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A Review of Automatic Gear Shifting Mechanism for Physically Challenged Persons Vehicle with Reverse Motion

A. Karthy[1], L. Aravindh[2], V. Arun[3], A. Boopathi[4], K. Divakar[4]
[1] *Professor,* [2, 3, 4] *Students' Department of Mechanical Engineering, Nandha Engineering College (Autonomous), Erode-638 052, India.*

***Abstract:** This paper is about the automatic gear shifting on the two-wheeler with revere motion. In our project, we are trying to implement the automatic gear changing in two-wheeler with revere motion to help the physically challenged people. Some physically challenged people cannot move the vehicle without help from others. By implementing our project we use electronic control and shifting systems to change the gear as per the speed of the vehicle. The main objective of our project is to increase fuel efficiency and to reduce the maintenance cost of the transmission system.*
***Keywords:** Linear Actuator; Arduino; automatic gear shifting; microcontroller reverse gear;*

I. INTRODUCTION

In an automobile the way of power transmission between the engine and driving wheels. The power transmission system includes gearbox and propeller shaft, etc.., for transmitting the power from the engine to driving wheels. The gearbox transmits power from the engine to wheels according to the speed of a vehicle. The gear selection based on the speed of the vehicle. When the vehicle runs at low speed means small size driver and large size driven gears are connected to the engine shaft. If it runs at high speed means the large size driver and small size driven gear is connected to the engine shaft. The various speed achievement is due to the connection between the driven and driver gears based on their size. The automobile filed having update daily. New innovations like GPS, abs, automatic gear change, etc.., has been implemented in automobile mainly in cars. Now they are introduced in two-wheelers. On the basis, the automatic gear changing also introduced to avoid the tiredness in traffic areas due to regular changing of gear to achieve considerable speed. In automatic gear changing the gear engagement and disengagement was on the basis of the speed of the vehicle. When the vehicle reaches low speed the lower power transmission gear was engaged if it reaches high speed means it engage high power transmission gear. The common automatic gear changing setup includes the sensing unit control unit and the shifting unit. In our project, we use arduino as a controlling unit and actuator and servo motor as the gear shifting unit and sensors as sensing unit.

II. LITERATURE REVIEW

In Journal [1] they referred about recent years, there were no vehicles equipped with reverse gear motion. So it is difficult to physically challenged person. In this concept to obtain reverse gear motion with the help of portable gearbox. It contains for reverse gear, v-belt or sprocket for transmission and other necessary parts of two-wheelers. It will provide a better convenient ride to physically challenged people while driving in roadways. In journal [2] they observe the difficulty faced by the physically challenged person by while riding a vehicle. It is difficult to remove the vehicle from parking to riding position. By using the additional gearbox and supporting wheels to overcome the problem. In this project additional gearbox coupled with vehicle gearbox. For gear shifting hand operated lever was fixed with the engine. Based on the position of a lever the vehicle moves in a forward or reverse direction. In journal [3]they implement semi-automatic gear shifting using electronic setup. It is a hand operated gear shifting method. It is an easy method of gear shifting. In this mechanism, the gear engagement was done by electronic equipment's. The gear was shifted by dc motor. The components of this project were dc motor, gearbox, microcontroller, push button, etc.., the vehicle moves forward or reverse motion as per the position of the hand lever. In journal [4] explain about the problem faced by the physically challenged people in the society. They explained the reverse gear mechanism in a two-wheeler. They used the components like a lever, reverse gearbox, chain sprocket, spur gear, bearing, etc.., they explained about the world level focus on developing the physically challenged people. In journal [5] they studied about using the embedded system to make the gear transmission faster and less destructible for the driver in the auto clutch equipped vehicle. By using this gear transmission makes

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easier driving and to drive efficiently. According to the gear shifting method selection of gear transmission as per the speed of the vehicle controlled by microcontroller without human interference. Fuel efficiency can be achieved and also make the driving easier by using this application.

In journal [6], they have been prepared data collection system. To acquire the signal, arduino with help of hall effect sensor, throttle positioning sensor is mounted on the vehicle. Create a data logger system for a vehicle. it can give the signal to the controller in further these data will be used making a strategy of the vehicle, that strategy help to shift schedule in automate manual transmission vehicle. In journal [7]they referred about automobile several research going on, in this, they introduce automation in an automobile that means implementing automatic gear shifting mechanism in the vehicle without human intervention with help of embedded control system for actuating gear automatically this automation is controlled by using of microcontroller and necessary sensors and actuators. After equipping the desired gear shifting technology, will able to get a smooth ride in on road and off road condition.

In journal [8]they explained about an automobile, gears are used to transmit the power from engine to the wheel and these gears are used to control by manually. In the two-vehicle gearbox are used which are operated by foot pedal. This type of manual linkage, gear shifting takes time, it can make a deciding factor while driving. Instead of using an electronically actuated system can reduce the factor of gear changing time. Through this, aimed to design semiautomatic which will be used to future race car projects.

In journal [9] they referred about currently, most of the vehicle has a manual transmission system which is done by the user. In technical terms, the driver of the vehicle must manually press the clutch plate. And it is a tiresome process in heavy traffic. Automatic manual transmission is already implemented in cars, automatic manual transmission in two-wheelers fully based on electrical control unit which intakes different unit such as rpm sensing unit, speed sensing unit, clutch control etc. And also control gear shifting.

III. SUMMARY OF LITERATURE SURVEY

From the literature

1) The multiple ways of automation in gear shifting was observed. Still now more research, innovative ideas and projects need to do in automation to eliminate the difficulty of gear shifting.
2) The size of the additional gear setup also needs to reduce.
3) There is more need for automated working systems to reduce work and help the physically challenged people.
4) The drawback of the hydraulic system compared to electronic was explained.
5) The importance of electronic systems in future automobiles are explained. The electronic systems are overcome the mechanical systems due to energy consumption compared to electronic systems.

IV. WORKING PRINCIPLE

In this project, the automatic gear shifting mechanism in two-wheeler with reverse motion.

A. Automatic Gear Shifting Mechanism

In two-wheeler, gear shifting takes place with varying speed. The sensor is attached in two-wheeler to identify the speed. When the two-wheeler attains a certain speed sensor signal to Arduino. arduino signal to the electronic actuator to gear shift .while gear shifting takes place clutch applied with delay time.

B. Reverse Gear Shifting Mechanism

The reverse gear mechanism setup is attached with the two-wheeler. The gearbox unit is attached between the engine output and chain drive mechanism. When the push button is pressed, input gear engages with ideal gear and ideal gear drive the output gear. The gearbox output is attached with sprocket wheel. The power transmits through the chain drive mechanism from sprocket wheel to rear wheel.

V. CONCLUSION

In this project involves the automatic gear shifting and reverse motion for physically challenged person's vehicle. Implement the reverse motion, automatic gear shifting mechanism to reduce the effort of physically challenged person and also to improve the efficiency of the vehicle. Using the audio controller, the manually operated gear transmission is converted into a fully automated one and also we introduce a new gear shifting mechanism for reverse motion. The application this project is to reduce the driving effort and improve the fuel efficiency will achieve.

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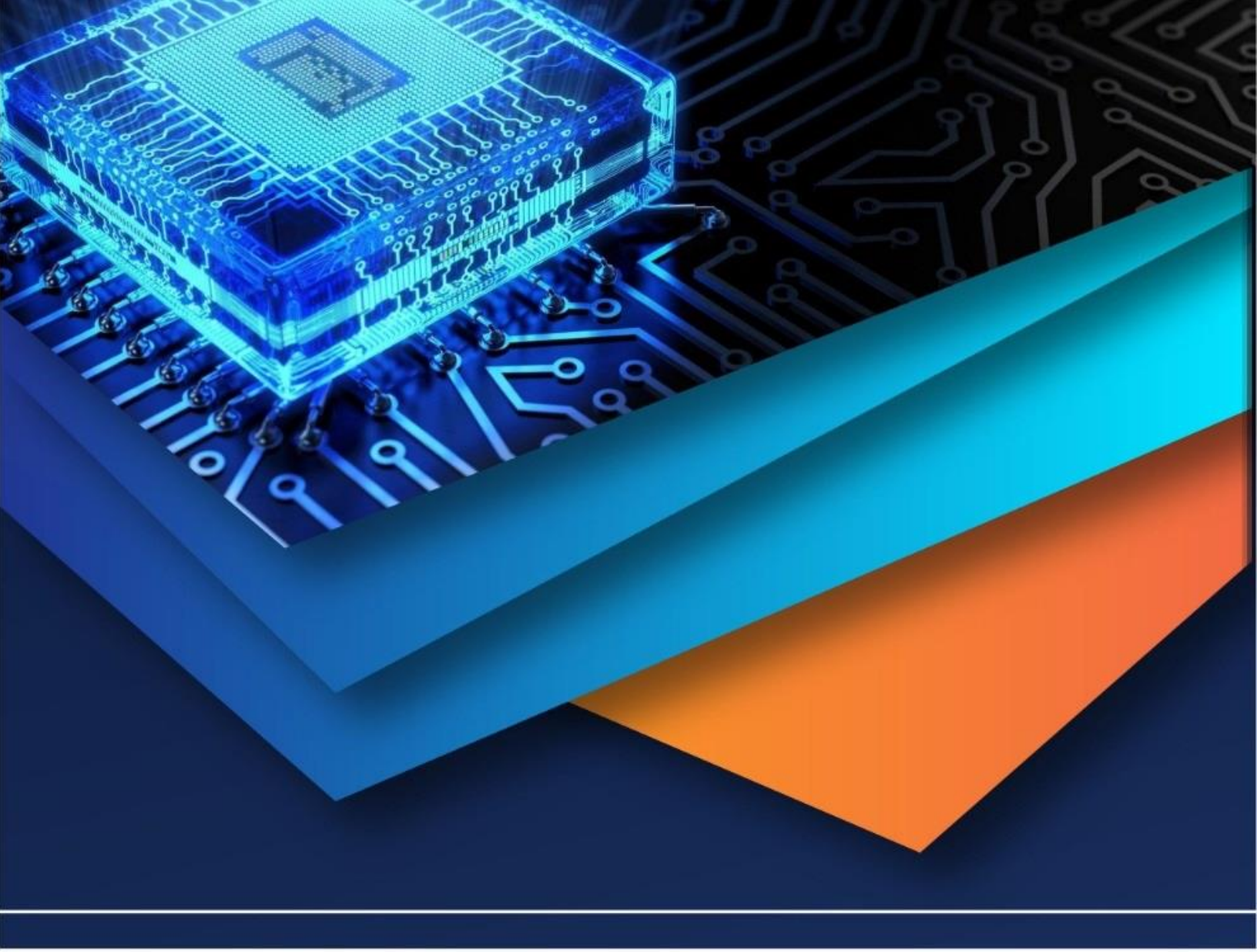

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