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SMART SAFETY ENHANCEMENT FOR MOUNTAIN ROADS

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Abstract: In developing country accident is main cause of death. Growth in population has led to growth in technology. People use car on large number and number of accidents taking place, is increasing day-by-day. Road accidents are undoubtedly the most frequent happening cases and overall, the cause of the most damage The intensity of deaths are more in curved roads i.e mainly in U-turn, Hairpin bend roads and mountain narrow roads. In this case the driver can't see the vehicle coming from the other side. Because of which thousands are losing their lives in accident. If the vehicle is in great speed then it is difficult to control and there are chances of falling off a cliff. Hence there is a need of many road safety systems. The solution for this problem is alerting the driver about the vehicle coming from the other side. This is done by keeping the sensor unit on one side of the road before the hairpin bend curve/Land Slide and keeping LED light after the curve/Landslide, so that vehicle coming from the one side of the road is sensed by the sensor unit and LED light glows at opposite side. By looking at the LED light driver become alert and slow down the speed of vehicle. When two cars pass from the opposite side of a mountain curve the sensor senses the car and LED colour changes to red and raises the buzzer giving signal of danger and then it changes one LED colour into green to allow the one car to pass and then the other LED colour turns green. In this way we can prevent the accidents of curved road. Once receive the signal from wireless module the vehicle reduce the speed by using motor drive unit.

I. INTRODUCTION

(ADASs) have become a salient feature for safety in modern vehicles. They are also a key underlying technology in emerging autonomous vehicles. State-of-the-art ADASs are primarily vision based, but light detection and ranging (lidar), radio detection and ranging (radar), and other advanced-sensing technolo-gies are also becoming popular. In this article, we present a survey of differ-ent hardware and software ADAS technologies and their capabilities and limitations. We discuss approaches used for vision-based recognition and sensor fusion in ADAS solutions. We also highlight challenges for the next generation of ADASs. Safe driving through ADAS Stress and stimulus saturation accompany modern mobility. Multiple different hazards require quick, considerate action without losing sight of further traffic every second. Innovative Advanced Driver Assistance Systems help drivers stay on top of things, helping them arrive safe and relaxed. These systems act as electronic copilots, providing pure driving comfort and make driving safer and stress-free. Advanced Driver Assistance Systems make the road traffic safer and are an essential part of the vision of accident free driving. As a leading supplier Continental has a strong portfolio of technologies and components for Advanced Driver Assistance Systems.

II. LITERATURE SURVEY

1. Yoichi Sugimoto has proposed in EFFECTIVENESS ESTIMATION METHOD FOR ADVANCED DRIVER ASSISTANCE SYSTEM AND ITS APPLICATION TO COLLISION MITIGATION BRAKE SYSTEM.

This paper focused on a Collision Mitigation Brake System (CMBS), which is mainly focused on rear-end collisions, was introduced in the Japanese market in June 2018. To make such kinds of advanced driver assistance systems more available in and accepted by society, it is essential to measure their effectiveness in enhancing safety.

2. Muhlbacher, D.; Mark, C.; Kruger, H.-P. , Maag, C. has proposed in Studying Effects of Advanced Driver Assistance Systems (ADAS) on Individual and Group Level Using Multi-Driver Simulation at the Intelligent Transportation Systems Magazine, IEEE Fall 2019.

This paper deals with the effects of advanced driver assistance system. ADAS have the potential to optimize safety and efficiency in road traffic. In order to reach this objective, human-centered design principles have to be considered.

3. Kisacanin, B. has proposed in Automotive vision for advanced driver assistance systems at the VLSI Technology, Systems and Applications (VLSI-TSA), 2011 International Symposium on 25-27 April 2019.

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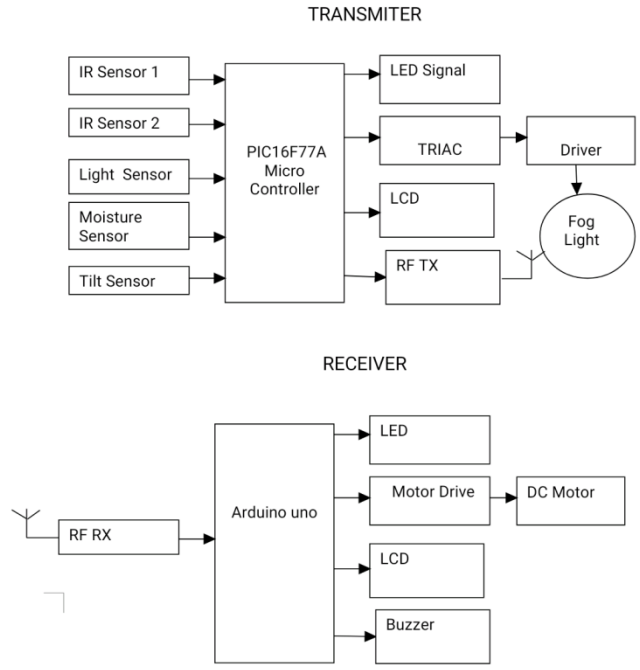
This invited paper gives an overview of road safety statistics and a summary of advanced driver assistance systems that have recently been deployed. The science and technology behind popular automotive vision systems, such as traffic sign recognition, is briefly explained and the processing requirements of vision algorithms are presented in the context of automotive environment. There are many opportunities in front of the semiconductors industry to help improve the safety of roads around the world and to contribute to the future in which all cars will be autonomous vehicles.

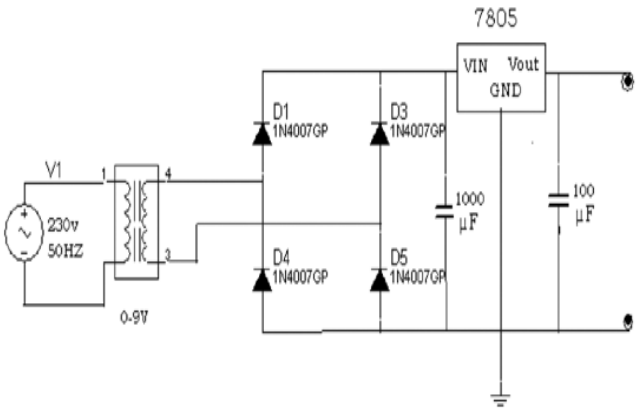
III. BLOCK DIAGRAM



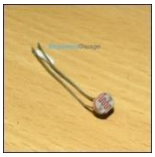
IV. COMPONENTS DECSRIPTION

4.1 POWER SUPPLY

Every circuit needs a source to give energy to that circuit. The Source wills a particular voltage and load current ratings. The following is a circuit diagram of a power supply. We need a constant low voltage regulated power supply of +5V, providing input voltages to the microcontroller RS232, LM311 and LCD display which requires 5 volts supply.



4.2 LDR (Light Dependent Resistor)



An LDR (Light dependent resistor), as its name suggests, offers resistance in response to the ambient light. The resistance decreases as the intensity of incident light increases, and vice versa. In the absence of light, LDR exhibits a

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resistance of the order of mega-ohms which decreases to few hundred ohms in the presence of light. It can act as a sensor, since a varying voltage drop can be obtained in accordance with the varying light. It is made up of cadmium sulphide (CdS).

4.3 RF TRANSMITTER AND RF RECEIVER

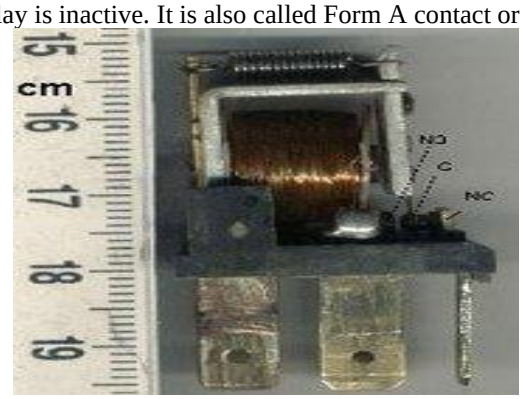
This **RF module** comprises of an **RF Transmitter** and an **RF Receiver**. The transmitter/receiver (Tx/Rx) pair operates at a frequency of **433MHz.** An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4.

The transmission occurs at the rate of 1Kbps -10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

Transmitter Receiver

4.4 RELAY

A relay is an electrical switch that opens and closes under control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of electrical amplifier. These contacts can be either Normally Open (NO), Normally Closed (NC), or change-over contacts. Normally-open contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called Form A contact or "make" contact.



4.5 MOISTURE SENSOR

Soil moisture sensors measure the volumetric water content in soil.[1] Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

4.6 IR SENSOR

This device emits and/or detects infrared radiation to sense a particular phase in the environment. Generally, thermal radiation is emitted by all the objects in the infrared spectrum. The infrared sensor detects this type of radiation which is not visible to human eye.

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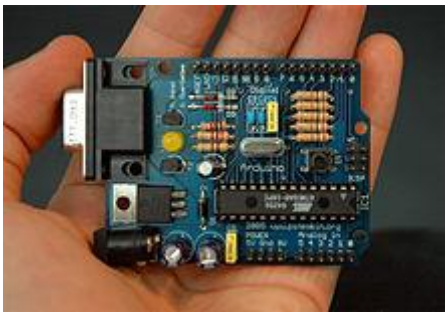
4.7 Tilt sensor

A tilt sensor can measure the tilting in often two axes of a reference plane in two axes. In contrast, a full motion would use at least three axes and often additional sensors. One way to measure tilt angle with reference to the earth's ground plane, is to use an accelerometer.

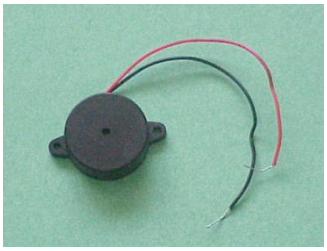
4.8 Arduino IDE

Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project is based on microcontroller board designs, manufactured by several vendors, using various microcontrollers. These systems provide sets of digital and analog I/O pins that can be interfaced to various expansion boards ("shields") and other circuits.



4.9 BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. Early devices were based on an electromechanical system identical to an electric bell without the metal gong. Similarly, a relay may be connected to interrupt its own actuating current, causing the contacts to buzz. Often these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that electromechanical buzzers made.



4.10 LCD DISPLAY

Displays of liquid crystal cells (LCDs) are used in similar applications where LEDs are used. These applications show numerical and alphanumeric characters displayed in dot matrix and segmental displays.

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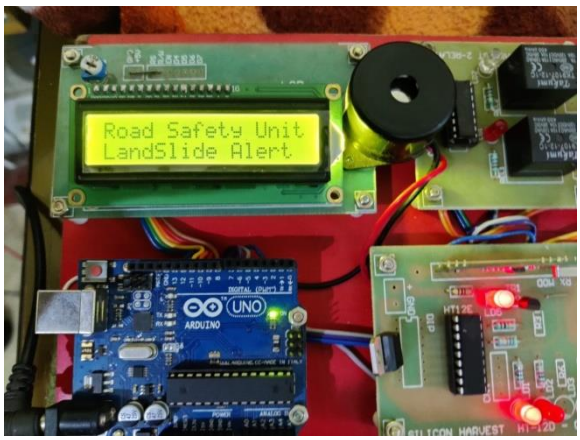
V. RESULT AND CONCLUSION

The project has been completed successfully and the output results are verified. The results are in line with the expected output. The project has been checked with both software and hardware testing tools. In this work "LCD, Microcontroller, sensors ,relay unit and motor" are chosen are proved to be more appropriate for the intended application. The project is having enough avenues for future enhancement. The project is a prototype model that fulfills all the logical requirements. The project with minimal improvements can be directly applicable for real time applications. Thus the project contributes a significant step forward in the field of **"ADVANCED AUTOMATION",** and further paves a road path towards faster development s in the same field. The project is further adaptive towards continuous performance and peripheral up gradations. This work can be applied to variety of industrial and commercial applications.



The overall hardware module of smart safety enhancement for mountain roads is shown in the figure.

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