IJARETY

International Journal of Advanced Research in Education and TechnologY (IJARETY)

Volume 12, Issue 4, July - August 2025

Impact Factor: 8.152

www.ijarety.in editor.ijarety@gmail.com

International Journal of Advanced Research in Education and TechnologY(IJARETY)

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 4, July - August 2025 ||

DOI:10.15680/IJARETY.2025.1204043

Design and Fabrication of Button Operated Gear Shifting in Two Wheelers

Akash B P[1], Dr. Hemanth Kumar T R[2]

PG Student, Department of Mechanical Engineering, Sri Siddhartha Institute of Technology, Tumkur, Karnataka, India[1]

Professor and Head, Department of Mechanical Engineering Sri Siddhartha Institute of Technology, Tumkur, Karnataka, India[2]

ABSTRACT: This paper's major goal is to automate two-wheelers' gear shifters by utilizing servo motors. The primary function of this new, inventive type is vehicle control. In this case, we are focusing on designing the automatic gear shifting mechanism, engine temperature detecting, and break failure signaling in two-wheeler vehicles using parts such as a potentiometer, buzzer, temperature sensor, servo motor, and break failure indicator. This approach to the gear-changing mechanism in twowheeler vehicles is very practical and distinctive. This makes it simple to operate the bike by means of a button that instructs the servo motor. With programming, we may accomplish motion control, such as clockwise or counterclockwise rotation at a particular angle.

KEYWORDS: Automatic Transmission, Gear Position Sensor.

I. INTRODUCTION

Over the past 20 years, automobile accessibility has improved with the introduction of automatic gear transmission systems. Typically, a lever is used to manually shift gears on two-wheelers, but this method is ineffective for persons with disabilities and does not provide the highest level of comfort for non-handicapped riders. Therefore, we are now working to make it more user-friendly and convenient. A motor can accomplish this. These days, motorcycles and two-wheelers use manual transmissions, also known as sequential transmissions, in which gears are chosen sequentially and direct access to certain gears is not feasible. The driver can shift gears with conventional manual transmissions. Drivers must understand how to utilize a clutch, when to shift, and the precise timing needed to operate a manual transmission efficiently. This is necessary when shifting between gears to fit acceleration and deceleration needs.

MTs are generally thought to be more efficient than automatic gearboxes, which are typically larger and more bulky. In the last few years, however, a lot of work has been done, and the new generation of automatic transmissions is very efficient because of the addition of variable ratios and dual clutches (DCT), which cause them to shift between gears at strategic points depending on specific engine parameters and driver-regulated throttled input. But because of the basic design of an automated gearbox, which includes large "torque converters" that hold the transmission fluid to enable gear modifications, adding more gears and clutches makes them larger.

II. DESCRIPTION

This system outperforms electromagnetic, pneumatic, hydraulic, and manual systems. There is no human intervention when the gears are in motion. The gears are shifted in this method by a servo motor. It is a semi-automatic system, the gear is changed using the supplied button. The servo motor that is attached to the cam working shaft rather than the gear pedal is activated by these buttons. To shift the gear, a servo motor is set to rotate at a particular angle. As soon as the gear is increased, a buzzer will instantly sound. When the engine temperature rises and the break fails, sound the alarm. It will use a temperature sensor to measure the engine's temperature.

III. AUTOMATIC MANUAL TRANSMISSION

A dry clutch, a gearbox, and a specialized control system that uses electronic sensors, computers, and actuators to change gears in response to driver commands comprise an AMT. Human shifting is not necessary when a vehicle is moving since an automated transmission adjusts the gear ratios automatically. Predetermined gear ranges and a parking

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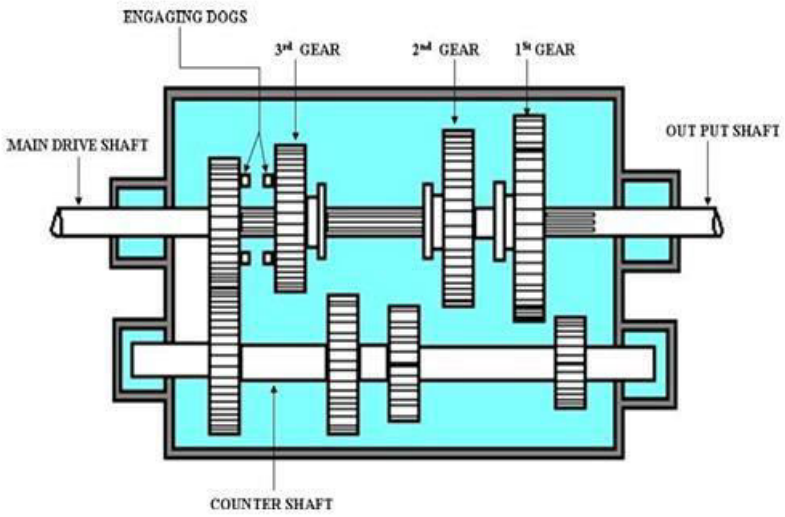
pawl to lock the output shaft on the stroke face are standard features of automatic gearboxes. Automatic transmissions do not require manual clutch plate pressing; instead, they use a hydraulic torque converter to carry out functions based on speed.



IV. LITERATURE SURVEY

Regardless of its implementation, a transmission is a necessary part of every automobile. When the automobile industry first started out, clutch inputs and gear changes were controlled by the driver in a manual gearbox. This means the transmission needs to be physically connected to and disconnected from the engine drive shaft by the driver. When two gears are coupled, the engine and transmission are turning simultaneously, "transmitting" the engine's energy to the wheels through the gearbox. When using the manual translation system, the rider must shift gears on two-wheelers using the clutch pedal. Understanding the new rider is challenging. It makes the rider uncomfortable as well. Changing gears on a regular basis in such conditions becomes quite difficult. Although some cars, like the MARUTI and FERRARI, already have this technology, two-wheelers do not employ it because of the significant quantity of hydraulic and pneumatic equipment. This component adds weight to the arrangement. Additional space is needed for pneumatic and hydraulic equipment. The entire gearing system is electrically controlled by AMT. Various sensors are employed to obtain input signals.

Gear position, speed, and other input data are detected by these sensors. The signal is transferred to the microcontroller or PLC when it has been sensed. This signal is transformed by the PLC into a signal that is transmitted to the actuator. The actuator may consist of either a direct current motor or a stepper motor. These actuators attach to the pedal of the gear.

It moves the gear by applying a certain torque to the base of the gearbox when it is engaged. When a predetermined speed is recognized, the PLC is configured to activate the actuator. As a result, the gears shift automatically without human assistance once the vehicle reaches the desired speed. Although the automated gear changer is quite convenient, it could be problematic when we need to shift gears in urban areas or in traffic. The manual gear shifting system is exploited by the automatic gear shifting mechanism. However, in situations when frequent gear changes are necessary, a fully automated system is useless.

They use an electromagnetic gear shifting mechanism. As a result, the arrangement is less heavy.

This method controls the gears with an electrical switch. The battery and the switch are connected.

Through an electromagnetic actuator, the battery is attached. In the electromagnetic actuator, the LVDT principle is employed. Two coils are attached to the magnetic bar. Current flows through the coils when we press the button. In the

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coils, a magnetic field is produced by the current source. The magnet's bar is drawn in their direction by these magnetic fields. A certain torque is produced by the bar. The electromagnetic system's tiny size and low weight allow it to operate better than the hydraulic and pneumatic systems. The torque that results, meanwhile, is quite challenging to control. Additionally, electromagnetic actuators are rather scarce.

V. COMPARATIVE ANALYSIS OF MANUAL AND AUTOMATED TRANSMISSION

Sr. No.	Manual Transmission	Automatic Transmission
1	Driver is responsible for shifting gears.	Gear shifting is automatic.
2	More concentration is required	Less attention results in accident inducing behavior
3	Fuel efficiency is low	Fuel efficiency is high
4	Transmission repairs are less costly	Repair costs are high
5	Complicated to change gears frequently	Easier to use
6	Depend on manually	Less manually

VI. PROPOSED SYSTEM

The proposed method mounts an external electro-mechanical device with a gear position sensor on the motorcycle's gearbox to preserve manual mechanical gear shifting. The gear position is shown on the dashboard of the car once the gear position sensor sends an electrical signal to the Electronic Control Unit (ECU). Similar to a human rider, this technique provides a seamless gear shifting sequence through electromechanical alterations. The system offers both automatic and manual selections.

The shift drum itself rotates, as does the embedded magnet in a gear position sensor that is connected to it. They use a hall effect sensor for the gear position sensor.

Based on the hall effect concept, the hall effect sensor will generate the voltage. This voltage is sent to the ECU when the magnetic field crosses perpendicular to the field. The actuator will receive instructions from the ECU based on the circumstances.

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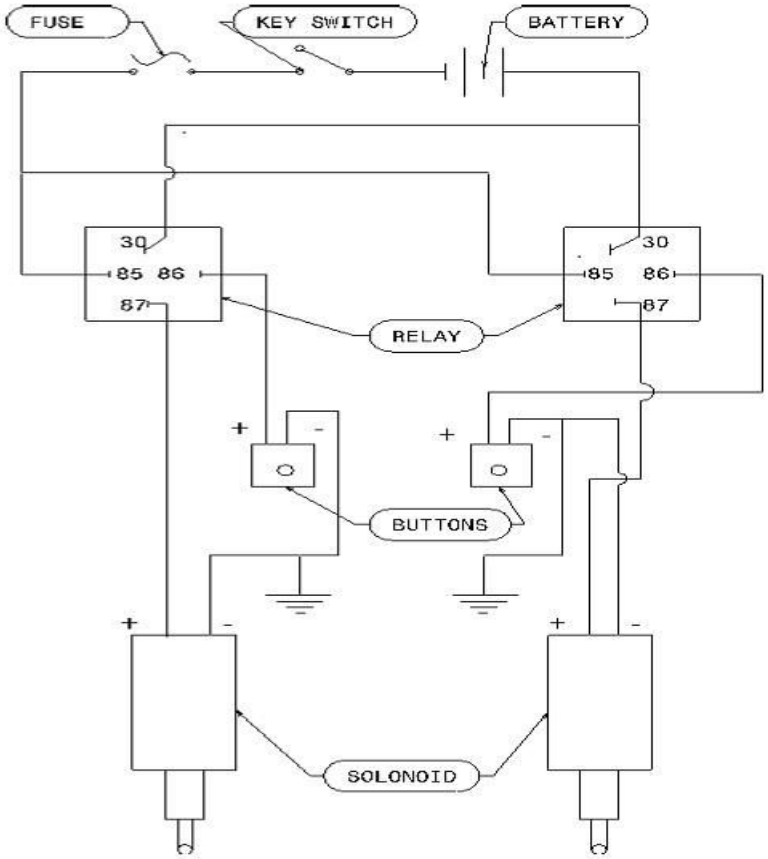

VII. CONCLUSION

Several studies have shown that it can be difficult to shift gears often in situations like traffic. To change this, an automatic transmission is used, which improves rider comfort, lowers human effort, and increases vehicle efficiency. The suggested method increases the gear system's adaptability and dependability.

VIII. FUTURE SCOPE

A touch screen makes it easy for people to apply equipment. Two-wheeled vehicles can also employ a touch screen. A general method for enhancing the quality of gear shifts. This makes driving easier and more convenient while requiring less effort from the driver. Low-cost methods should be the main focus of future research using optimal control techniques.

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