Automatic Vehicle Dim And Brightness Control Using NRF24L01

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Abstract- *Vehicle to vehicle data transmission, we present initial designs and results of a small-scale prototype using NRF24L01 technology, a new technology that was developed in the last few years, which still needs more systematic inquiry on its sustainability for outdoor vehicular networks. Vehicle to vehicle communication is the most effective solution we have used in order to reduce vehicle's accidents. In this technology for vehicle-to-Vehicle data transmission we use NRF24L01 Transceiver. In this technology there is elimination protocols use so in this technology complexity get reduce. The aim of designing this system is highly reliable which give desired data transmission between vehicle to-Vehicle by using transmitter and receiver mounted on vehicle.*

Keywords- Arduino, Ultrasonic sensor, LDR sensor, NRF24L01 module, Buzzer, LCD, power supply

I. INTRODUCTION

High beam of vehicles poses a great danger during driving, this causes uncomfortable to the person travelling in the opposite direction. He experiences a sudden blaze for a short period of time. This is caused due to high intensity of headlight beam from the other vehicle coming towards him in the opposite direction, we expect that person to dim the headlight beam to avoid the blaze. This blaze causes a temporally blindness to a person, resulting in accidents during the night, so we must reduce the intensity of headlight beam in order to avoid accidents during the night. In vehicles, alcohol sensor is suitable for detecting alcohol concentration on breathe. It has a high sensitivity and fast response time and also it indicates whether the person wearing seat belt or not.

PROPOSED SYSTEM

In this proposed system, In this, a vehicle (Vehicle-A) which is having ultrasonic sensor gives the information about distance between target vehicle (Vehicle-B). However, in this system, communication between only two vehicles is done, we can also design number of target Communication and ranging technologies for communication between vehicles by Using wireless technologies.In this project we can send messages to the receiving vehicle one by one depending on condition. We are also using buzzer output and LCD to display message on both transmitter and receiver side. Based on LDR Values the LED's intensity will change.

The system automatically adjusts the brightness of the car headlights based on ambient light conditions, ensuring optimal visibility for the driver while minimizing driver distraction and discomfort caused by overly bright headlights.The nRF24 wireless module enables reliable and low-latency wireless communication between the Arduino and the headlight control module, eliminating the need for wired connections and providing greater flexibility in system installation.

NRF24L01 MODULE

The nRF24L01 is a single chip 2.4GHz transceiver with an embedded baseband protocol engine (Enhanced Shock Burst™), designed for ultra low power wireless applications. The nRF24L01 is designed for operation in the world wide ISM frequency band at 2.400 - 2.4835GHz. An MCU (microcontroller) and very few external passive components are needed to design a radio system with the nRF24L01.The nRF24L01 is configured and operated through a Serial Peripheral Interface (SPI.) Through this inter- face the register map is available. The register map contains all configuration registers in the nRF24L01 and is accessible in all operation modes of the chip. The embedded baseband protocol engine (Enhanced Shock Burst™) is based on packet communication and supports various modes from manual operation to advanced autonomous protocol operation. Internal FIFOs ensure a smooth data flow between the radio front end and the system's MCU. Enhanced Shock- Burst™ reduces system cost by handling all the high-speed link layer operation .The radio front end uses GFSK modulation. It has user configure able parameters like frequency channel, output power and air data rate. The air data rate supported by the nRF24L01 is configurable to 2Mbps. The high air data rate combined with two power saving modes makes thenRF24L01 very suitable for ultralow power designs .Internal voltage regulators ensure

a high Power Supply Rejection Ratio (PSRR) and a wide power supply range

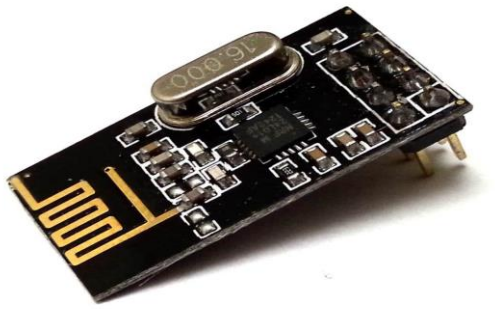


Fig no 1.1NRF24L01 MODULE

ULTRASONIC SENSOR

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target)

ARDUINO

Arduino refers to an open-source electronics platform or board and the software used to program it. Arduino is designed to make electronics more accessible to artists, designers, hobbyists and one interested in creating interactive objects or environments. An Arduino board can be purchased pre-assembled or, because the hardware design is open source, built by hand. Either way, users can adapt the boards to their needs, as well as update and distribute their own versions

LDR SENSOR

LDRs are tiny light-sensing devices also known as photo resistors. An LDR is a resistor whose resistance changes as the amount of light falling on it changes. The resistance of the LDR decreases with an increase in light intensity. This property allows us to use them for making light sensing circuits.

LCD (LIQUID CRYSTAL DISPLAY)

The LCD display controller provides an interface between the multimedia processor and a flat-panel display module.The controller can be integrated as a part of system on chip or can be discrete. The image rendered by the application is displayed on the screen for the user by the LCD controller. The image of the screen on the memory is called the frame buffer. The configuration of the controller is typically established through programmable options for display type, resolution, pixel depth, overlays, hardware cursor, and output data formatting

BUZZER

A buzzer is an audio signal device commonly used to produce sound. Buzzer is a very small component in electronics but can be used very smartly in multiple applications. Piezo buzzer produces sound based on the reverse principle of the piezoelectric effect. The buzzer is a less costly and light-weighted electronic device that's why it is used in computers, alarm devices, refrigerators, microwave ovens, security devices, and so on. There are two conductors available inside the buzzer along with a piezo crystal between them. Whenever the potential is applied across the crystal then the conductor's position gets changed due to which a 2 to 4 kHz sound wave is produced by the buzzer.

POWER SUPPLY

Apower supply is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters. All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output or rail connections that deliver current to the load. The source power may come from the electric power grid, such as an electrical outlet, energy storage devices such as batteries or fuel cells, generators or alternators, solar power converters, or another power supply. The input and output are usually hardwired circuit connections, though some power supplies employ wireless energy transfer to power their loads without wired connections. Some power supplies have other types of inputs and outputs as well, for functions such as external monitoring and control.

EMBEDDED C

Anembedded system is the one which is designed to perform a specific task and the embedded software rules the entire system. This software for a particular embedded system could be developed using various embedded programming languages. But embedded C is the well-known embedded

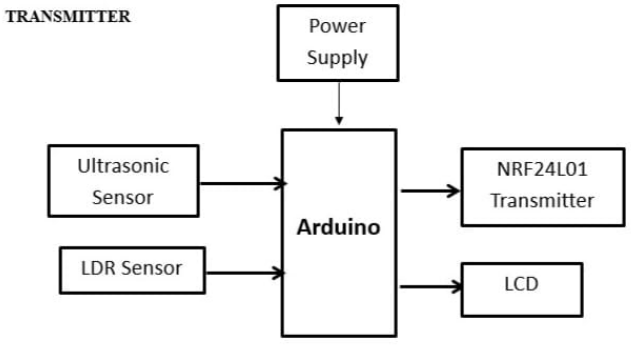
programming languages. Use of C in embedded system is driven by following advantages

1. It is small and reasonably simpler to learn, understand, program and debug
2. C Compilers are available for almost all embedded devices in use today, and there is a large pool of experienced C programmers.
3. Unlike assembly, C has advantage of processor-independence and is not specific to any particular microprocessor/ microcontroller or any system. This makes it convenient for a user to develop programs that can run on most of the systems.
4. As C combines functionality of assembly language and features of high level languages, C is treated as a 'middle level computer language' or 'high level language'.
5. It supports **access** to I/O and provides ea**se** of management of large embedded projects**.**

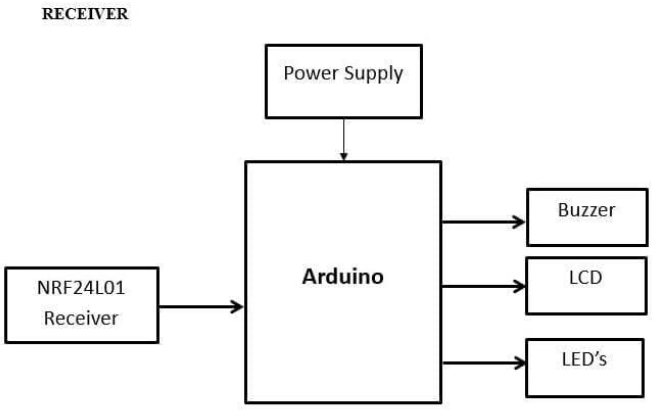
II. WORKING PRINCIPLE

The LDR acts as a variable resistor. Therefore, the LDR and the two resistors form a potential divider network which will decide the current in the circuit. Thus, this balanced network gives a trigger to the gate/base of the transistor. The design of this particular circuit gets a trigger if there is a voltage imbalance in the circuit due to change in resistance of the LDR from the light source. The source required for the operation is 12 V DC supply and the DC source is then taken from battery. However, in real-time application, this can be substituted from the car's own battery pack. The headlights, LDR and transistor are all connected to the same DC supply

BLOCK DIGRAM



Figno1.2



Figno1.3

III. OUTPUT

These are the output which are observer our project while underworking

Figno1.4TransmitterSection

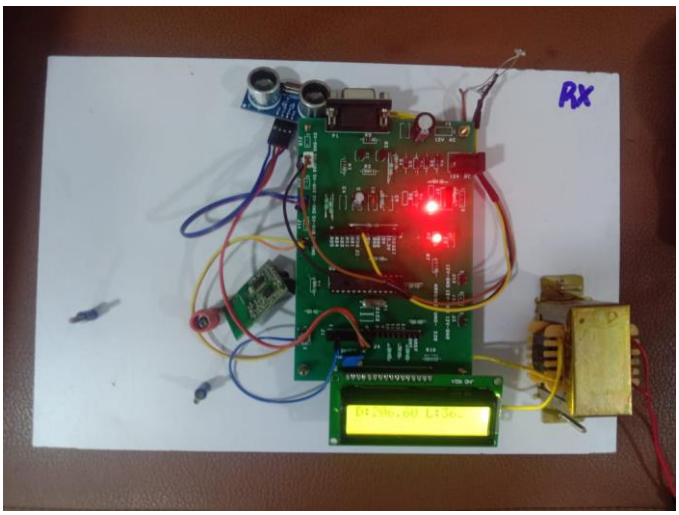
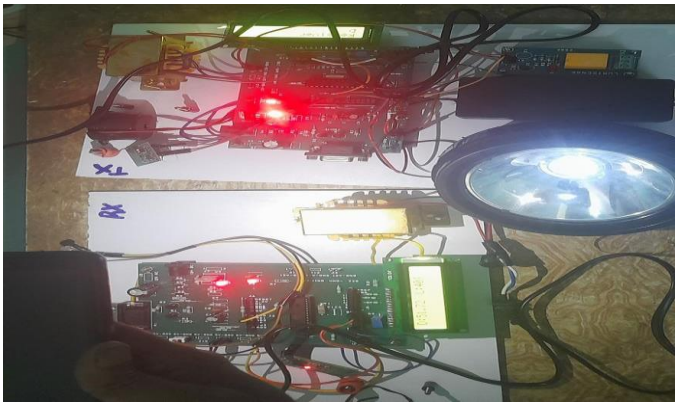


Fig no 1.5 Receiver Section



Figno 1.6Automatic vehicle headlight dim and brightness controll

LDR sensor detects the light and ultrasonic sonic sensor detects the object which are measured the distance,they will alarm the buzzer.and then automatically dim the headlight

IV. CONCLUSION

Glare during driving is a serious problem for drivers and therefore caused by the sudden exposure of our eyes to a very bright light of the headlights of vehicles. This causes a temporary blindness called the Troxler effect. Eventually this has become the major reason for accidents occurring at night and also during bad conditions such as rainy and foggy conditions. The driver should turn down the bright lights immediately to avoid glare to the other person, however they find it difficult to do. Hence, the idea for the design and development of a prototype circuit called the embedded automotive control system. It enables the driver to use high beam light when required and also automatically switches the headlight to low beam when it senses a vehicle approaching from the opposite side with the same beam. Thus, the implementation of this device in every vehicle does not only avoid accidents but also provide a safe and a comfortable driving. A server module could be included to this system for receiving and storing head light rays parameters information in a database application

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