AUTOMATIC DIM AND DIP SYSTEM FOR VEHICLE

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Recepción: 28/11/2019 **Aceptación:** 04/03/2021 **Publicación:** 30/11/2021

Citación sugerida:
Manikandan, P., Sivakumar, P., Reddy, G. K. S., Vyas, M. C. T., y Kumar, Ch. H. (2021). Automatic DIM and DIP system for vehicle. *3C Tecnología. Glosas de innovación aplicadas a la pyme, Edición Especial,* (noviembre, 2021), 459-469. https://doi.org/10.17993/3ctecno.2021.specialissue8.459-469

ABSTRACT

This paper presents the design of "automatic light dim and dip system". In existing system, vehicles dim, and dip is done by man(or)manually. It is important for journey during nighttime. Our strategy involves design, development and creating this automatic light dim and dip system. Most of the vehicle riders use elevated, bright beam during night driving. This leads the individual traveling in the opposite direction to be uncomfortable and accidents to be occurred in most of the cases. The automatic vehicle headlight dim and dip system adjust the intensity beam when finds the vehicles in opposite direction. It utilizes a Light Dependent Resistor (LDR) sensor was intended to dim the headlight of cars automatically to prevent the impacts of human eyes. It eliminates the driver's need from manual switching which was not done all time. Also, this system helps to reduce the accidents rate in nighttime due to the high beam headlight.

KEYWORDS

Light Dependent Resistor (LDR), Dim and Dip, Headlight, Vehicle, Source, High beam, Low beam.

1. INTRODUCTION

The requirement of headlights during night travel, are very prevalent. The human eye is an organ that is very delicate. Without any rest, it operates almost a whole day. With the increase in brightness headlight that typically offers the driver with better night vision. It is also accountable for many crashes that are caused. The driver has the headlight control that can be switched from elevated (bright) to low (dim) beam. The headlight must be set by the driver according to the light requirement. But there are It improves the pressure to concentrate on an item. The prototype intended to decrease this issue by shifting the bright headlight of our vehicle to low beam automatically. when it senses a vehicle coming carefully from other direction. The entire working of switching takes place.

Figure 1. Impacts of High beam head lights during driving.
Source: own elaboration.

Most drivers do not use manual dipper control because manual switching is hundreds of times during riding at night. Another reason is that instead of dipping the head light beam (Guttman, 2003). The driver likes to be more careful. Another cause is the problem of ego, which leads everyone to wait until the other person starts to dip which may not occur.

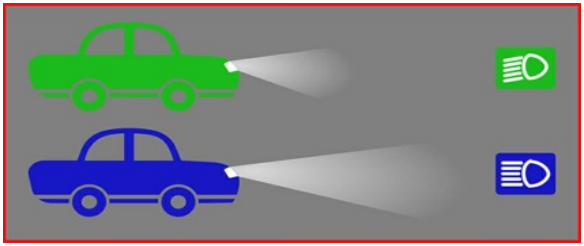

Figure 2. Low Beam and High beam distance.
Source: own elaboration.

https://doi.org/10.17993/3ctecno.2021.specialissue8.459-469

2. METHODOLOGY

The vehicle 2 senses the high beam of vehicle 1 with the help of the Light Dependent Resistor (LDR) sensors that converts the light intensity into electrical signal. Designing a circuit is very simple, and this is one of the best ways to approach the prototype in distinct view.

Figure 3. Prototype of Dip and Dim System.
Source: own elaboration.

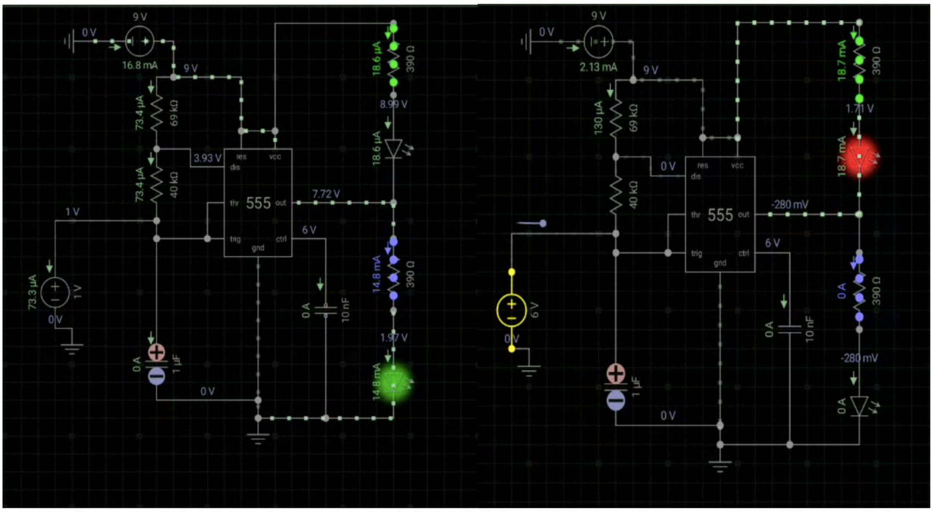

Figure 4. Circuit Design.
Source: own elaboration.

3. CIRCUIT COMPONENTS

3.1. 555 TIMER

The *555* timer IC is this system's primary control and is known primarily for producing stable delays in time. Monostable mode is used here for this scheme to develop the timing logic. It is a dual-in-package (DIP) 8-pin IC.

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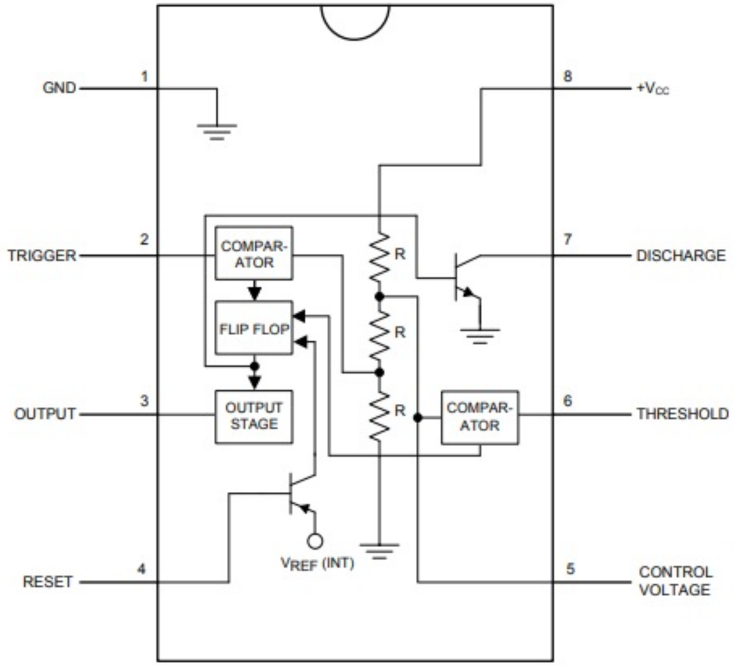

Figure 5. IC *555* TIMER.
Source: own elaboration.

There is no single agreement on architecture for IoT, which is accepted universally. Different architecture has been proposed by several researchers. There are two main architectures, they are: Three layer and Five-layer architecture. Among these, three-layer architecture is more basic one which has perception layer, network layer and application layer. This Perception layer is commonly known as Physical layer. In which, it has sensors for sensing the information and gathering it related to the application environment. In other-words, the sensors will sense some physical parameters. The network layer is responsible for connecting to smart devices (Single board computers) as a gateway. It adds the features, that it can transmits the data and process the data from the sensors in the physical layer. The final layer will be the Application layer, in this layer it delivers the application explicit administrations to the client (users). Three-layer architecture has been overcome by the five-layer architecture since it focuses on only few aspects of Internet of Things (IoT).

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3.2. LDR (LIGHT DEPENDENT RESISTOR)

It is also called a photo resistor. A photo resistor is a variable resistor that is light controlled. A photo resistor's strength reduces as incident light intensity increases. It plays a significant part in our project. It will detect the light from the opposite direction. Then, by raising the light intensity from the opposite car, the picture resistance will be reduced. Working LDR Principle. This resistor operates on the picture conductivity principle. It's nothing but when the light drops on its surface, the conductivity of the material decreases and the electrons in the device's valence band are thrilled to the conductive band as well. The LDR's strength improves when the light level reduces. As this resistance rises over the other resistor, which has a fixed resistance, it also raises the voltage dropped across the LDR.

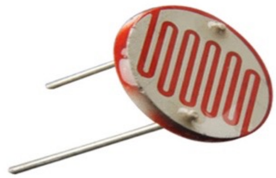

Figure 6. LDR.
Source: own elaboration.

3.3. BATTERY SOURCE

Figure 7. Battery.
Source: own elaboration.

This system utilizes 9V supply that is drawn straight from the battery of the car already present in each car. It offers steady DC supply and safe operation of the system vehicle battery Supply and no external elements are required.

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4. OPERATING PRINCIPLE AND WORKING

It provides the clear concept of the dipper control scheme from the block diagram shown in automatic mode, as the LDR resistance changes with the intensity of light, LDR senses the headlight of the approaching vehicle. The voltage was supplied to the *555*-timer control IC becomes high or low because of the shift in intensity. The output shifts its state to high or low in dark and output of *555* IC shift based on trigger and threshold condition. The headlight beam shifts from dipper to upper beam. This scheme utilizes the *555*-timer application's monostable mode to display the output waveform of monostable mode that provides the time limit T after the small input pulse applied to *555* IC.

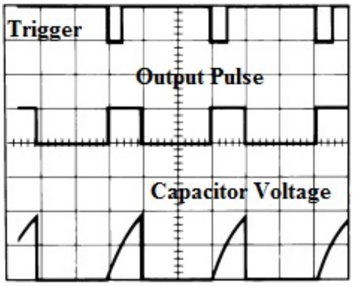

Figure 8. Timing diagram.
Source: own elaboration.

Automatic mode comprises of light-dependent resistance (LDR), *555* IC, relay and a few other elements as shown in Normally, elevated in darkness (20 kb) and low in brightness (2 kb) LDR resistance. VR and LDR function as a prospective splitter and VR are used for potential divider output voltage control resulting in LDR time and intensity control changes. Internal structure of *555* IC, in which three 5 k resistors function as a voltage divider and supply 2/3 Vcc to comparator 1 and 1/3 Vcc to comparator 2, where Vcc is the supply. The timing interval is given by these two voltages.

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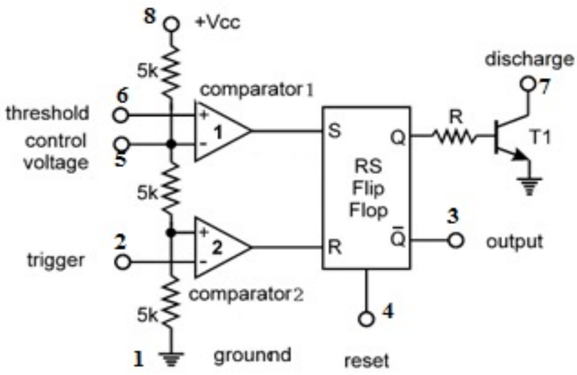

Figure 9. Internal Circuit diagram of IC*555* Timer.
Source: own elaboration.

Drops on the LDR, the resistance of the LDR decreases and the voltage immediately adjusted to the limit and the trigger pin shortens to the floor. As a result, an adverse voltage will activate the pin, which will be set by comparator 2 at 1/3 Vcc. If this voltage is equivalent to 1/3 Vcc, the output of the comparator 2 is large and the output of the comparator 1 is not equivalent to 2/3 Vcc. It lays FF at S=1, R=0 and FF output is Q=1, == 0, this output is reversed by the inverter current at pin 3, resulting in an elevated output of *555* IC. This situation remains until the light continually drops on LDR, which implies that the light beam of the car still falls on the LDR sensor. The LDR detector goes into darkness once the approaching car passes away. LDR resistance is increased and voltage shortened owing to low LDR resistance is retrieved and provided to *555* IC threshold and trigger pins. As a result, the positive voltage will be a threshold pin set by comparator at 2/3 Vcc 1. If the voltage is equivalent to 2/3 Vcc, the output of the comparator 1 is large and the output of the comparator 2 is not equivalent to 1/3 Vcc.

5. RESULTS

The circuit had been designed to be a working model. Until the vehicle is encountered by an opposite vehicle, it can travel with high beam. Once it encounters an opposite vehicle, each of the two vehicles senses the opposite vehicle's light. Thus, if either of the vehicles are using high beam, it switches to low beam. If the headlight is already in low beam, then no change occurs. As the vehicles cross each other, the intensity of light falling on the sensor decreases and the headlights switch back to their original mode. There might be a question

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of other sources of light in the road like sign boards, street lights and buildings. But as LDR is used as the source and the placement of the device is highly directional, it is not affected by any other light sources which might be present in the vicinity.

Figure 10. Prototype Results.
Source: own elaboration.

6. CONCLUSIONS

Automatic dipper offers better nighttime safety and drivers can comfortably drive and securely achieve their destination. While driving in the towns, light is everywhere that can influence the functioning of the device at that moment, the mode can switch to manual mode to prevent headlight flickering. When the "Automatic Dipper" was installed in both vehicles, the vehicles dipped. Effectively each other's headlight beam. Main components are easy to use accessible and inexpensive to operate the circuit. The circuit is compatible with any car and requires no other supply; it can operate effectively on the vehicle-fitted battery. The installation of this safety scheme in each car therefore provides safety during night driving, increases driver convenience and reduces road accidents.

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