

Automatic Upper Dipper Light System

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Abstract— The sudden increase in the number of vehicles travelling on the road is a concerning issue which has led to a surge in the number of accidents. Unfortunately, the situation appears to be worsening day by day. According to recent statistics, more than 5 lakh accidents took place in the country last year, out of which 41% (around 2 lakh) were caused during night time, and around 18% (90 thousand) were due to headlight glare. The glare of headlights from an oncoming vehicle can severely impact the vision of the driver, leading to dangerous situations. Our eyes are highly sensitive to light, and exposure to light after darkness causes our cornea to contract, leading to temporary blindness. This can take a few minutes to recover from, which is extremely risky for drivers on the road. Many mass-scale motor vehicle manufacturers have not paid enough attention to safety features in their cars, instead focusing on reducing costs and maximizing profits. Although some high-end cars have intelligent headlight technology that can prevent accidents by up to 60 to 70%, there is no such solution available for budget cars. The main objective of this project is to provide a solution for the issue of headlight glare at night for budget car customers. The device we have developed is capable of automatically switching to dipper light when another car is in close proximity and then changing back to upper light once the car has passed. This mechanism ensures that the driver maintains a clear vision while driving at night, reducing the risk of accidents caused by headlight glare. Overall, it is crucial to address the issue of headlight glare to ensure the safety of all drivers on the road, regardless of the type of car they drive. With our device, we hope to provide a cost-effective solution for those who cannot afford high-end cars with intelligent headlight technology.

Keywords — Automatic Control, Upper, Dipper, Vehicle, Headlight, Road, Cars, Accidents.

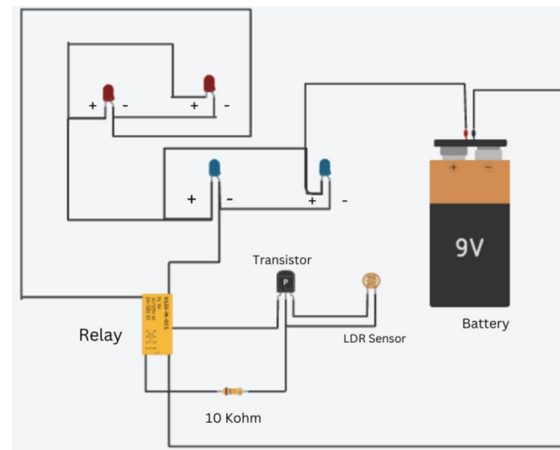
I. INTRODUCTION

The darkness at night can cause reducing visibility, making driving challenging. To help drivers navigate the roads safely, every vehicle is equipped with headlights that have two modes - high beam and low beam settings. Low beam headlights provide a focused beam of light that illuminates the road ahead, while high beam headlights offer a broader and more intense beam that illuminates the entire road. However, using high beam headlights can create glare on oncoming vehicles and traffic, which can be dangerous and cause accidents. To address this issue, an automatic upper dipper light system for vehicles has been developed by us. The system uses a Light Dependent Resistor (LDR) sensor to detect the intensity of light from oncoming vehicles. When the sensor detects the presence of an oncoming vehicle, a relay and transistors are used to control the automatic switching of the headlights from high beam to low beam settings. This ensures that the driver of the oncoming vehicle is not subjected to glare from the high beam headlights, which improves visibility for drivers on both driving. In this research paper, we will

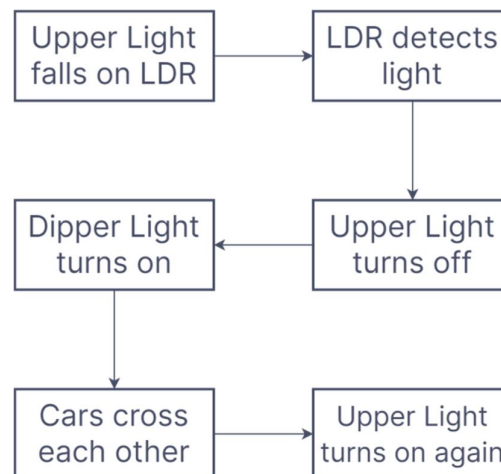
present the design and implementation of the automatic upper dipper light light system, including the circuit diagram. Overall, we believe that this system has the potential to make a significant impact on driving safety during night time driving and benefit drivers all over the world.

II. METHODOLOGY

To create an automatic system for vehicles that can sense the intensity of light and switch between high and low beam headlights, we first started by making a cut-out of a bus picture using Medium Density Fibreboard (MDF) board. This cut-out was made to replicate the front portion of a bus, including the location of the headlights. We then fixed LED lights on the MDF board at the position where the headlights of the vehicle are located. The LED lights were used to represent the headlights of the bus. Next, we placed Light Dependent Resistor (LDR) sensors at the center of the board, at the same position where the driver's eye would be. These sensors were used to sense the intensity of light and determine when to switch between high and low beam headlights. After the sensors were properly placed, we created a circuit on the opposite side of the bus picture. This circuit contained LDR sensors, transistors, and relays with proper connections. The batteries were used to power the circuit. Finally, we assembled all the components together to get an appropriate model of this automatic system. This model deeply illustrates how to implement such a system in vehicles. By using this model, we can demonstrate how this system works to switch between high and low beam headlights based on the intensity of light, reducing the risk of accidents caused by headlight glare. Overall, this system can significantly improve driving safety during night time driving. It can be easily implemented in any vehicle, and it has the potential to make a significant impact on driving safety all over the world.



Circuit Diagram :



Flow chart

III. RESULTS AND DISCUSSIONS

The automatic upper dipper light system is a valuable addition to road safety as it helps drivers to see better at night or in low-light conditions. The system's primary function is to automatically switch the headlights between high and low beams based on the presence of other vehicles or light sources. This feature ensures that other drivers are not blinded by the glare of the headlights, which is one of the primary causes of accidents on the road. One of the most prominent use cases of the automatic upper dipper light system is its ability to reduce the number of accidents on the road. By preventing drivers from being temporarily blinded by oncoming headlights, the system can help to avoid collisions and reduce the severity of accidents. This is particularly important in low-light conditions when visibility is reduced, and drivers may find it challenging to see the road ahead. Another significant advantage of the automatic upper dipper light system is that it can reduce driver fatigue. Manual switching between high and low beams can be tiresome and distracting, leading to driver fatigue and reduced focus on the road. The system takes over this task, allowing drivers to focus more on their surroundings and less on switching between high and low beams. The system also provides an effortless driving experience for drivers by handling the switching between high and low beams automatically. This convenience is particularly useful for drivers who may forget to switch between high and low beams, resulting in unsafe driving conditions. Overall, the automatic upper dipper light system provides several benefits to drivers, including improved visibility, reduced driver fatigue, increased safety, and convenience. The system's automatic switching mechanism ensures that drivers are not temporarily blinded by oncoming headlights, leading to a safer driving experience. Its ability to reduce driver fatigue and provide a more effortless driving experience is also a significant advantage, making it a valuable addition to any vehicle.



IV. FUTURE SCOPE

The future scope for the automatic upper dipper light system holds immense potential for improving road safety. Advancements in sensor technology can enhance the accuracy and efficiency of the system by incorporating LiDAR sensors to detect the proximity of other vehicles and adjust the headlights accordingly. Integration with vehicle communication systems can enable real-time exchange of information, allowing for synchronized headlight adjustments among multiple vehicles. Additionally, leveraging artificial intelligence and machine learning algorithms can further optimize the system's performance by continuously learning and adapting to different driving scenarios. Exploring adaptive lighting techniques, such as dynamic beam shaping or selective illumination, can enhance the effectiveness of the upper dipper light system based on road conditions and the presence of other vehicles. Integration with autonomous vehicles can provide an added layer of safety, complementing their sensors and algorithms. Advocating for regulations and standards mandating the implementation of automatic upper dipper light systems in all vehicles can significantly enhance road safety. Moreover, efforts should focus on developing cost-effective solutions and ensuring accessibility for budget cars and motorcycles. The future of the automatic upper dipper light system lies in technological advancements, intelligent transportation integration, innovative lighting techniques, collaboration with autonomous vehicles, regulatory considerations, and affordability for all vehicles.

V. CONCLUSION

The detection of other vehicles on the road is heavily reliant on the working of the LDR sensor in the automatic upper dipper light system. Once the system has detected another vehicle, it will automatically switch the headlights from high beams to dipped lights to prevent blinding the other driver. This technology is particularly useful for drivers who frequently drive on rural roads with little to no street lighting. With the automatic upper dipped lights system, drivers can have peace of mind knowing that they are always using the appropriate headlights for the conditions, which can help to reduce the risk of accidents caused by poor visibility. In addition to improving visibility and safety, the automatic upper dipped lights system can also help to reduce driver fatigue. By automatically adjusting the headlights, the system takes one less task off the driver's plate, allowing them to focus more on the road and their surroundings. This can help to reduce the likelihood of accidents caused by driver error or fatigue. Overall, the automatic upper dipped lights system is an essential safety feature that can help to improve visibility, reduce driver fatigue, and reduce the risk of accidents caused by poor visibility. As this technology becomes more prevalent in modern vehicles, we can expect to see a reduction in the number of accidents caused by poor visibility on the road.

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