



Automatic Manual Transmission Using ARM Controller

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ABSTRACT: Today all vehicles are use Manual Transmission or Automatic Transmission. We have a designed a transmission which neglects some problems which are causes/detected in those transmission. Like human tendency, need of rapid switching of gears, accurate and precise shifting of gear, achieving maximum mechanical efficiency etc.

To overcome such problems we have designed an “smart transmission”. In that system we monitor some data to achieve accurate and precise shifting of gears. Due to this it gives maximum efficiency. Data which have being monitored like speed, throttle position, break position, clutch plate position, actual position of gear etc. those data feed from microcontroller to makes some arithmetic operation on it. After processing all data, it feed to various actuator and indicators. Actuator used are linear solenoid actuator, servo motors and indicator like leds, display. Due to this system we get advantage of manual transmission as well as automatic transmission to.

KEYWORDS: AMT ,MT ,Automatic Transmission, Manual Transmission, Actuator; Sensors, RPM

I. INTRODUCTION

Now a days every car manufacturer gives both transmission options in most of their cars ,so when any one wants to purchase the car first thing his/her mind is that which transmission system is best suited for their needs. Here comparative study between manual and automatic transmission system based on operating parameters and professional requirement helps customer to find out transmission system which is best suited for their needs.

II. PROBLEM STATEMENT

In conventional vehicles, either manual transmission or automatic transmission is used. transmission is the device which fulfil the speed to torque requirements of vehicle . A transmission is machine in a power transmission system ,which provides controlled application of power .often the term transmission refers simply to the gearbox that uses gears and gear trains to provide speed and torque conversions from a rotating power source to another device . Manual transmission come in two basic types .a simple but rugged sliding mesh or unsynchronized system ,where straight –cut spur gear sets spin freely and must be synchronized by the operator machining engine revs to road speed , to avoid noisy and damaging clashing of the gears . The now ubiquitous constant-mesh gearboxes, which can include nonsynchronized or synchronized systems. where typically diagonal cut helical gear sets are constantly “meshed” together and a dog clutch is used for changing gears . on synchronous boxes friction cones or “synchro- rings” are used in addition to the dog clutch to closely match the rotational speeds of the two sides of the (declutched) transmission before making a full mechanical engagement. Most modern north American, and some European and Japanese cars have an automatic transmission that selects an appropriate gear ratio without any operator intervention .they primarily use hydraulic to select gear, depending on pressure exerted by fluid within the transmission assembly. Rather than using a clutch to engage the transmission, a fluid flywheel of torque convertor is placed in between the engine and transmission. Most modern north American , and some European and Japanese cars have an automatic transmission that selects an appropriate gear ratio without any operator intervention they primarily use hydraulics to select gears, depending on pressure exerted by fluid within the transmission assembly .rather than using a clutch to engage the transmission ,a fluid flywheel ,or torque converter is placed in between the enging and transmission .it is possible for the driver to control the number of gear in use or select reverse, through precise control of which gear is in use may not be possible. As those transmission i.e manual or automatic transmission is operated manually or automatically but not autonomously .as transmission has interface with driver/user so of the human tendency affect the performance of transmission ,as transmission is main factor which affects efficiency of vehicle .human tendency contains manner of driving ,sometimes driver forgets to change the gear ,robust driving manner, sometimes rapid gear changing is required such as cities. Those parameters are major problems which reduces performance of transmission .also IC engine cars



are not able to drive autonomously due to transmission needs continuous interface of driver. To overcome above problem we're developing a system called "smart transmission."

III. PROPOSED SYSTEM

In recent times the craze for automatic transmission car has increased great extent, many people attracted towards transmission cars but it didn't decrease the sale of manual transmission car. In this transmission system vehicle are work manual or automatic transmission but not autonomously. a transmission basically transfers the power from car's engine to drive shaft and the wheel. the gear present inside the transmission change the drive wheel speed and torque (pulling power). An automobile engine runs at its best certain RPM range and it is the transmission jobs to make sure that the power is delivered to the wheel while keeping engine within that range. There is no doubt that a manual adds the fun in developing due to the changing of gears but as also increase complexity of driving and required more concentration. In city driving, especially like of India where there are heavy traffic jams, a manual gearbox could prove to be tiresome to shift in every next moment. Because of manual transmission are mechanically simpler, are more easily manufactured and have fewer moving parts than automatic transmission, they require less maintenance. Manual transmission generally offer a wider selection of gear ratios. Many vehicles offer a 5-speed or 6-speed manual whereas automatic option would typically be a 4-speed. This is generally due to the increased space available inside a manual transmission compared with automatic. Since the latter requires extra component for self shifting, such as torque converter and pumps, however this transmission are now adding more speed as the technology matures. The increased number of gears allows for better use of the engine power band, allowing increased fuel economy, by staying in the most fuel efficient part of power band or higher performance, by staying closer to the engine's peak power.

IV. WORKING OF SYSTEM

When system starts, it takes few seconds for initialization purpose. After initialization of controller it looking for the driver's decision i.e. automatic mode or Either Manual mode. If driver selects automatic mode then, controller takes data from the all sensors for appropriate gear shifting decision. Speed sensor are mounted on flywheel for measurement of engine output or transmission input speed. Another inductive proximity sensor is mounted after transmission i.e. load shaft of transmission to measure the speed of transmission output.

Throttle position sensor are laced in accelerator pedal and brake pedal, this sensors gives the position of pedal during driving. Depending up above data controller takes decision that whose gear is to be engaged. For this purpose it actuates clutch actuator, it disengages the transmission shaft from engine shaft. After that it actuates the actuator which is mounted on respective synchronizer. Due to this shifting of gear takes place automatically. If driver selects manual mode of driving, it takes input from the driver and shifts the respective gear. Dashboard contains three touch sensitive buttons i.e. Gear-up, gear down and one tap neutral. This buttons are used to take control on transmission. If driver touches the gear-up button it shifts one gear up i.e. if current gear is 3rd then it shifts its onto 4th. If driver touches gear-down button it shifts one gear down i.e. if current position of gear is 3rd then it shifts it to 2nd gear. Also one tap neutral button is present in to achieve the neutral position of transmission.

V. SYSTEM ARCHITECTURE

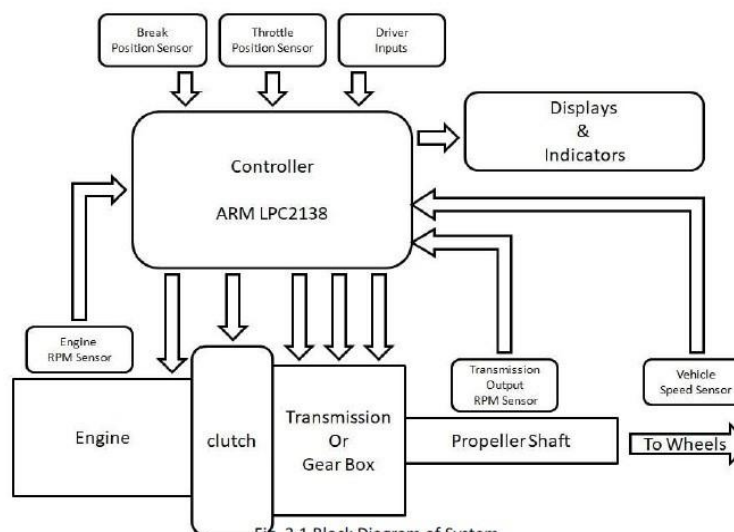


Fig. 3.1 Block Diagram of System



VI. CONCLUSION AND FUTURE WORK

The various research works shows that the smart transmission system can be with hydraulic actuator or electro-mechanical based actuator

.actuators are basically used for clutch and gear shift actuation however in some systems the actuators are also used to manage accelerator input to control fuel injections. An optimum control strategy is the key to successful working of transmission system and this has been research work has conducted that with respect to manual transmission. The smart transmission allows improving driving comfort, increase fuel efficiency and gear shifting quality. In market sectors, such as High series and Ecological cars. Smart transmission has the advantages of lower weight and higher efficiency with respect to other topologies of automatic transmission. Moreover smart transmission is directly derived from manual transmission with the integration of actuator into existing devices, development and production cost are generally lower than other automatic transmission. After studying various actuators, electromechanical actuators seem to be the best solution. An electro-mechanical actuator and some sensors are compact, light in weight and can be controlled easily with help of actuator

.therefore solving the issue like switching of gear is possible in certain conditions and in manual transmission heavy clutch pedal feedback may hurt your left leg in longer run, that can be avoided.

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