

Auto Dipper system using IR signals and Arduino

<https://www.youtube.com/watch?v=2XRhujsW6jU>

The main aim of this project is to design and develop an **Automatic Headlight Dipper System using IR sensing and an Arduino controller**. The proposed system is intended for use in vehicles to automatically control the dipping operation of vehicle headlights in response to the high-intensity light emitted by approaching vehicles.

The Arduino acts as the main controlling unit of the system. An appropriate light or IR sensing module is used to detect the presence and intensity of light from the headlights of an opposite vehicle. Based on the sensor input, the Arduino automatically controls the vehicle headlamp and changes it from high beam to low beam (dipper mode).

Night-time driving can be dangerous because the high-intensity headlights of approaching vehicles may cause glare and temporary visual impairment to drivers. This reduced visibility can increase the possibility of road accidents. In conventional vehicles, the driver has to manually switch between high beam and low beam headlights. However, manual operation may not always be convenient, particularly when the driver needs to concentrate on the road.

To overcome this problem, the proposed system provides automatic headlight intensity control. When the sensor detects intense light from an approaching vehicle, the Arduino automatically activates the dipper mechanism and switches the headlight from high beam to low beam. After the approaching vehicle passes and the intense light is no longer detected, the system can restore the headlight to its normal high-beam condition.

An LCD display can be used to indicate the operating status of the system, such as high beam, low beam, and vehicle detection status. Thus, the proposed Auto Dipper System provides a simple, reliable, and low-cost solution for improving night-time driving safety. By reducing glare and minimizing driver distraction, the system helps improve visibility and may reduce the risk of collisions and road accidents.

The main objectives of the proposed System:

1. To design and develop an automatic headlight dipping system for vehicles using an Arduino controller.
2. To detect the intense light coming from the headlights of approaching or opposite vehicles using an IR sensor.
3. To automatically switch the vehicle headlight from high beam to low beam when an opposite vehicle is detected.
4. To reduce glare and temporary vision impairment caused by high-intensity headlights during night driving.
5. To eliminate the need for manual operation of headlight dipping by the driver.
6. To improve driving comfort and visibility during night-time travel.
7. To reduce the possibility of road accidents caused by dazzling headlights.
8. To display the operating status of the automatic dipper system on an LCD display.
9. To provide a simple, low-cost, reliable, and efficient vehicle safety system using Arduino technology.
10. To enhance overall road safety by ensuring automatic and timely control of vehicle headlight intensity.

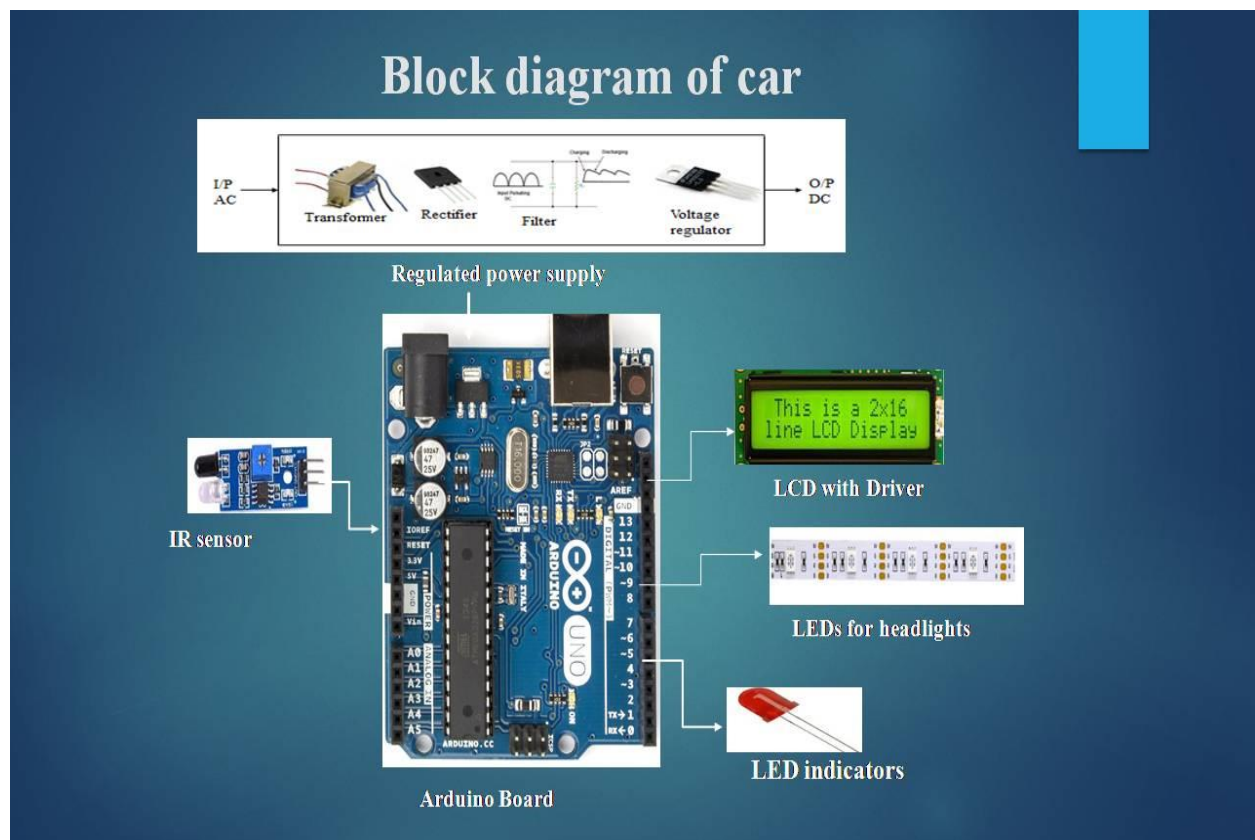
The main blocks of this project are:

- ▶ Regulated Power Supply.
- ▶ Arduino UNO.
- ▶ IR sensors
- ▶ LCD display.
- ▶ LEDs for headlights
- ▶ LED indicators.

Software's used:

1. Embedded Linux programming.
2. Express SCH for Circuit design.

Block diagram:



Block diagram of heavy vehicle

