SAFETY HONK (ALERT SYSTEM USING RADAR AND WIRELESS TECHNOLOGY)

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Abstract: In this road safety system by using radar and wireless technology, two poles installed on the bend detect the speed of oncoming vehicles, and then communicate with each other to alert approaching vehicles on either side with a horn. The phenomenon of Doppler Effect thus comes in play. With installing such systems, we can reduce the risk of accidents. This system will prove to be beneficial especially in the hilly areas having sharp bends and turns. Also these systems are cost effective and help in saving many lives. The limitation maximum speed works as a standard reference, above which the honks will be activated for the safety purpose to aware the people on the other side of the bend. For the advancement of the system, it can be installed with an 'SOS' messaging system to the nearest hospital and the ambulance service in case of accidents. It is operated on both electricity and solar power so it is effective and handy in all situations even if there is no electricity.

***Index Terms - arduino Uno, LCD display, Zigbee RF*.**

I. INTRODUCTION

Safety equipment in vehicles only limits the impacts of the damage, does not actually prevents the mishaps. What if we instead made the roads smarter to prevent the accidents? For this we are making a model using radar and wireless technology, two poles installed on a bend detect speeds of oncoming vehicles, then communicate with each other to alert approaching vehicles on either sides with a horn. India is marked as the country which has the highest number of road accidents in the world. The automobiles companies are making their cars in a way so that it can have less damage in the accident. But there is a need to reduce the accidents not the damage caused by the accidents. In this model we'll be fitting the roads with the radar, alert and messaging system. It is also equipped with solar panel so that it can work without electricity. The radar poles have been introduced on the key hairpin bends and are able to detect the speed of the vehicles and then communicate with each other to warn vehicles on both sides.

Why we use safety honks?

The main objective of this system is to reduce the risk of accidents in the hilly areas.

II. LITERATURE SURVEY

Obstacle detecting sensor are one of the most basic type of sensor that electronic hobby use. There are several methods to make cheap obstacle sensors. These simple sensors are made using IR/TX pair or normal LED and LDR pair (this design is most basic and heavily affected by environment lighting conditions).

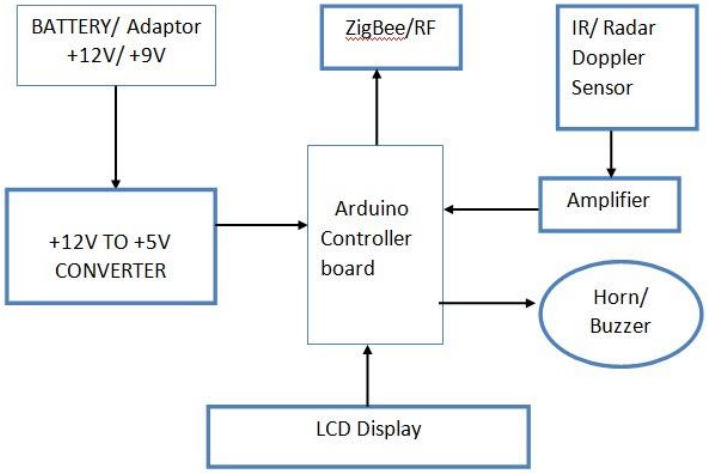
These sensors may be useful for simple requirement but have following drawbacks:

1. Cannot say anything about the real distance of obstacles.
2. Give different results for different coloured obstacles.
3. Need calibration (like setting up a variable resistor).

To solve all these kind of problem we can use an infrared sensor. An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings. It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. Passive infrared sensors are electronic sensors that measures infrared light radiating from objects in its field of view. They are most often used in PIR- based motion detector. The reasons for using the radio waves (3 kHz to 30 MHz) instead of other electromagnetic waves, as radio waves can travel long distance through all kinds of media, or even through empty space. They also travel really fast, moving at the speed of light. Because of this, radio waves are critically important for all kinds of communication technologies. Radio waves are therefore used from transmitting music and videos to communicating with astronauts in outer space.

III. PROPOSED WORK

This project is a step forward in the advancement of the road safety system. The project require the help of arduino uno and infrared sensor and the basic communication modules, also it is solar powered version of existing project system.



Block Diagram

IV. COMPONENT DESCRIPTION

Arduino Uno: The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Interfacing Cable: USB 2.0 printer cable is ideal for connecting Arduino Boards**,** Arduino Power bank**,** scanner, hard drive, printer, server, camera and more, to a laptop, computer (Mac/PC) or other USB-enabled device.

Radar Doppler Sensor with amplifier:

- Wireless Module Doppler Radar
- For Microwave Motion Sensor
- Low current consumption (typical 30 mA)
- CW or pulse operation
- Long detection range (20 m)
- Supply voltage: between 4.75V and 5.25V
- X-Band frequency: 10.525 GHz
- Minimum Power Output: 13 dBm EIRP

It has a built-in Dielectric Resonator Oscillator and a pair of Micro strip patch antenna array, making it ideal for usage in motion detection equipment. This module is ideal for alarms, motion detectors, lighting control, vehicle speed measurement and automatic doors.

LCD Base: The **LCD Patch/shield** attaches to Arduino/ AVR Board to provide a 16×2.
Power Supply Patch/ Extension/ breakaways board is used to provide multiple extensions for V_{cc} & GND. Purpose of Power Supply Extension/ patch is to provide multi-extension.
Alphanumeric LCD Display- 16×2 is a basic 16 character by 2 line display. Black text on Green background. Utilizes the extremely common HD44780 parallel interface chipset. You will need to connect general I/O pins to interface to this LCD screen, **Includes LED backlight.**
Buzzer/ speaker module: Buzzer can be used as a noise-maker driven by your microcontroller for audible feedback of events, and it can also be used as a knock-detector input to sense events and react to them. Includes a built-in 1M resistor to allow the piezo element to detect shocks.
Step down Power supply +12V to +5V: DC to DC voltage converter +12V DC to +5V DC. Step down the +12V/+9V Dc Input Power to +5V DC, suitable for sequential power output.
Power supply adapter +12v: Adapter +12V, 1A Power supply, suitable for Arduino boards, Atmega boards & ARM Processor Board.
ZigBee RF: This is a RF data modem working at 2.4 GHz frequency in half duplex mode with automatic switching of receive/transmit mode with LED indication. Receives and Transmits serial data of adjustable baud rate of 9600/115200 bps at 5V or 3V level for direct interfacing to microcontrollers.

The key features are:

1. Arduino boards are able to read analog to digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
2. You can control your board functions by sending a set of specifications to the microcontroller on the board via Arduino IDE.
3. Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware in order to a load a new code onto the board. You can simply use a USB cable.
4. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.

Finally, Arduino provides a standard form factor that breaks the functions of the microcontroller into a more accessible package.

V. CONCLUSION

The project has proved to be advance in the field of safety as well as its technological aspects. The advancement in the system and over the existing system will prove to be a lot more beneficial as it is solar power and also there is an improved sensing technology.

REFERENCES

1) "Fundamentals of Radar Signal Processing" by Mark. A. Richards
2) "Millimeter- wave and Infrared Multisensor Design and Signal Processing" by Lawrence. A. Klein
3) The 8051 microcontroller and embedded systems using assembly and C (second edition) by Muhammad ali mazidi, Janice Gillispie mazidi, Rolin D.McKinlay.
4) Embedded/real-time systems: Concepts, Design and programming by Dr. K.V.K.K. Prasad.
5) An embedded software primer by David E.Simon.