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Over Speed Surveillance using IoT

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Abstract: This paper presents a device to detect rash driving on highways and to alert the traffic authorities in case of any violation. In past, lot of devices to detect rash driving on highways has been made. Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement. In this paper we intend to design a system aimed at early detection and alert of dangerous vehicle driving patterns related to rash driving. The system basically comprises two laser IR sensor pairs, which are installed oppositely on the highway. This sensed speed is fed to the Microcontroller which displays the time taken by the vehicle in crossing the required distance from one pair to the other from and also the speed of the vehicle. In case the vehicle speed crosses the limits a buzzer gives beeps to indicate that the vehicle has crossed the speed limit. A relay is also activated when any vehicle crosses the speed limit. The speed limit is set by the police who use the system depending upon the traffic at the very location. The time taken by the vehicle to travel from one set point to the other is calculated by control circuit and displays that on seven segment displays. Moreover, if the vehicle crosses the speed limit, a buzzer sounds alerting the police. The objective behind this project is to control rash driving and over speeding vehicles so that amount of accidents and death of innocent people on road lessens.

I. INTRODUCTION

The Internet of Things (IoT) is a concept reflecting a connected set of anyone, anything, anytime, anyplace, any service, and any network. The IoT is a megatrend in next-generation technologies that can impact the whole business spectrum and can be thought of as the interconnection of uniquely identifiable smart objects and devices within today's internet infrastructure with extended benefits. Benefits typically include the advanced connectivity of these devices, systems, and services that goes beyond machine to-machine (M2M) scenarios. Therefore, introducing automation is conceivable in nearly every field. The IoT provides appropriate solutions for abide range of applications such as smart cities, traffic congestion, waste management, structural health, security, emergency services, logistics, retails, industrial control, and health care. Most of the road accidents in India occur due to over speed and rash driving of vehicles on public roads. The rate of accidents has increased as more vehicles come on to ground. To control and monitor the speed of the vehicle on public roads the respective department has taken necessary step. But it is not doing enough. Presently the motor vehicle departments have been provided with laser speed detectors. But a man has to be there on road, which is not an ideal way for monitoring. Also the laser tracker is very costly. In this paper, by using RF transceiver module and dc motor as its main components, we detect the whether a particular vehicle has exceeded the set limit and if so, switch off the ignition system of the corresponding vehicle in order to avoid any accident.

II. SYSTEM OVERVIEW

This system is designed to solve the problem of over speeding of vehicles due to bad driving behavior at university campus, Hospital zones, or any private sectors. This device takes a speedometer reading for a speed of vehicle and gives warning to the driver when the speed is near the upper speed limit of any particular zone speed limit. Then user should reduce the vehicle speed to that of particular lane speed, but if he/she don't do so then our system will reduce the speed and at the same time no. of times speed exceeded will get recorded, if count reaches to three then extra penalty amount will get received at toll gates by police men who is having all related information of the driver got through GSM.
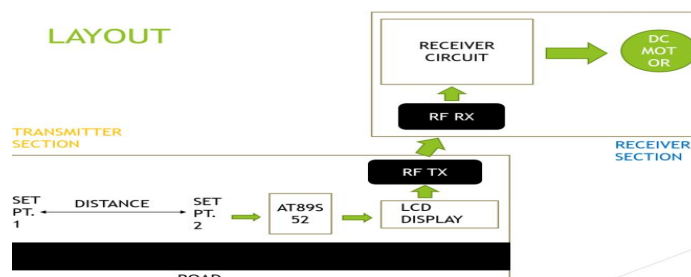

Fig.2.1 Layout of Project in real world

III. HARDWARE COMPONENTS

A. Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non volatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non volatile memory programmer

1) Features
a) Compatible with MCS®-51 Products
b) 8K Bytes of In-System Programmable (ISP) Flash Memory
c) Endurance: 10,000 Write/Erase Cycles
d) 4.0V to 5.5V Operating Range
e) Fully Static Operation: 0 Hz to 33 MHz

B. Transformer

Transformers convert AC electricity from one voltage to another with a little loss of power. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step-down transformer to reduce the dangerously high voltage to a safer low voltage.

Fig. Typical Transformer

C. IR led

An IR LED, also known as IR transmitter, is a special purpose LED that transmits infrared rays in the range of 760 nm wavelength. Such LEDs are usually made of gallium arsenide or aluminum gallium arsenide. They, along with IR receivers, are commonly used as sensors. The appearance is same as a common LED. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED.

Fig 3.3.1. IR LED

To overcome this problem, the camera on a cell phone can be used. The camera can show us the IR rays being emanated.

D. Photodiode

A photodiode is a type of photo detector capable of converting light into either current or voltage, depending upon the mode of operation. Photodiodes are similar to regular semiconductor diodes except that they may be either exposed (to detect vacuum UV or X-rays) or packaged with a window or optical fibre connection to allow light to reach the sensitive part of the device.

Fig. 3.4.1. Photodiode and its symbol

Many diodes designed for use specifically as a photodiode will also use a PIN junction rather than the typical PN junction.

E. RF transceiver module (2.5GHZ)

RF 2.4HGhz Serial Link module is an embedded solutions providing wireless end-point connectivity to devices. These modules use a simple proprietary networking protocol for fast point-to-multipoint or peer-to-peer networking. They are designed for high-throughput applications requiring low latency and predictable communication timing. It should be connected to any TTL/CMOS logic serial RXD and TXD lines and can support baud-rate of 9600bps, 19200bps, 38400bps and 57600bps.

FIG 3.5.1. RF MODULE

It also supports 4 unique RF channel selections to reduce congestions on the same channel during peer-to-peer communication.

IV. SOFTWARE REQUIREMENT

A. Keil Software

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families. Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. When starting a new project, simply select the microcontroller you use from the Device Database and the µVision IDE sets all compiler, assembler, linker, and memory options for you. Keil is a cross compiler. So first we have to understand the concept of compilers and cross compilers. After then we shall learn how to work with Keil

V. CONCLUSION & FUTURE SCOPE

It is a very useful technique to detect over-speeding of a vehicle which sends the notification to control center via internet. It is mainly useful in the areas where high rate of accidents are recorded. For future purpose we can add a camera to the setup for live surveillance. The information obtained about each vehicle can be stored on a database for future reference.

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