

# Automatic Steering System

Manish Kumar Mishra<sup>1</sup>, Arjun Maurya<sup>2</sup>, Rajiv Ranjan Dev<sup>3</sup>

<sup>1,2,3</sup>Student, Department of Mechanical Engineering Buddha Institute of Technology, Gida, Gorakhpur, U.P. India

**Abstract:** *The arrangement for converting a conventional manual steering system of an on-road vehicle to automatic steering system utilizable electric microcontroller and ultrasonic sensor. A DC motor is direct connected to rack and pinion drive to a drive mounted on the steering shaft. In this paper we work on the pre notification which helps in the reduction of the extreme impacts of the vehicle collision. This pre notification is calculated in concern with both the distinct on the steering as well as the vehicle. This paper can play an important role in the advancement of the intelligent system of the chore automotive. In this paper, we propose a safety only in terms on the road. The DC motor is connected to a electrical control unit (ECU) and moves with the steering shaft in both a manual steering mode and an automatic steering mode. An encoder provides a signal to a electrical control unit (ECU) that changes operation to the manual mode if the number of steps reported by the encoder is different than What is expected. An assembly including alternate steering Wheel, shaft pulley, adapter fit and DC motor is easily connected to the steering column. This type of design structure work both on manually and automatic.[1]*

**Keywords:** Automation

## 1. An Area of the Invention

The being invention related generally to automatic steering systems for vehicles and a greater for a special purpose to automatic systems acceptable to a wide range of on-road vehicles With different steering mechanisms.[2]

## 2. Technical Field

The present invention related to a vehicle steering system. Which combines a power steering system and automatic steering system Which assists the manual effort required by the vehicle operator to steer the vehicle and an automatic steering system Which automatically steers the vehicle according to given road information.[3]

## 3. Background of the Invention

Various forms of automatic steering systems have recently been proposed which automatically steer the vehicle according to the conjuration of the road. The road information can be derived from a sensor system incorporated with an obstacle of the area, and/or from a display which may detect the position [4][9]

## 4. Introduction

Recently, evolved the cars unmanned driving technology and battery technology, interest of developing manned and automatic vehicle is increasing. Apart from technological advances, being serious oil prices rising, energy depletion and air pollution, research and development for manned and automatic electric cars is rapidly progressing in related industries. Also, auto parts suppliers is developing parts used in automatic electric cars because manned and automatic electric cars use different parts and Mechanism that use existing engine.

If people ride manned and automatic electric vehicle, directly manipulating the handle to move to wherever you want. If people do not ride the car, itself is moving to destination.

Manned and automatic electric vehicle need manual steering device when driving manned and manned, automatic electric vehicle need automatic steering device when driving unattended. Namely, steering device that is capable of conversion is required.[1]

Mechanical steering device and hydraulic power steering device in a engine vehicle has been used a lot. Recently in case of car that is available for auto parking, electric power steering device EPS, MDPS using electric motors has applied on behalf of the hydraulic device. EPS is in charge of sponsored role when driving a manned. However, EPS has problems of handle locking caused by overheating to protect the system itself due to self protection system. Handle locking while driving car causes very dangerous situation.

Most of the vehicle uses engine power and hydraulic power to manipulate the handle. But manned and automatic vehicle needs change of the steering mechanism because it is using battery and motor to move or automatic gear.

In this paper, we propose design of manual and automatic steering mechanism and controller that have solved problem when applied to electric vehicles automatic gear vehicles. Proposed steering mechanism is manual and automatic combined steering device of new structure applying servo motor and electronic clutch.

Servo motor is connected to electric microcontroller (ECU) and operated by ultrasonic sensor and IR sensor. Wheels turn with help of rack and pinion, servo motor.[3][5]

## 5. Design and Structure

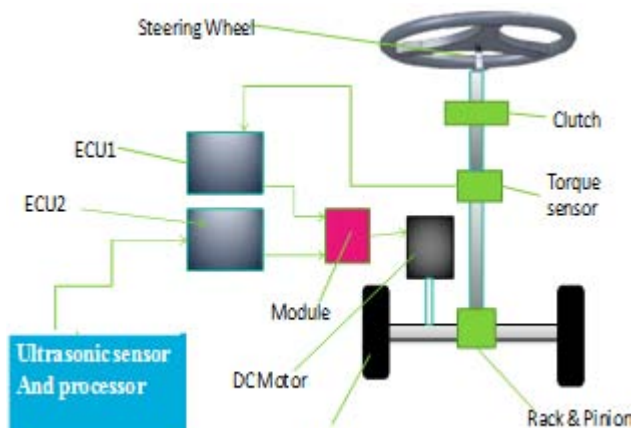


Figure: Automatic steering system

### 1) Steering wheel

Steering system is a device which controls the direction of vehicle and turns the wheels.

An automatic steering system working

Principal on electric power steering system.

In this system is mostly use ECU device and also include torque sensor, actuator, ultrasonic sensor etc.

### 2) Clutches

Clutch should be able to engage and disengage the engine and gearbox without any jerks or shocks during stationary as well as moving condition.

### 3) Torque sensor

It is a device which use for convert rotary motion and direction to electrical signal.

### 4) Electronic control unit (ECU)

An Electronic Control Unit (ECU) is a general term for any embedded system that controls one or more of the electrical system or subsystems in a motor vehicle.

### 5) Voltage regulator

A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may be a simple "feed-forward" design or may include negative feedback control loop. It may use an electromechanical mechanism, or electronic components.

### 6) Ultrasonic sensor

An ultrasonic sensor operating in air was developed to measure distance (up to 100 cm) or to operate as a proximity sensor in a resettable distance range. The error in the measured distance is about  $\pm 1$  mm while the accuracy is maintained within  $\pm 1$  percent of the reading in the whole temperature range from  $-20^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$ , being the temperature dependence of the sound velocity electronically compensated.

### 7) Infrareds Sensor

IR sensors use infra red light to sense objects in front of them and gauge their distance.

A pulse of infra red light is emitted from the emitter and spreads out in a large arc. If no object is detected then the IR light continues forever and no reading is recorded. However, if an object is nearby then the IR light will be reflected and some of it will hit the detector.

### 8) DC motor

A DC motor in simple words is a device that converts direct current (electrical energy) into mechanical energy. It's of vital importance for the industry today.

### 9) Rack and Pinion

Rack and pinion combinations are often used as part of a simple linear actuator, where the rotation of a shaft powered by hand or by a motor is converted to linear motion.

### 10) Wheels

A wheel is a circular component that is intended to rotate on an axle bearing. The wheel is one of the main components of the wheel and axle which is one of the six simple machines. Wheels, in conjunction with axles, allow heavy objects to be moved easily.[10]

## 6. Brief Description of the Drawings

An automatic steering system as showing in figure When disengage the steering wheel and steering arm with the help of clutch and vehicle run on the rod auto from then ultrasonic sensor and IR sensor is activated and when any object or obstacle is come in near or overtake the cross side then sensor is sense and measure the distance between vehicle and object and forward the signal in electronic control unit (ECU). ECU is a control device which calculate the signal and give the need of electric power in DC motor which motor in joint in pinion gear so pinion is move with motor shaft on the rack path and vehicle move safe direction and again come in same or save way and provide accident free road and when engage the steering wheel and steering arm with the help of clutch system then steering is work on electric power steering system.

Now showing figure electric power steering system firstly to provide the small quantity of force on the steering wheel after that torque sensor sense its torque and covert electric power and give it electric power in the electronic control unit (ECU). Electronic control unit is a control unit device which calculates and provides the need of electric power in the DC motor. DC motor is join in pinion gear and run on the rack way and provide the moment of wheels. So that is called electric power steering system.[6][7]

## 7. Brief Summary of the Invention

In view of such problems of the previous mastership, a primary object of the present invention is to provide an automatic power Steering system which allows an automatic steering system and a power steering system to share various components so as to simplify the structure.

A second object of the present inventions to provide an automatic power steering system which allows a smooth transition from one of the operation modes to the other without involving any absence of control. According to the present invention, these and other objects can be accomplished by providing a steering control system for a vehicle comprising a steering mechanism.[7][8][11]

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