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Automatic Speed Breaker

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Abstract: Safety is a necessary part of man's life. Due to the accident cases reported daily on the major roads in all parts of the developed and developing countries, more attention is needed for research in the designing an efficient car driving aiding system. It is expected that if such a device is designed and incorporated into our cars as a road safety device, it will reduce the incidence of accidents on our roads and various premises, with subsction in loss of life and property. When itequent redu comes to the use of a motor vehicle, accidents that have occurred over the years tell us that something needs to be done about them from an engineering point of view. Now it is suffice to say that the implementation of certain highway safety means such as speed restrictions, among others, alone has done a lot in reducing the rates of these accidents. Many motorists have had to travel through areas with little light under much fatigue, yet compelled to undertake the journey out of necessity. It is therefore imperative to consider the advantages of an early warning system where the driver is alerted of a possible collision with some considerable amount of time before it occurs. Key Words: Smart Speed Breaker, R.
Keywords: Smart Speed Breaker, IR Sensor, Servo Motor, AVR ATmega328, Arduino.

I. INTRODUCTION

The main objective of this project is to control the speed of any vehicles in schools, hospitals and speed in restricted regions etc. Smart speed breakers are the traffic claiming devices where over speeding vehicles will activate the speed breaker and it will raise the speed breaker above the surface of the road and will give the physical remainder to the driver for slowing down the vehicle. If the speed of the vehicle will be in the given allowed speed limit then the speed bumps will remain flat on the surface of the road and the vehicle can pass through it comfortably.

II. LITERATURE REVIEW

Paper 1: "An early detection warning systems to identify speed breakers and bumpy rods using sensor in smartphones"
In this paper the author have discussed that when the user uses the Google maps, an android service begins in the background. The device collects speed breaker latitude and longitude data The proposed system is built in such a way that speed breakers don't need any person to tell. When a consumer encounters a speed breaker the sudden amplitude shift is noted.

Paper 2: "Design and development of smart speed breaker"
In this paper the author have discussed that explains to develop Today's traffic safety solution requires all cars to slow down without realizing the speed of the ongoing vehicle, which raises the traffic issue. To prevent this, the device must work according to the speed of the car. In this assembly, the bumps of the smart speed breaker lower into the road surface is elevated above the physical residue.

Paper 3: "Automated speed breaker to control speed of vehicle based on IOT"
In this paper the author have discussed that addressed that Smart Speed Breaker system with IOT that will surface and only display if the speed of the vehicle is greater than those limits. Arduino board activates a motor to surface the speed breaker mechanism for control of the speed breaker, for use of RTC in real time. The Arduino board sends a signal to the buzzer to start the beep sound to warn the driver according to the speed and distance of the breaker.

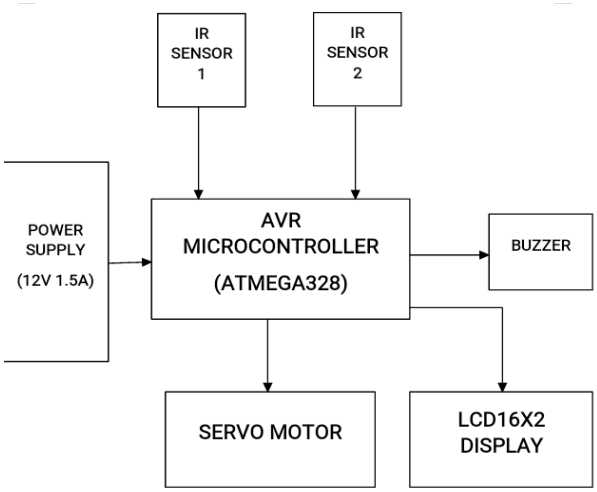
Paper 4: "Automatic speed breaker on time demand using embedded system"
In this paper the author have discussed that to have an automatic speed breaker on time demand according to the specifications The breaker disappears when there is no need for a speed breaker and when there is a need then the breaker comes on the road by spinning itself and begins to work slowing the vehicles speed. In implementing this definition, we use a hemicylinder speed breaker made from iron.

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Paper 5: "A break free path for ambulance using speed breaker"
In this paper the author have discussed that the ambulance does not decrease the speed in order to save the patient from injury. As the ambulance approaches the speed breaker, the motor rotates after getting the signal. The speed breaker is flat. The speed breaker returns to normal after the speed programmed in the Arduino. The proximity sensor is located to avoid the rotation in the exact speed breaker location. The control circuit consists of Arduino, which processes the RF signal and transmits it to the RF receiver via the RF transmitter. The RFtransmitter circuit shall be placed on the ambulance. The speed breaker lets the ambulance reduce speed, but this new flat speed breaker device plays a major role in protecting human lives by making the speed breaker flat.

III. METHODOLOGY

The way as our Model works with the components used can understood much better with a scenario that we would like to share as follows



A. IR Sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. 11 Usually in the infrared spectrum , all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.

B. AVR ATMEGA328 Microcontroller

The ATmega328 is a single-chip microcontroller created by Atmel in the megaAVR family (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core.
The Atmel 8-bit AVR RISC-based microcontroller combines32 KB ISP flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general-purpose I/O lines, 32 eneral-purposeworking registers, 3 flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8 channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and 5 software-selectable power-saving modes. The device operates between 1.8 and 5.5 volts. The device achieves throughput approaching 1 MIPS/MHz.
The Ardunio will perform the task of ploughing, the ploughing will perform in three modes on, off, mid condition.ploughing is also known as tilling. The command will get from Ardunio and then task will get performed.If spped of vehicle is detected then microcontroller compares real time speed with database speed and make decision.If over speed is detected it automatically create speed breaker.

C. Servo Motor

Servo motor is a device that produce rotary motion or linear motion in the actuator that allow for precise control of angular or linear position. This Servo Motor used, provides only 180-degree rotation or half rotation.

It has three pins

- Red-Red pin -- +9V
- Brown-Brown pin— -9V
- Orange is given an output and is connected to Arduino digital pin.

This Servo motor is directly controlled by the controller and it doesn't require the motor driver board. In modern cars, servo stepping on themotors are used to control its speed. When gas pedal, it sends electrical signals to the car's computer. The computer then processes that information and sends a signal to the servo attached to the throttle to adjust the engine speed.

D. LCD Display

It is 16×2 means 16 columns and 2 rows in display.simultaneously LCD display speed and speed breaker status.

E. Buzzer

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.If over speed is detected then buzzer beeps before creating speed breaker.

F. Power Supply

For getting +5volts supply,the +12 volts supply from power supply output is taken.And is given to 7805. The minimum input to 7805 is +7 vdc and maximuminput is +35 vdc. And we are giving +12vdc as input to the 7805.Therefore, the output of the 7805 is constant regulated +5vdc.

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IV. WORKING

The IR sensors are installed before the Smart Speed Breaker at appropriate distance. As vehicle passes, it detected by first IR sensor and then by second. The distance between two IR sensors are known and from that we can calculate the speed of vehicle. A predetermine speed limit set into programme of Arduino microcontroller. If vehicle speed is exceeding the predetermine speed then Arduino microcontroller give input to servo motor. Servo motor rises the Smart Speed Breaker, thus giving physical remainder to driver for slow down. If speed of on-going vehicle is within the permissible limit then, the Smart Speed Breaker stays flat on road.

V. EXPERIMENTATION AND RESULTS

The Hardware and software are used in this project will mentioned below, .

A. Hardware and Software to be Used

1) Software

a) Programming Language : Embedded C
b) Express PCB
c) VP812 burner

2) Hardware

a) AVR ATMEGA328 Microcontroller
b) IR Sensor
c) Servo motor
d) Buzzer
e) LCD

VI. CONCLUSION

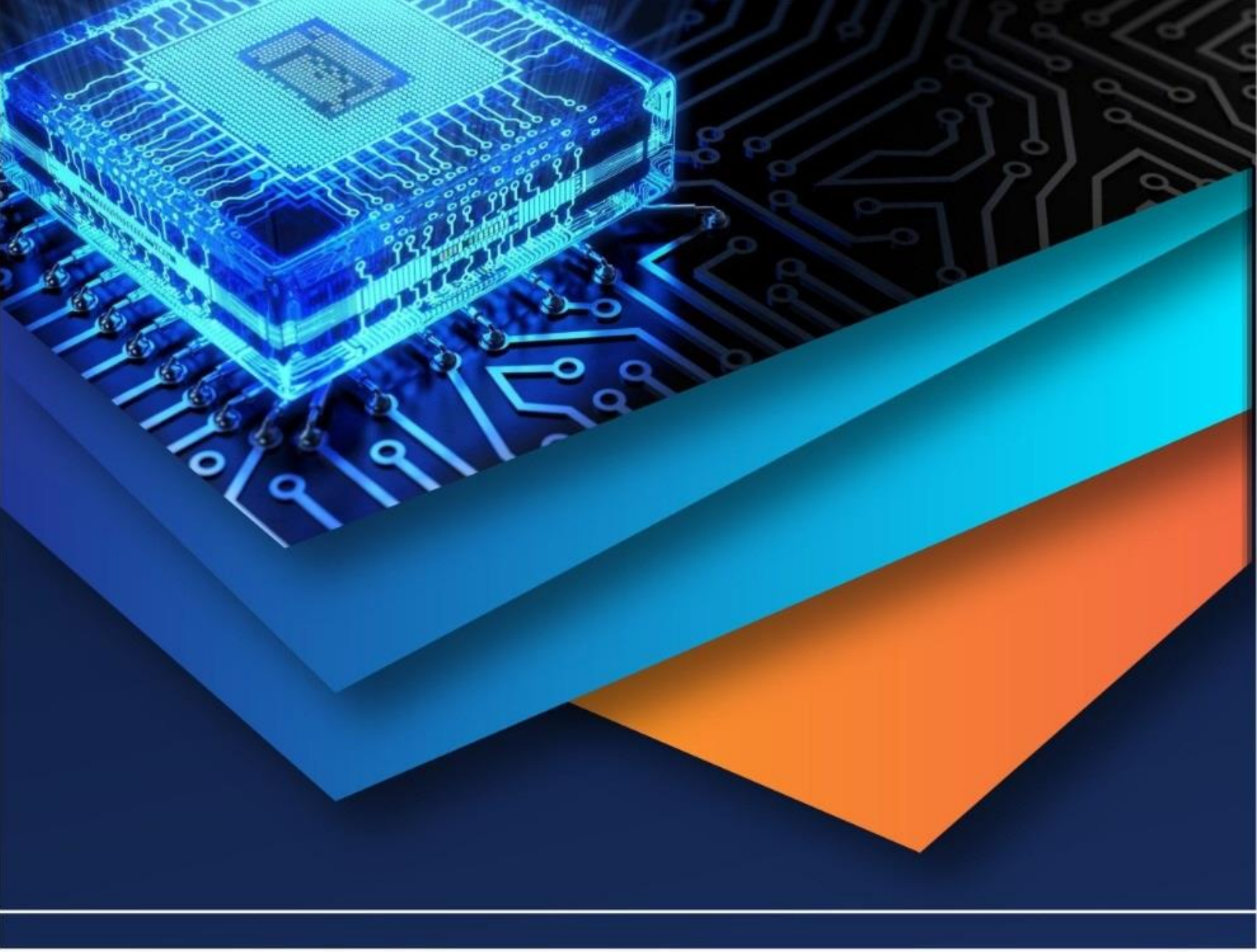
The speed breaker allows the emergency vehicle to lower the pace, but this new flat speed breaker device plays the main role in safeguarding human lives by flattening the speed breaker. Transportation is easier and more convenient for emergency vehicle. This device will be introduced in future in most emergency situations, where emergency vehicles need to reach quickly with the help of solar energy.

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