by drivers, and lifting a car manually using a conventional jack requires significant physical effort and time. This is inconvenient, particularly for elderly individuals, women, and people with limited physical strength.

The Bluetooth Controlled Scissor Car Jack is designed to automate this process using an electromechanical system controlled through a smartphone. The system combines a scissor jack, DC motor, relay circuits, microcontroller, and Bluetooth module to achieve effortless lifting and lowering of the car. This project represents a practical application of mechatronics, wireless control, and embedded programming.

II. PROJECT OVERVIEW

The proposed project aims to design and implement a motorized car jack that can be operated wirelessly using a Bluetooth-enabled smartphone application. The scissor jack, driven by a DC motor, can lift the vehicle with minimal human effort. The control signals are transmitted via Bluetooth to a microcontroller unit, which drives the motor through relays.

This innovative approach not only reduces physical strain but also improves safety during roadside emergencies, especially in poorly lit or hazardous environments.

III. PROBLEM STATEMENT

Manual operation of car jacks requires physical strength and is time-consuming.

Lack of automation leads to difficulties during emergencies such as nighttime tire punctures.

Elderly people and women drivers face additional challenges in handling mechanical jacks.

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Current manual systems lack safety features and can be unstable if not properly positioned.
Thus, there is a strong need for a user-friendly, reliable, and automated jack system to enhance convenience and safety.

IV. OBJECTIVES

The main objectives of the project are:

1. To design an electromechanical car jack system controlled via Bluetooth.
2. To minimize human effort and time required for lifting a car.
3. To integrate wireless technology for convenient and safe operation.
4. To ensure the system is compact, portable, and cost-effective.
5. To analyze the performance, efficiency, and safety of the proposed system.

V. TECHNOLOGIES USED

- Microcontroller (Arduino/ATmega series): Processes commands received via Bluetooth.
- Bluetooth Module (HC-05): Establishes wireless communication between smartphone and jack.
- DC Motor (High Torque): Provides the lifting force required to operate the scissor mechanism.
- Relay Driver Circuit: Switches the motor ON/OFF and controls direction.
- Smartphone Application: Provides user interface for controlling the jack.
- Scissor Jack Mechanism: Mechanical structure for lifting the car.
- 12V Battery: Power supply for the motor and control circuit.

VI. SCOPE OF THE PROJECT

The project can be applied to all types of four-wheeler vehicles with minor modifications.
It is highly beneficial for private car owners, professional drivers, and fleet operators.
The technology can be expanded to include voice-controlled operation, IoT-based remote monitoring, and solar-powered charging.
The project serves as a strong academic base for research in automotive mechatronics and wireless embedded systems.

VII. METHODOLOGY

The project follows a systematic approach:

1. Requirement Analysis:
Identify mechanical and electrical requirements such as load capacity, motor torque, and battery power.
2. Design of Mechanical Structure:
Scissor jack is selected based on lifting capacity.
DC motor is coupled to the jack screw for motion.
3. Electronics Integration:
Bluetooth module connected to microcontroller for receiving commands.
Relay driver controls the polarity of motor supply to change lifting/lowering direction.
4. Software Development:
Android mobile application developed for Bluetooth-based commands.
Microcontroller programmed to interpret commands and drive motor.
5. Testing & Implementation:
Testing under different load conditions.
Performance optimization and safety validation.---

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VIII. BLOCK DIAGRAM

Smartphone App → Bluetooth Module → Arduino → Relay Driver Circuit → DC Motor → Scissor Jack → Car Lifting/Lowering

1. 12V Car Battery

The system starts with a 12-volt car battery.It provides power for the motor and the control circuit.

2. Voltage Regulator (LM7805)

The LM7805 converts 12V from the battery into 5V.

This 5V is needed for the Arduino and Bluetooth module because they can't handle 12V directly.

3. Arduino UNO (Main Controller)

Arduino is the brain of the system.

It receives commands (like "UP" or "DOWN") from the Bluetooth module via your mobile app.

Based on the command, Arduino turns Relay 1 or Relay 2 ON or OFF.

4. Bluetooth Module (HC-05)

This module connects wirelessly with your smartphone.

When you press a button on your phone, it sends a signal to the Arduino through Bluetooth.

Example:

"U" → Lift the car

"D" → Lower the car

"S" → Stop the motor

5. Relay Driver Circuit (Transistors + Relays)

The relay driver circuit works like an electronic switch.

It uses transistors to control the relays safely using Arduino's small signal.

The relays then control the direction of current to the motor.

6. Relays (Relay 1 and Relay 2)

Relay 1: Turns ON to make the motor rotate in one direction (Lift).

Relay 2: Turns ON to make the motor rotate in the opposite direction (Lower).

When both are OFF → the motor stops.

7. DC Motor & Scissor Jack Mechanism

The 12V DC gear motor is connected to the scissor jack.

When the motor rotates:

In one direction → the jack lifts the car.

In the opposite direction

1. Power on the circuit using the 12V battery.
2. Pair your phone with the HC-05 Bluetooth module.
3. Open the mobile app or Bluetooth terminal.4. Send commands:

"U" → Lift

"D" → Down

"S" → Stop

5. Arduino reads the command and switches relays accordingly.
6. Relays drive the motor to move the jack up or down

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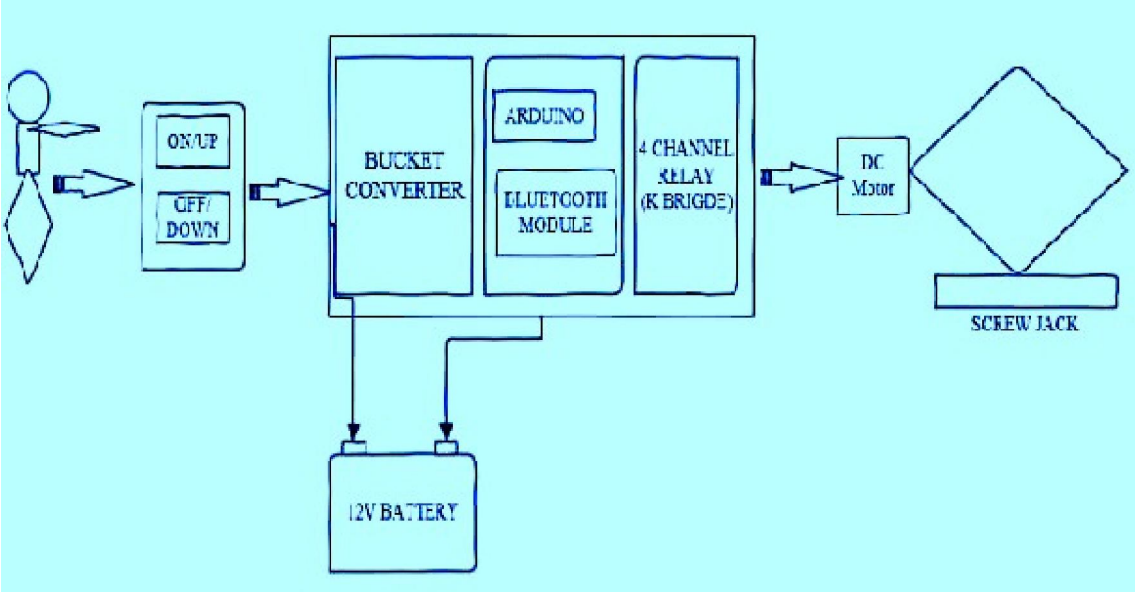
Circuit Diagram :



IX. EXPECTED OUTCOMES

A fully functional prototype of a Bluetooth-controlled scissor jack. Smooth and reliable lifting/lowering operation with minimal human effort.
Portable and user-friendly design.
Enhanced safety for roadside emergencies.

X. APPLICATIONS

1. Used in cars, jeeps, and small vans for effortless lifting.
2. Useful for fleet operators, taxi services, and transport companies.
3. Helpful for physically challenged or elderly drivers.
4. Can be integrated in smart vehicle kits for emergency preparedness.

XI. FUTURE SCOPE

Voice Control: Integration with Google Assistant/Alexa for hands-free operation.
IoT Connectivity: Remote operation and condition monitoring through the internet.
Load Sensors: Automatic cut-off to prevent overload**.**
Solar Charging: Eco-friendly power supply solution**.**
Compact Portable Design: Commercialization for automotive markets.

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Project Result:

Fig. 7: Live lifting test of Toyota Accent 2002

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