



FABRICATION OF AUTOMATIC GEAR SHIFTING BY USING ELECTRICAL MOTOR

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Abstract: This paper aims to improve gear Actuator Gear Changer can be used four wheelers easily because the shifting process using devices as: a manual four speed gear box, Programmable Logic Controller (PLC), an electrical motor, limit switches, push buttons, bulbs, a table (holder) and power supply. According to suggested gear_ shifting method the control unit chooses optimum gear shifting ratio for an automobile without operating it manually (using relays). Using this method leaves to the driver the excitement of choosing the shifting moment. Device must be reliable, has a small dimensions, low construction and maintenance cost. In this study, a gear shifting mechanism was designed and applied to make the shifting process faster and less destructible for the driver. The new availability of compressor is there. So we don't need extra support. In this we used principles of Mechatronics in developing this project work. It is used to reducing the gear shifting time without losing. the break power and the efficiency is improved. The main advantages of our project are elimination of wear and tear, simple in operation, fast movement in control and less space by elimination of linkages. Our project is a gear changing device, in which gear is changed using actuator power so that it avoids wear and tear.

Keywords: Automatic gear transmission; automatic headlight control; Digital speedometer; Inductive proximity sensor; Microcontroller AT89s51;

I. INTRODUCTION

Automation is nowadays followed because shortage skilled labor and also to increase the accuracy, faster production through machines. So companies prefer automation considerably but it leads the moderate people to buy it difficult for their regular use. Our project deals with one of the automation to afford it for a low cost and it is a Actuator Gear Changer which is used to avoid wear and tear with faster shifting of gear. In this we are using solenoid operated AC valve which is a 2 position and 5 ports so it is used to shift gears as it is in four wheelers and double acting cylinders are used in this setup with air as a working fluid it is carried out by an air compressor. In this setup when the button is operated the air enters in to the cylinder based on the operation of solenoid so gear is shifted to front and back. There are already some inventions done of gear box for motorcycle for transmitting the torque from engine crankshaft to the rear wheel of the motorcycle. The gear box is used to vary the torque as per the different driving conditions. The gearbox increases the required torque for start the ride and put the motorcycle in to motion. After the start or the running of the motorcycle there is no need of high torque, so now gear box will transmit the optimum torque to the rear wheel at high speed. For the operation of gearbox and shifting the gear there is need of some effort of driver of motorcycle. A foot lever is used to shift the gears in a motorcycle.

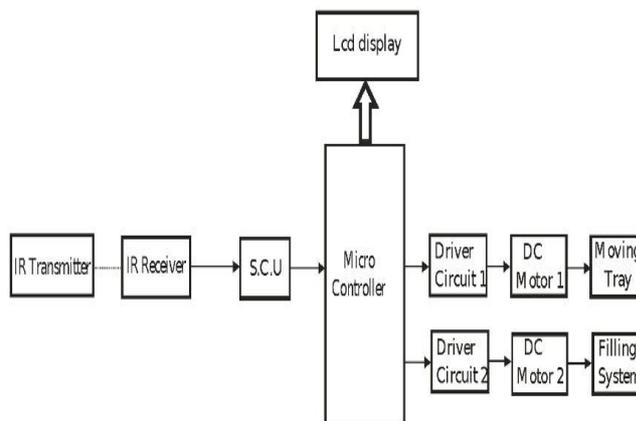
Also, a clutch is placed between the engine and the transmission in order to engage and disengage the flywheel with the transmission.

METHODS

An electronic gear-shifting system is a method of changing gears on a bike, which enables riders to shift with electronic switches instead of using conventional control levers and mechanical cables. The switches have been connected by wires or wirelessly to a battery pack and to a small electric motor that drives the derailleur, switching the chain from cog to cog. Use of an electronic system is to change gears faster, and because the system does not use Bowden cables and can calibrate itself, it may require less maintenance

II. CONTROL SYSTEM

BLOCK DIAGRAM:

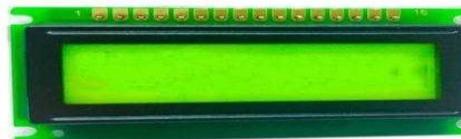


MAIN COMPONENTS

- 1) Speed sensor
- 2) Electrical motor
- 3) Gear rod
- 4) ATMEL 8-bit AVR Microcontroller
- 5) Accelerator
- 6) control unit

1) LCD

LCD (liquid crystal display) is the technology used for displays in electronic gadgets and other smaller computers. LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED. There are two types of LCD, they are active matrix LCD and passive matrix LCD.



A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time. Some passive matrix LCD's have dual scanning, meaning that they scan the grid twice with current in the same time that it took for one scan in the original technology. However, active matrix is still a superior technology.

2) SPEED SENSOR

This sensor sends a varying frequency signal to the TCU to determine the current speed of the vehicle. The TCU uses this information to determine when a gear change should take place based in the various operating parameters. The TCU also uses a ratio between the TSS and WSS which is used to determine when to change gears. If either the TSS or WSS fails or malfunctions/becomes faulty, the ratio will be wrong which in return can cause problems like false speedometer readings and transmission slipping. To test these parts, check the resistance to make sure it's within manufacturer spaces.

3) ELECTRICAL MOTOR

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and winding currents to generate force in the form of rotation. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators. An electric generator is mechanically identical to an electric motor, but operates in the reverse direction, accepting mechanical energy (such as from flowing water) and converting this mechanical energy into electrical energy.

4) MICROCONTROLLER

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and winding currents to generate force in the form of rotation. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators. An electric generator is mechanically identical to an electric motor, but operates in the reverse direction, accepting mechanical energy (such as from flowing water) and converting this mechanical energy into electrical energy. In our project we are going to modify the present automatic gear shifting mechanism based on speed sensor in two wheelers. We are making an attempt to shift the gears in two wheelers (motor bikes) using pneumatics instead of foot lever operated systems.



In the proposed system, the gear positions can be shifted by using pneumatic cylinders that can be placed near the gear ped In our project we are going to modify the present automatic gear shifting mechanism based on speed sensor in two wheelers. We are making an attempt to shift the gears in two wheelers (motor bikes) using pneumatics instead of foot lever operated systems. In the proposed system, the gear positions can be shifted by using pneumatic cylinders that can be placed near the gear pedal of the vehicle itself.

5) CONTROL UNIT

An automatic transmission, also called auto, self-shifting transmission, n- speed automatic (where is its number of forward gear ratios), or AT, is a type of motor vehicle transmission that can automatically change gear ratios as the vehicle moves, freeing the driver from having to shift gears manually. Like other transmission systems on vehicles, it allows an internal combustion engine, best suited to run at a relatively high rotational speed, to provide a range of speed and torque outputs necessary for vehicular travel. there are also other types of automated transmissions, such as a continuously variable transmission (CVT) and semi- automatic transmissions, that free the driver from having to shift gears manually, by using the transmission's computer to change gear, if for example the driver were redlining the engine. Despite superficial similarity to other transmissions, traditional automatic transmissions differ significantly in internal operation and driver's feel from semi- automatics and CVTs. In contrast to conventional automatic transmissions, a CVT uses a belt or other torque transmission scheme to allow an "infinite" number of gear ratios instead of a fixed number of gear ratios. A semi-automatic retains a clutch like a manual transmission, but controls the clutch through electric motor means.

III. OBJECTIVE

- The main objective of this concept is used to apply the gear by using automation system in automobiles. This is the new innovative model mainly used for the vehicles to control the vehicle.
- In this project we design the automatic gear changing mechanism in two wheeler vehicles by using the electronic devices.
- This is very useful for the gear changing mechanism in automobile vehicles. By using this we can easily control the vehicle and improve the performance of the vehicle also we can avoid the wear and tear of the gear.

REASON OF TOPICS SELECTION

Changing gears manually is a gruesome task which has also been very disturbing for the riders. However, switching to automatic transmission can help us overcome all such situations. Abrupt stopping of the engine in traffic due to poor handling of clutches can be avoided.

WORKING

The gear shifting operation is start when lever is turned in the control valve. The piston rod pushes the yoke in the gear changer. Thus gear drive changes to next speed. The sensor in 'A- (MINUS) position the middle gear connects the bottom shaft gears and in A+ position the middle gear connects the top shaft gears. Then the gear shifting operation is performed in ease so the devise works perfectly using the principle followed. In this construction there are two actuator cylinders consisting of pistons on either side of the vehicle pedal for engaging the gear. It is using speed sensor are gear shifting operation, speed varying for changing the gear. it used in ATMEL 8-bit AVR micro controller .two electrical motor in gear shifting

Implementation Vs New Techniques

- CVT is an advanced technology of automatic transmission.
- CVT also known as single speed transmission. gearless transmission one speed automatic ,variable pulley transmission

APPLICATION

- Commonly used in automobile
- Parts dimension verification
- Starts development on wind turbine in CVT
- New continuous variable transmission for medium duty trucks and cars
- Position verification

IV. CONCLUSION

This system is flexible and can be implemented on a motorcycle available in the Indian market without any modification. The motorcycle manufacturing can also use the system in their vehicles because it can be easily fitted to the motorcycle and there is no need of internal modification of the gear system. By installing this low cost system in their motorcycle. Companies may also be able to increase their sale due to availability of these new features. This will also help in improving fuel economy in addition to improving the parts life time

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