

Development of Adaptive Headlight System with Fog Detection for Four Wheeler

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ABSTRACT:: the highest fatal traffic accident rate happens on incurved roads at nighttime time. In most cases, the late recognition of objects within the traffic zone plays a key role. These facts purpose to the importance of the role of automobile forward-lighting systems. so as to produce increased getting dark safety measures, this work aims to style and build a prototype of steerable headlights by adapting a standard static light source with a awfully shut eye on cost and dependability. components that are simply out there within the market and appropriate for developing a steerable headlight system were tested. totally different styles of tests were done on crucial elements of the system so as to see its accuracy, its reaction time, and therefore the system impact. Finally, the results acquired from these varied tests are mentioned. Any findings and changes that should be made are mentioned and will be helpful for future development. A majority of serial collision accidents happens once visibility is low because of fog. the chance of those accidents are often reduced significantly with a system containing visibility sensors and variable speed-limit signs.

KEYWORDS:Traffic Accident, adaptive headlight system, 3D model, CATIA V5 R20.

I. INTRODUCTION

Because the static headlamp simply provides bound illuminating fields for drivers within the dark and is meager to serve for arced roads and intersection, Advanced Front-lighting System (AFS), has been projected by several researchers and is catching increasing interest. Over eighty % of all road traffic accidents occur darkly and inclementness – a compelling reason to place efforts into developing future generation of intelligent lighting systems with multi-functional swiveling headlamps. The aim is to boost visibility for the driving force, thereby achieving a major increase in road safety and driving comfort. numerous studies on swivel-beam headlamps have shown up to a three hundredth increase within the illumination of the driver's gaze purpose because the vehicle turns into a corner. adaptive headlights are a vigorous feature designed to form driving in the dark or in low-light conditions safer by increasing visibility around curves and over hills. once driving around a bend within the road, commonplace headlights still shine straight ahead, illuminating the aspect of the road and departure the road prior you within the dark. adaptive headlights, on the opposite hand, flip their beams in line with your steering input so the vehicle's actual path is lit up. Similarly, once a vehicle with commonplace headlights crests a hill, the headlamp beams briefly purpose upwards towards the sky. This makes it troublesome for drivers to ascertain the road ahead and for oncoming motorists to ascertain the driving force approaching. In distinction, adaptive headlights use a self-leveling system that points the sunshine beam up or down, in line with the position of the vehicle. adaptive headlights are generally known as active headlights or adaptive front-lighting systems. adaptive headlamp system moves the headlights by turning the vehicle through the steering. This places light-weight into the turning radius visibility at the cornering improved. this invention relates to headlights of associate degree automobile, a lot of significantly to a direction turning device for headlamps of the vehicle that allows to show direction synchronously with the rotation of the steering and therefore increasing the protection for driving in the dark or within the darkness. within the noted technology of the previous art, a headlamp of the vehicle includes a mounted line of emission that is aligned with the front direction of the vehicle. though the consequences of "high beam" or "low beam" may be achieved by adjusting the angle of elevation of the light source, the direction of emission isn't adjustable on the left or right. once the road curves or turns, the corner on time once the vehicle turns, thereby making a dead angle of illumination and such lack of visibility poses danger in driving at night or in darkness.

PROBLEM STATEMENT

The problem is that every time whenever a vehicle arrive from front the driver is unable to see so, he has to give some signals so that the driver of the vehicle understand he is not able to view. Also when the user is driving on a slope from down to top he has to give dipper so that he can see at the bottom. These problems are aimed to least those problem, every time user has to control the lights. A larger part of sequential crash mishaps happens when visibility is low because of fog.

NEED

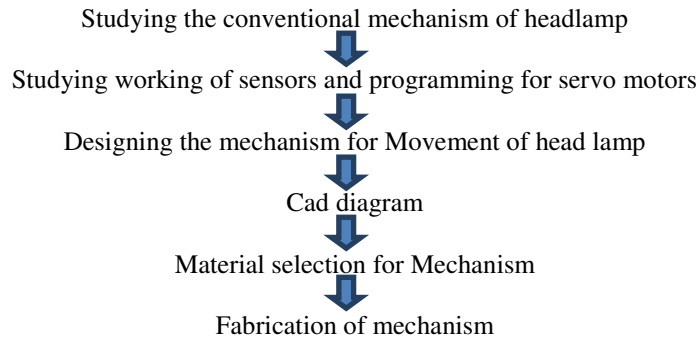
The most necessary and safety functions of car are headlamp. there's giant inequality between daytime and evening time traffic fatalities. so the light distribution of headlamps should be able to fulfill all wants like, no glare, comfortable illumination of sunshine to avoid accidents. In our existence, whereas victimization vehicle at night we tend to face a tangle of blind spot once turning at corner. Headlamps are parallel to body of car therefore whereas flipping to left similarly as right light illumination is tangential and meagerly for the driver therefore there's want of adaptational front light system during which once vehicle turns left or right at corners of the road light additionally moves consistent with turn and can bounce back light illumination. By using this adaptive front light system we will avoid accidents up to the 50%.

II. RELATED WORK

Anwar B. Abu Bakar et. Al. [1] The most noteworthy lethal car crash rate happens on bended streets at evenings. Much of the time, the late acknowledgment of items in the rush hour gridlock zone assumes a key job. These realities point to the significance of the job of vehicle forward-lighting frameworks. So as to give improved evening times security gauges, this work plans to structure and manufacture a model of steerable headlights by adjusting a traditional static headlamp with a nearby eye on cost and unwavering quality. Segments that are effectively accessible in the market and reasonable for building up a steerable front lamp framework were tried. Various types of tests were done on basic pieces of the framework so as to decide its precision, its reaction time, and the framework sway. At long last, the outcomes obtained from these different tests will be examined. Any discoveries and changes that ought to be made are talked about and might be helpful for future advancement Harish Kumar .V et. al. [2] This paper portrays the advancement of versatile lighting framework during evening, as the most noteworthy lethal auto collisions happens on bend streets at evening. Evening driving with existing traditional headlamps is especially perilous in light of the fact that it doesn't give enlightenment the correct way on bend streets. Because of this compel, we have to comprehend an elective innovation answer for improve perceivability for driver at evening time during bend street. Headlamp swings in the flat bearing by detecting guiding point and vertical by detecting separation between subject vehicle and next vehicle. In this way, when an individual turns their vehicle, the headlamp of the vehicle additionally goes as indicated by the directing edge with the goal that the individual driving the vehicle will have better vision. Yi-Shun Chen et. al. [3] This paper portrays another technique and control process for an optical fog light structure. A progression of trials were directed to show the projection edge of headlights utilizing this strategy. What's more, the dynamic model of the fog light control framework was examined. A few parameters were thought of, including the tough and downhill street conditions and vehicle speed, to comprehend the multistage varieties of the new fog light control framework. The vehicle conditions were checked by a vehicle speed sensor and electronic level. The varieties of the projection edge of the fog light framework were at the same time controlled during the work procedure. This investigation helps in the advancement of another fog light framework that could be elevated to improve the projection and perceivability under various tough and downhill street conditions and vehicle speed, bringing about improved driving wellbeing. Fengqun Guo . et. al. [4] This paper broke down photometric attributes of vehicle headlamps when turning the corner, and built up another sort of AFS (versatile front-lighting framework) in view of CCD (charge-coupled gadget) which was better than conventional AFS. This new AFS utilized CCD picture sensor to distinguish data about the corner and afterward sent ebb and flow range to electronic control units ahead of time. In the interim, electronic control units would ascertain exact turn angle of headlamps through speed and bend sweep, and send it to engine to modify headlamps to get the lighting shaft which was appropriate for the corner. Through along these lines, it could evade "vulnerable side" brought about by the fixed lighting territory when coming into the corner, and improve driving wellbeing. This paper gave a displaying for even revolution edge of vehicle headlamps, and recreated it with MATLAB. T. Hacibekir et. al. [5] According to auto collision information, most of serious street mishaps happen around evening time. It is, hence, critical to utilize accessible innovation to add to street well being by improving the visual conditions gave by vehicle headlights. This paper presents the equipment on top of it recreation of an Adaptive Headlight System for engine vehicles. The Adaptive Headlight System is a functioning security framework, where the headlamp direction control framework turns the privilege and left low bar headlights autonomously and keeps the shaft as corresponding to the

bended street as conceivable to give better evening time perceivability. In the paper, the continuous vehicle and street models utilized are introduced first.

III. METHODOLOGY



IV. EXPERIMENTAL RESULTS

Figures shows the Cad model and drafting of Adaptive Headlight System with Fog Detection Figs. 1 (a) shows the Cad image. (b) is the image obtained by applying drafting command on Catia model

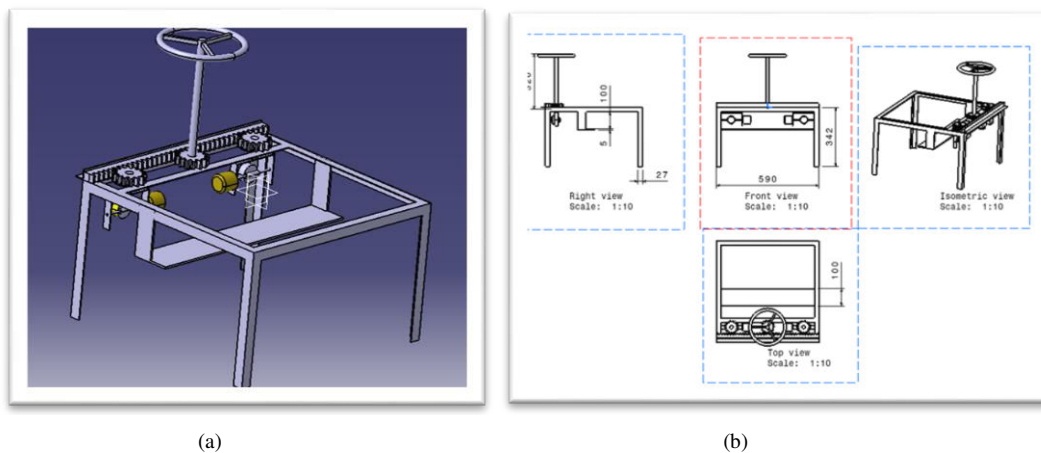


Fig. 1. Adaptive Headlight System with Fog Detection (a) CAD Model (b) Drafting of CAD Model

2.Components Used

Some Technical Hints on the Choice of Components

ArduinoMega

The reason for choosing an arduino mega over an arduino UNO is as following1) Having a Wi-Fi module increase the number of lines in the code dramatically and needs a more powerful processor to avoid possible chance of crashing while running the code.2) having higher number of pins in case of being interested to expand the design and add some more features.

Gravity Sensors: The gravity sensor measures the acceleration effect of Earth's gravity on the device enclosing the sensor. It is typically derived from the accelerometer, where other sensors (e.g. the magnetometer and the gyroscope) help to remove linear acceleration from the data. The Gravity unit is in m/s^2 like the accelerometer, and they are measured along the X, Y, and Z axes.



Servo motors For the water gun mechanism what we wanted was to possess motors which will give comparatively precise motion in an exceedingly specific vary. For what regards, there exist 2 selections : servo motor OR stepper motor usually a stepper motor is cheaper than a servo motor. However, depend upon the appliance, there square measure several different factors that ought to be taken under consideration. For our project we've thought-about the subsequent factors: 1) The Power/mass quantitative relation of servo motor is over steppers, which implies for having an equivalent quantity of power the stepper goes to be heavier than the servo motor. 2) A servo motor consume less energy than a stepper that is thanks to the actual fact that servomotor consumes power because it rotates to the commanded position then again the servomotor rests. Stepper motors still consume power to lock in and hold the commanded position.3) Servo motors are additional capable of fast hundreds than steppers. These reasons will lead to less consumption of energy which was important in our case since we used a Battery as the power supply for all motors.

Fog detection sensor DTH22 . DTH-22 (also named as AM2302) is a digital-output relative humidity and temperature sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin. Specification of sensor

V. WORKING METHODOLOGY

Headlight is controlled by two sensors. First is gravity sensor and second is fog sensor DTH22 sensor On basis of those gravity sensors we are going to control two DOF of headlights. If the vehicle is climbing the head light will go dipper and if vehicle is travelling upside down then it will adjust that is will be focus on road. Same for the turn, if vehicle is turning right, the focus will be turned to right and vice-versa. These fog sensor is contact with fog then it's change colour of headlight automatically .

Sr. No.	Components	Material	Total No.	Specifications	Cost
1	Gyro Sensor	-	1	BMG 250	700
2	Arduino	-	1	-	500
3	Fog Detection Sensor	-	1	DHT22 Model	400
4	Servo Motor	-	2	DC Motor 180 ⁰	1200
5	Frame and other supporting material	MS	-	1-inch pipe	1650
6	Rack and Pinion	MS	1		600
7	Steering	-	1	Maruti 800	500

VI. CONCLUSION

The structure and work of adaptive headlight system from traditional static headlamps has been accomplished. what is more alternative existing mechanisms for steering. controlled light source such as electrically controlled mechanism, reconciling light source mechanism it is straightforward, economical and might be simply custom-made for the any king of vehicles. in contrast to alternative obtainable systems it will not need any external supply for power for its commencement, only a little effort is applied to fog detection .

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