

# Intelligent Headlight System

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**Abstract:** our project is on vehicles headlight system, currently there are many researches are going on in this field. We reviewed all current trends, researches and came with a solution of intelligent headlight system. We came up with the idea to reduce the accident occur due to the headlight deflection while driving in night as well as in bad condition roads and also due to wrong turn indication. So we developed the prototype of intelligent head light is a solution for above problem. The microcontroller is used to prepare a prototype model. Accelerometer and potentiometer is used to turn the headlight using micro servomotor in vertical and horizontal direction. The ultrasonic sensor detects the coming vehicle and automatically reduces the intensity of head light and also it sense the ditch's present on road and inform to driver. The light dependent resistor is used to vary the intensity of headlight based on external lighting conditions. Potentiometer is also used for automatic turning indication system. As a result the road accident will be reduced rapidly. It is possible to implement because the device is cheap in cost, easy to implement and it works automatically. Traditional headlamps cannot compensate the light beam on a curved and unconditional road at night time and automatic turning indication helps to reduce many accidents due the negligence of driver while turning.

**Index Terms** – 2 axis compensation, ditch sensing, variable intensity, auto turning indication, auto dim light

## 1. INTRODUCTION

Headlight system is very important for driver to drive safely at night, but traditional headlight system have many demerits and road unevenness is also a major problem, when Headlight beam falls on coming vehicles then the driver can't see anything present in front of him and in turning if driver forgot to switch on or off the indicator then the wrong turn indication causes a serious accident while turning and overtaking. So we use the compensation technique of two axis to automatically adjust the light in any disturbance condition of road so that the upcoming vehicle driver doesn't affected to the reflection of light and automatic turning indication system so intelligent head light system will makes dynamic adjustment headlight in horizontal and vertical direction and also turning indication. So intelligent head light system has come into being. So we introduce a very advanced system than old adaptive headlight system to overcome all difficulties faced by adaptive headlight Systems. We have used the LDR to automatically vary the intensity of light according to the external lightning conditions, the two ultrasonic sensors are used one for to detect the ditch and inform the user and other is to detect the upcoming vehicle and dim the headlight. The variable voltage driver is used to vary the intensity of light.

So driver visible every pin to pin details of the road clearly in any harsh road conditions and harsh Drive condition. In many high end cars adaptive system is used it also some demerits and costlier to adapt for every vehicle so we develop intelligent head system so it can be adapted for all vehicles with low cost.

## 2. LITERATURE REVIEW

**1) Paper titled :** -- Adaptive Head Light System, department of mechanical engineering, MATS school of engineering and I,T, Gullu, Raipur, Chhattisgarh, India. International journal of engineering and management research march-April 2006. Four-wheeler driving is always carries a lot of danger. Many things are related to vehicle and driving atmosphere like road texture, darkness, visibility, track unevenness. One of these main problems is darkness and late recognize of upcoming objects. Conventional head light are fails to give the visibility of upcoming objects at a right time. Our project is tends to improve the visibility of such a objects on road in turnings. this arrangements consists a mechanical parts like gear arrangements.

limitations: since they have use the mechanical devil gear system a periodic maintenance is required and the mechanical component may be there soon and also the lifespan is less the response to the turning our car running condition is very low as compared to the electronic system and also the limitation of mechanical components is fiction so periodic maintenance is required.

**2) Paper titled:** -- Adaptive Headlight System, Department of Mechanical Engineering Pravara Rural Engineering College, Loni Maharashtra. International journal of informative and futuristic research, March 2015.

AFS is introduced to prevent and increasing the visibility at night. AFS automatically adjusts the light based on steering condition. Dynamically adjusting the headlights according to

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the car's current direction of travel to ensure optimum illumination of the road ahead and to give the driver much better visibility.

Limitations: Is the above project is used only for turning condition and not for ditch ditching of road condition so the intelligent headlight system is not meant only to use for one directional compensation and also the position of the sensor can also be increased The advance activator can also be used to increase the sensitivity.

**3)Paper titled :** -- Automatic Speed And Auto Light Beam Control System For Glare Prevention In Vehicles, Department Of Electronics And Communication Engineering .Shridevi Institute Of Engineering And Technology, Tumakuru. Project Reference No: 40s\_be\_1192.

Driving is control of head light which can be switched from high beam to low beam .during pitch back condition there is no other source of light, high beam is used while on all other cases, low beam is preferred. In a two –way traffic, vehicle ply on both sides of the road, so when the bright light from the headlight of a vehicle coming from the opposite direction falls on a person, It glares him for a certain amount of time, causing disorientation to that driver. this discomfort will result in momentary involuntary closing of drivers ayes .this fraction of distraction is the prime cause of many road accidents at night. this prototype reduces this problem by actually switching the headlight high beam to low beam automatically when it senses a vehicle at close proximity approaching from the other direction and switching it back after vehicle passes.

Limitation: Since the above project is used switch from High beam to low beam when the vehicle is detected through the camera but the camera is not accurate in all weather conditions as well as in fog condition so the switching of too low beam should be accurate in cornering conditions also so that accident avoided but cornering adaptive light is not used so accident avoid is somewhat low , When two opposite vehicles switched too low beam what's behind the vehicle doesn't seen by the driver so what behind vehicle is there can't be seen so it's not used in the remote place road condition..

### 3. SUMMARY



Fig 3.1: Problem

By reviewing the above three paper we came to know that they are only compensated the light for cornering conditions and switching the light from high beam to low beam .Since only these improvements is not sufficient to prevent the accident caused by the headlight.

## 4. OBJETIVE AND METODOLOGY

### 4.1 Objective

Main objective of the project is to reduce the accident caused by Headlight Falling on coming vehicles so that the driver can't see anything in front of him. So we use the compensation technique of two axes to automatically adjust a light in any disturbance condition of road so that the upcoming vehicle driver doesn't affect to the reflection of light. We introduce a automatic indicator system to show left and right signal which the car is turning by this we can reduce accident due to wrong turn indicator signal by drivers unknowingly , this is very major issue in traffics. We also use the adaptive technique of light to automatically increase or decrease the intensity based on the external lighting condition. So the user gets notification off ditch when it's detected. By the by these techniques we able to greatly reduce the accidents caused by the reflection of light, In Country like India the accidents are more due to the dense population Also the road conditions are not good .so we developed the above system to overcome all problems faced by the driver while Driving in night condition.

### 4.2 Methodology

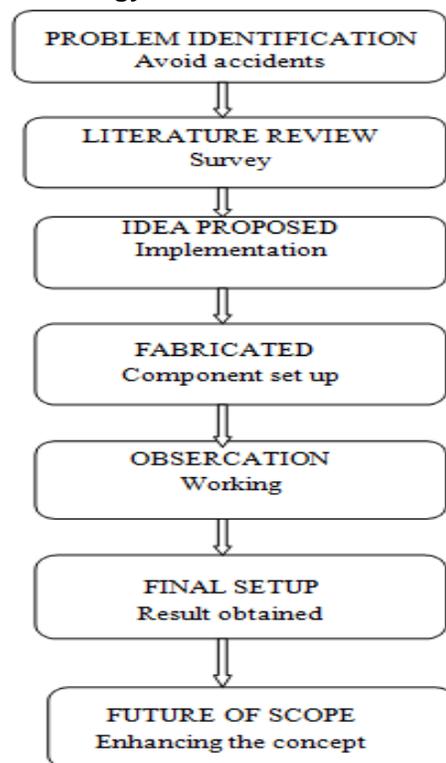


Fig 5.2:Methodology flow chart

## 5. EXPERIMENTAL SETUP

### 5.1 Construction

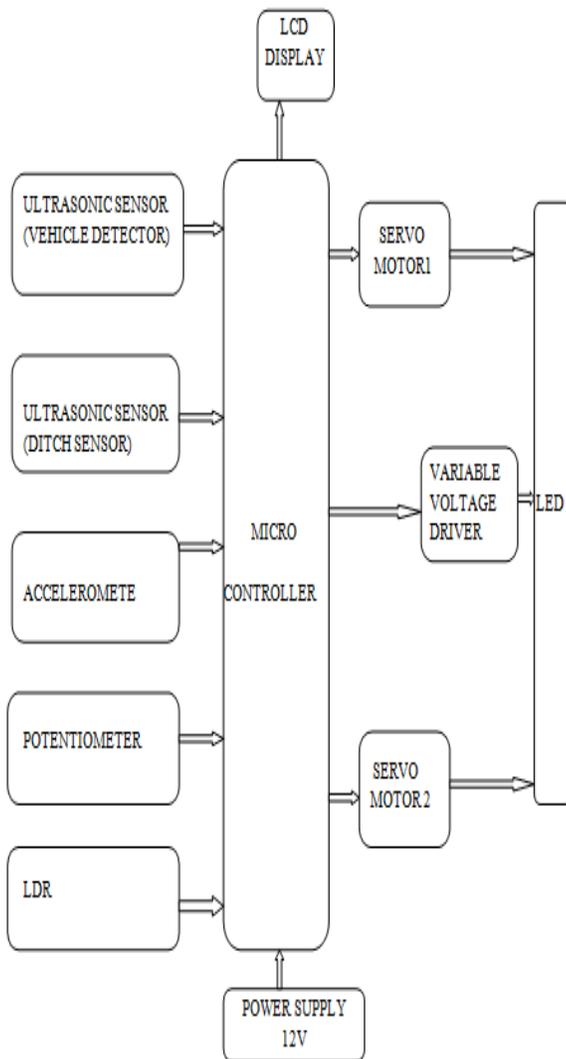


Fig 6.1: Construction Flow Chart

The above figure shown is a block diagram of the intelligent headlight system, in the headlight system we have used accelerometer and potentiometer (the range of accelerometer 90 to -90 and potentiometer range is 0 to 1040) is to compensate the movement of vehicles to the headlight in X and Y axis through the two micro servo motors (range is 10 to 150 degree) and we have used the LDR (light dependent register) (range is 0 to 225) to automatically vary the intensity of light according to the external lighting conditions, The two ultrasonic sensors are used one for to detect the ditch and inform the user and other is to detect the upcoming vehicle and dim the headlight. The variable voltage driver is used to vary the intensity of light. We mapped the potentiometer even to show the automatic indicator while overtaking and turning conditions.

### 5.2 Working

The above shown is the experimental setup of intelligent Headlight system. It consists of a microcontroller which is equipped with five input sensors. An accelerometer and potentiometer are used for compensation of headlight by sending the signal to the microcontroller. The microcontroller drives the servomotor according to the accelerometer and potentiometer value. The LDR is used to detect the external lighting condition and send the signal to the microcontroller, it processes the signal from the LDR and activates the voltage driver, which reduces the voltage, making the LED reduce its intensity. The ultrasonic sensor one detects the upcoming vehicle and sends the signal to the microcontroller, which processes the signal and makes the LED dim. Ultrasonic sensor two detects the ditch and sends the signal to the microcontroller, which in turn sends the signal to the LCD, in which the user is notified of the presence of a ditch. At last, we mapped the potentiometer value to the microcontroller to process the rotating of the potentiometer to show an automatic indicator system of left and right turning.

## 6. RESULTS

By reviewing all the three papers, we came up with a solution to compensate the headlight in X as well as Y-axis, so that we can achieve the compensation of light in any harsh road condition while in cornering, also in hump and bump off-road conditions. We also use the adaptive light system to reduce the intensity of light based on the external lighting conditions to save battery as well as to enhance the clarity of the road in any remote location. We came up with the idea of notifying the user when there is a presence of a ditch in the road. Finally, we introduced the automatic indicator system to show the direction of car turning, either left or right. So by all the above solutions, we have solved all the problems faced by the driver, also reduce the lot of damage to the body parts of the vehicle, i.e.; chassis, suspension, wheels, etc.

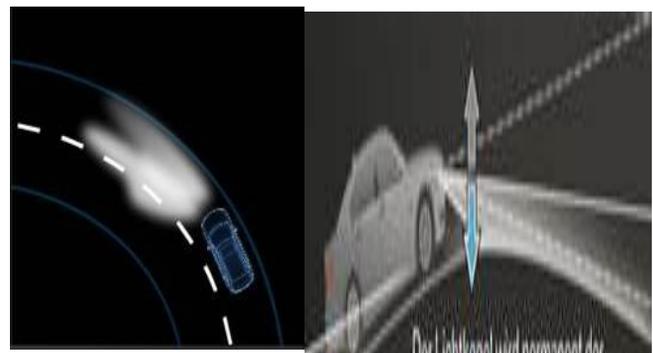


Fig6.1:Results

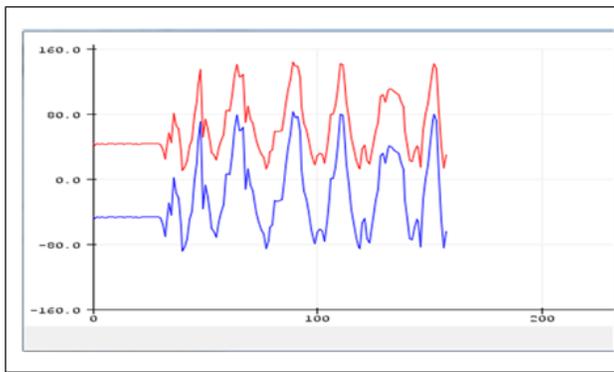


Fig6.1: Accelerometer x value vs Servo motor angle

Accelerometer	Servo motor angle
Blue colour	Red colour
Ranging from 90 to -90 values	Ranging from 10 to 150 values

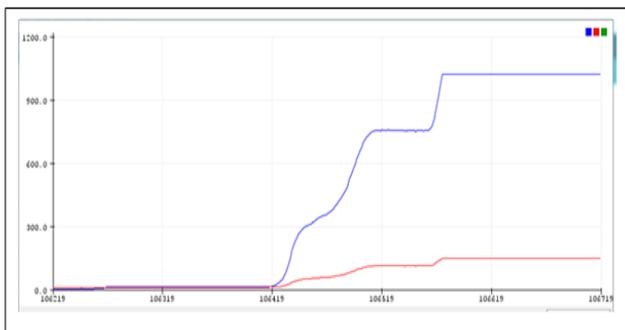


Fig 6.2: Potentiometer vs servo motor Angle

Potentiometer	Servo motor angle
Blue colour	Red colour
Ranging from 0 to 1040 values	Ranging from 0 to 150 values

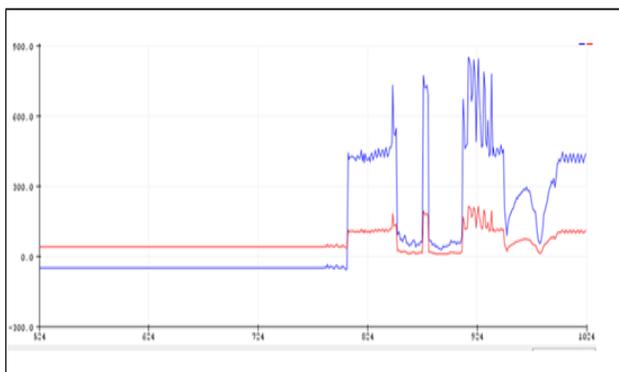


Fig 6.3: LDR value vs Brightness

LDR value	Brightness variable
Blue colour	Red colour
Ranging from 0 to 225 values	according to LDR value change the bright of head light will change

## CONCLUSION

Finally we concluding our project by compared to current research and trends they all are concentrated on advancing light illumination, compensating in cornering condition etc , we reviewed the demerits of current technology , problem faced by drivers , road conditions etc . we made the way taking road to way showing road. This Intelligent headlight control system is implemented for reducing accidents ,overcome all the problems faced by driver in night ,unconditional roads, uneven roads (presence of ditch's) ,wrong steer(turning) indication situations. We also increased the life of headlight by automatically varying the light based on external lighting conditions this might also save the battery life. At last we introduced the auto dim of light when vehicles approach in front .our intelligent head light system has good visibilities of road and enhance the light intensity, fast response, less error, saves battery, increase life of battery, low cost, can be adapted for all vehicles. So this all feature reduce many accidents and save many lives. Our project can be globally used in all country road conditions.

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