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AUTOMATIC HEAD LIGHT CONTROLLING SYSTEM WITH STEERING WHEEL

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ABSTRACT

The design here is all about Front wheel steering system with the modern electronics technology with moving headlights. The objective is to design and build a control system based on an electronically operated automatic head light controller called the "Automatic Head Light Dim / Bright Controller" by using LDR circuit."The automatic head light dim / bright controller and headlight alignment according to steering wheel "consists of the LDR sensor circuit, control unit, headlight with gear rack and pinion setup. The sensor is used to identify the pathway on the opposite side vehicle (Light Beam). There is some obstacle on the road, the sensor detects the obstacle (Light Beam) and gives the Dim / bright Light as the output signals.

KEYWORDS: Headlight, Rack & Pinion Gear, LDR Circuit.

I. INTRODUCTION

Auto safety is the prevention of car accidents or the minimization of accident-related harmful effects, especially as regards human life and health. Since years, unique safety devices have been built into automobiles, some for the safety of vehicle occupants only and others for the safety of others. We are glad to launch our building program "Automated Head Light Dim / Bright Controller With Automatic Alignment Of Head Light According To The Steering Wheel" which is completely fitted with circuit sensors, dim / bright light circuit and gear rack and pinion system. This is a genuine initiative planned and professionally built for automotive vehicle.It is an integral part of high output. This system has undergone strenuous testing in our automotive vehicles and it is excellent. The most typical steering arrangement is to turn the front wheels using a hand-operated steering wheel that is situated in front of the driver, through the steering column that may include universal joints to enable it to deviate from a straight line somewhat. Other arrangements, for example a tiller or rear-wheel steering, are often found on various types of vehicles. Army vehicles such as tanks, armoured lorry deploy differential steering and that is, the tracks are designed to run at different speeds, or sometimes in opposite directions to change course.As for the Indian road transport scenario, accidents are becoming a day-to-day incident as an effort has been made to eliminate these accidents. The following process happens automatically in the vehicle in our "Automatic Head Lamp Alignment System" project having. They are,

1. Automatic head light left and right alignment is based on the rotation of the steering wheel in the left and right direction of the vehicle.
2. In normal, condition the head light in a stable position for the car.
3. The sensor automatically dim and brighten the headlight depending on the size of the headlightcoming in front of the vehicles
4. Automatic head light left and right alignment is based on the rotation of the steering wheel in the left and right direction of the vehicle.
5. In normal, condition the head light in a stable position for the car.
6. The sensor automatically dim and brighten the headlight depending on the size of the headlight coming in front of the vehicles.

II. STEERING SYSTEM MECHANISM

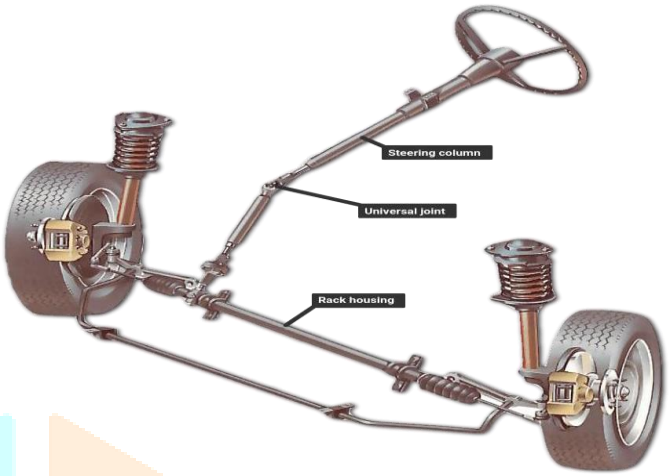

Figure:1 Existing Steering Mechanism[2]

Working Principle:

While in Stable Condition:-

The steering of the rack and the pinion is in straight line, and the frame of the head light is in straight line.

The headlight frame is made of materials from

While Turning Left Side:-

When the gear set steering is turned around left then the frame containing the headlights will also turn around in left within the wheel radius. Head light supplies from the already charged lead-acid 15 voltage

battery are drawn.

While Turning Right Side:-

The rack and pinion steering switches the right way, so that the mechanism of the head light frame turns in the same right side using hinges.

Layout of the Model:

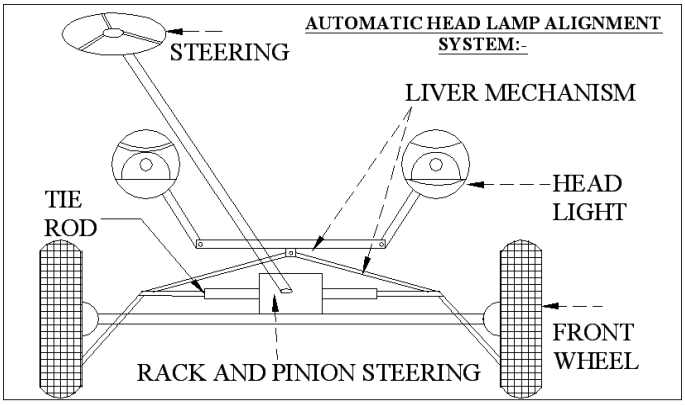

Figure-2: Automatic Head Lamp Alignment System[1]

Components Required for Automatic Alignment of Head Lamp:

The major components of the "Automatic Head Light Dim/Bright Controller with Automatic Alignment of Head Light According to the Steering Wheel" are follows

- LDR Sensor Frame
- Battery
- Dim/Bright Light (Head Light)
- Relay
- Rack and pinion gear setup

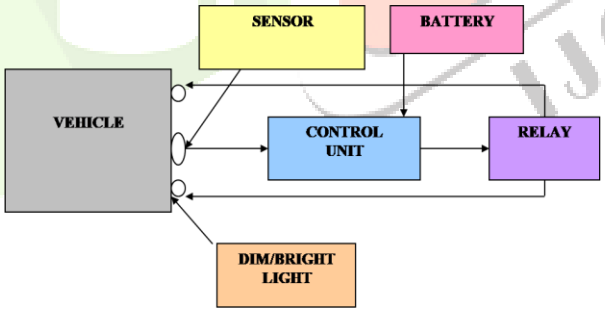

Figure-3: Block Diagram for Automatic Head Light Dim/Bright Controller

LDR circuit with relay can operate a relay to switch on the lights or it can load any AC circuits, when it senses darkness. LDR is used as a light sensor. Its resistance is low and about 100 ohms in bright light but increases to 10-mega ohm in more dark. Control unit consist of a battery & photo- conductivity plate. When the photoconductivity plate senses light, the resistance varies and control unit sends signal to the relay, which is operated by the battery. Then the feedback mechanism works & gives signal to dim and bright the headlight.

Specification of Pinion:

Figure: 4 Rack & Pinion Setup

Material	: cast-iron
Outside diameter	: 75mm
Circular pitch	: 4.7mm
Tooth depth	: 3.375mm
Module	: 1.5mm
Pressure angle	: 21□
Pitch circle diameter	: 72mm
Addendum	: 1.5mm
Dedendum	: 1.875mm
Circular tooth Thickness	: 2.355mm
Fillet radius	: 0.45mm
Clearance	: 0.375mm

Specification of Rack -

Figure: 5 Rack & Pinion Setup

Material : cast iron

Module : 1.5mm Cross-section

: 75×25mm

III. LDR SENSOR MECHANISM

Figure: 6 LDR Sensor Mechanism

This mechanism works by sensing the light intensity in the atmosphere around it. An LDR is the sensor, which can be used to detect light. It's inexpensive, and can be purchased from any local electronics store or online.When connected to VCC (5V), the LDR releases an analogy voltage which varies in magnitude in direct proportion to the intensity of the input light on it. This is the higher the light intensity, the greater the equivalent LDR voltage would be. As the LDR produces an analogy.

Basic LDR Circuit Operation:

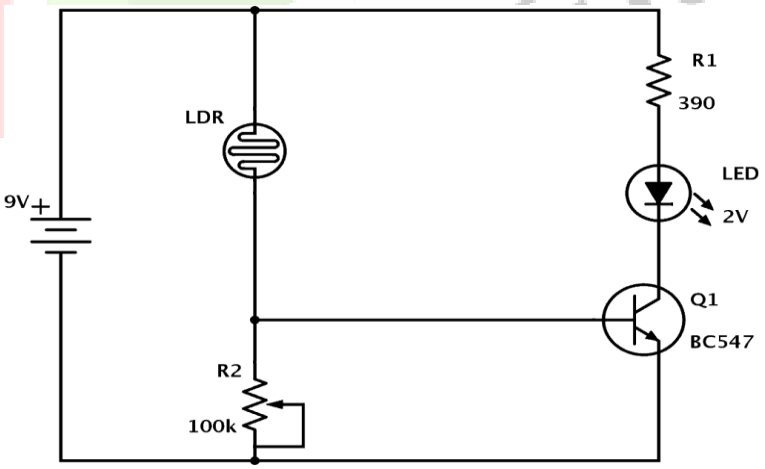

Figure: 7 Circuit image of LDR

Voltage it is attached to the Arduino analog input board. With its built-in ADC (analog-to-digital converter), the Arduino then converts the analog voltage (from 0-5V) in the range of (0-1023) to a digital value. The converted digital values read from the LDR via the Arduino should be in the range of 800-1023, whether there is enough light in its atmosphere or on its surface. We then program the Arduino to

turn a relay on. Accordingly, when the light intensity is small (this can be achieved by covering the LDR surface with some object), switch on an appliance (Headlight), that is, when the read digital values are in ahigher range than normal.

Technical Characteristics of the LDR

1. Standard values differ in darkness between1M or more and in bright li ghtbelow 100 Maximum dissipation (50M W – 1W).
2. Maximum voltage (600V).
3. Spectral response.

- The average response time of an LDR is 1/10th of a second

IV. ADVANTAGE, DISADVANTAGE & APPLICATIONS

Advantages

1. To provide smooth and safety ride.
2. To give rider a stress free mindset about the road accidents.
3. If we implement this technique, our nation roads will be accident free.
4. Low Cost Automation Project
5. The head lamp aligns with the steering wheel (Left, right)
6. High light dark resistance ratio in the LDR Sensors
7. Low cost & easy installation of sensors.

Disadvantages

1. This circuit does not operate at low falling rain.
2. This program applied only in case of water not falling during the class period.
3. Installation of this device on four wheelers needs additional cost.
4. Low temperature stability in LDR sensor for fastest materials.
5. Hysteresis effect and narrow spectral response of the sensor.

Applications

1. Four wheeler application
2. Two Wheeler Application
3. Vehicles moving in mountain roads and dark places, a sharp bend, and a pedestrian wearing dark

clothes hiding in the shadows can be visible.

4. It can be cost effective in installing and can used to prevent night accidents.

5. Installation of this mechanism takes no time and its real quick.

V. CONCLUSION

Thus, we implemented and presented "Head Lamp Alignment with Steering" successfully. A model, which can bring greatness in the field of automotive safety and in automobile manufacturing. The problems which the headlight and steering system were facing at earlier time, it can be resolved by the technology which we have mentioned in this paper. Our work can be deployed in the upcoming vehicles, which will be added benefit and can reduce the risk factor in driving vehicles in various pathways.

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