

A Review Paper on Development of Automatic Gear Shifting Mechanism

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Abstract— In the present world of automobile, gear shifting system are manually and automatic. Gear shifting system is important in automobile to vary the speed. So automatic gear shifting system is costly than manually gear shifts system but manually gear shifting system is difficult to understand for handicap people or it take physical effort to change gear. To overcome this disadvantage we try to apply touch screen based automatic gear shifting system. In that system by touch on touch screen panel gear is shift. By applying this gear shifting system it gives cost reduction in compare of automatic gear shift system and flexible or simple then manually gear shift system, and by applying this system on automobile it's easier to drive car for everyone. It also reduces the possibility of transmission error of manual gear system. The purpose of this research is to reduce physical effort of human being and they can concentrate only in driving and prevent the accidents. In present report we studied literature review based on this review we define transmission system and gear shifting mechanism to modify a manual gear shifting mechanism.

Key words: Actuator, Micro-controller, Arduino Display Module - 4.3- Touch screen LCD, Four wheeler Engine, Manual gear box, Clutch plate

I. INTRODUCTION

A. Detailed Description Of Problem

Today use of automobile is growing rapidly and to survive in the market is quite difficult with previous technologies. So to survive in the market new technologies are mandatory. The technology must be flexible enough to undertake changes. The technology must continue to grow. During our study on the recent gear shifting mechanism we find out many problems in present system.

In the recent trend there are two existing gear shifting system consists 1) manual gear shifting 2) automatic gear shifting. Here are the problems of existing system are explained below:

1) Manual Gear Shifting Mechanism:

The problems in manual gear shifting mechanism are described below

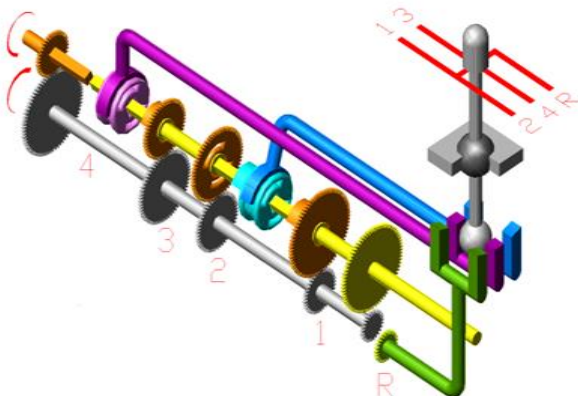


Fig. 1: Manual gear shift technology.

– Required More Human Effort

In manual gear shifting mechanism, the gear can be change with the help lever. To provide motion of lever human effort is required. Without applied human effort gear cannot be change, so sometime it's burdensome for car driver.

– Transmission Error

In manual shifting mechanism. The gear is changed by the driver so that it may be chance to shifting wrong gear instead of true gear. So in manual transmission system the chance of transmission error is high.

– Lack Of Response

We notice that while driving the car hesitates to refuse into gear. Manual transmissions can have the lack of response, so that car cannot run fast as per required in that gear.

– Humming Sound

Manual transmission will emit the sound while changing the gear. This sound is louder due to mechanical operation. The clucking sound is always done when we shift gear within transmission.

– Complex System

The manual transmission system is very complex because it is consist of complex mechanism like gear, lever operation, clutch engage & disengage mechanism.

– Gears Slipping

If the transmission system is immediately slipping in out of gear while driving, then chance of accident is high. So it is very risky. The reason of this problem due to hold the gears.

– Difficult To Understand

In manual transmission system the gear can be changed manually. For change gear we must be change lever operation so that it is difficult to remember & understand.

2) Automatic Gear Shifting Mechanism

There are following problems which occur in automatic gear shifting mechanism.

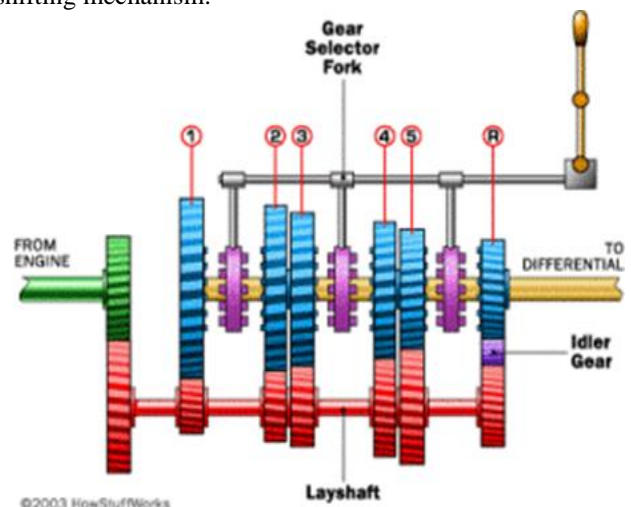


Fig. 2: Automatic gear shift technology.

– High Cost

The automatic transmission system is very costly due to its functioning.

– Less Efficiency

Automatic gear shifting mechanism have a low efficiency compare to manual gear shifting mechanism.

– Gear Slipping

As per mentioned in manual transmission problem gear slipping problem is also occurred in automatic transmission system.

– Grinding Or Shaking

Automatic transmission act a little differently, in automatic transmission system will take some time to wiggle into gear at first instead of typical smooth gear shifting.

– Delayed Engagement

Delayed engagement is one type of slip in this transmission. The clutch & brake do not operate instantly; due to this reason delayed engagement is occurred in automatic transmission system.

The purpose of this research is to reduce people physical effort and they present only in driving and prevent from accidents. In the present world of automobile, gear shifting system are manually and automatic.

Gear shifting system is important in automobile to vary the speed. So automatic gear shifting system is costly than manually gear shifts system and manually gear shifting system is difficult to understand for some people or it take physical effort to change gear.

To overcome this disadvantage we apply touch screen based automatic gear shifting system. In that system by touch on touch screen panel gear is shift. By applying this gear shifting system it gives cost reduction in compare of automatic gear shift system and flexible or simple then manually gear shift system. And by applying this system on automobile it's easier to drive car for everyone. It also reduces the possibility of transmission error of manual gear system. The following are the objective of touch screen based gear shifting mechanism.

1) Low Cost:

This system is less costly compared to automatic gear transmission system but it is costly compare to manual gear transmission system.

2) Flexibility:

This system is flexible compare to the manual transmission system so that it's beneficial to use this system compare to the manual gear shifting mechanism.

3) Easy to operate:

This is semi-automatic shifting mechanism in which touch screen are used so that gear can be shift with the help of pressing number so it is easy to operate.

4) Less human effort:

With the help of touch screen based gear shifting mechanism, no effort is required to change gear. Gear can change just with touch the appropriate number on the screen, so no effort is required

5) High efficiency:

The efficiency of semi-automatic gear shifting mechanism up to 85-90% ,whereas automatic gear shifting mechanism have a efficiency only 75%, so it is very reliable compare to other system.

6) Less transmission error:

Transmission error is occurring due to the improper gear at the certain speed. This is eliminating in this project because we provide indicator for wrong gear at specific speed.

7) Additional Outcomes:

– This project will save time and expenses of user.

– Easy to understand.

– Prevent from accident

– No emit sound while changing gear

– Applicable for all class

II. LITERATURE REVIEW

The literature studied provides so far insight information or new way to carry out this research. An attempt has been made to present the finding research paper on Gear Shift Mechanism. MT Gear Shifting Behavior indicated on manual transmission gear shift mechanism force required to shift gear he got result that max force required to shift gear back to one is 17.88N at shifting rod angle 12.86 °. "A Brief Review of Transmission in Automobiles" revealed that the engine provides its highest torque outputs approximately in the middle of its range, while often the greatest torque is required when the vehicle is moving from rest or traveling slowly. "A Brief Review of Transmission in Automobiles" revealed that the engine provides its highest torque outputs approximately in the middle of its range, while often the greatest torque is required when the vehicle is moving from rest or traveling slowly. "Development of Actuator Control Strategy for DC Motor Controlled Automated Manual Transmission (AMT)" developed that Actuator control strategy for automated manual transmission (AMT) which uses electro mechanical Dc motor controlled linear actuators. Develop a strategy for deciding the operation of actuator. "Design Proposals for Low Cost Automated Manual Transmission (AMT)" analyzed that different automated manual transmission (AMT) system for automobile vehicle and developed a low cost design proposal for AMT system. In house designed actuators will require much time to prove the functionality according to our requirement and would demand increase in the development time of the project.) "A Literature Review on Automated Manual Transmission (AMT)" analyzed that transmission based actuator (TBA) uses multi-speed transmissions such that heavy, high-torque motors can be traded for high-speed, reduced mass motor-transmission combinations.) "A Literature Review on Automated Manual Transmission (AMT) analyzed that transmission based actuator (TBA) uses multi-speed transmissions such that heavy, high-torque motors can be traded for high-speed, reduced mass motor-transmission combinations.

III. CONCLUSION

The various research works shows that the system can be with hydraulic actuators or electrical based actuators. Actuators are basically used for gear shift actuations. It has the advantage of lower weight and higher efficiency with respect to other transmission system. Moreover, since AMT is directly derived from manual transmission with the integration of actuators into existing devices, the cost of this system is very less compare to Automatic transmission system.

IV. FUTURE SCOPE

With the help of touch screen people are easily applied gear without more effort. Touch screen can also be used in two wheel vehicle. Shifting of the gear system is more flexible and more reliable. An overall strategy aiming to the improvement of the gear shift quality should take into account the reduction of shifting time, the minimization of mean vehicle deceleration due to traction loss and the minimization of vehicle and driveline oscillations due to variation of transmitted torque. Existing transmission system can be converted into this transmission system. Here, the gear stick is to be replaced by touch screen for the driver to interact with the actuator, so that gear can be applied according to requirement. Future work should basically focus on low cost system with optimized control strategy.

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