Fuel Saver System at Traffic Light

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Abstract

*This paper describes the design of the system which will turn off the vehicle which are stop at traffic light when traffic light is red and due to this a wastage of fuel will be avoided. Among the different city of MAHARASHTRA, NASIK is the one of the biggest one. It has very heavy traffic during day time. Since number of vehicles are increasing day by day, which ultimately increase the length of stopping period of vehicles at most of the traffic signals. Situation becomes worst in peak traffic hours. Resulting excess fuel consumption and pollution load to the atmosphere. For quaffing the excess fuel consumption and pollution load to the environment by motor vehicles studies was carried out at different traffic signal. Study reveals that about 5.9*105 liter per kg year petrol and diesel (3.6*105 liter petrol and 2.3 *105liter diesel) and 1.7*105 kg/year CNG are being wastage by Nasik itself. This resulting addition of 20.2*105 kb CO2 in the atmosphere. This excess pollution load to the atmosphere and wastage of fuel could be minimize by turning vehicles off at traffic light.*

I. INTRODUCTION

Vehicular pollution and fuel wastage is directly or indirectly linked with the population. Due to increasing population, number of vehicles are increasing fuel, which results in increasing fuel consumption. This is also responsible for road traffic problem. Increasing traffic problems not only responsible for degrading of our atmosphere, it is also responsible for wastage of fuel. Traffic signals have become invaluable tool in ensuring smooth flow of motor vehicles at crossing. Consequently, with orderly flow of traffic, we lose huge quantity of fuel at crossing and crating the pollution for already polluted environment. This is because people often leave the engine of their vehicles running while Watonga signal (idling). During no load running mode (idle) of the vehicular engine, the air is supply is restricted by the nearly closed throttle and the section pressure is very low. This low pressure condition gives rise to backflow of exhaust pressure, results an increase the amount of residual gases and reducing the fresh mixture inhaled. Idling increases dilution causes the combustion to erratic, irregular and slow, so obtained, results in poor thermal efficiency and higher exhaust emission. At part load and idling the compression ignition engine prevents even more favorable relative fuel consumption than the spark ignition engine.

To avoid this kind of pollution and fuel wastage we implemented a system name as fuel saver traffic light. Our system works as fuel saver for vehicles as traffic light as well as many other places where this fuel wastage occurs. Our system turns off the vehicles which stops at traffic light when red signal is on. At traffic light so our system automatically turns off the vehicles which are on at traffic light.

Due to turning off the vehicles can consume less fuel so that there will be less fuel consumption for vehicles and due to this fuel wastage can be controlled.

To communicate with the traffic light we use the transmitter and receiver pair. Transmitter is placed at traffic light and receiver is placed at vehicles. When red light s get on then the transmitter also gets on and send the signal to receiver. This signal is received by the receiver which placed at vehicles. As well as the signal the vehicles gets off. In this way our system works.

II. BLOCK DIAGRAM

Our whole system is divided into two section i.e.trasmitter section and the receiver section. The transmitter section is placed at the traffic light and opposite to this the receiver section is placed at the vehicles. The receiver section is directly connected to the vehicles ignition section so that whenever the signal get received it will directly switch the battery section. It will cut down the supply of the battery and the vehicles ignition system this result that turning off the vehicles.

III. TRANSMITTER SECTION

Fig.1 shows the block diagram of the transmitter section. As shown in block diagram the system is similar to the existing system only the difference is that a transmitter is attached to the system. A controller is used for the controlling the traffic light as well as the transmitter section of the system. A controller is programmed in such way that it will first turn on the green light that indicated that the vehicles allow to go. Then the red light is get on this result to indication to the stopping of the vehicles. Along with this when the red light get on in result the transmitter is also gets on. Due to this transmitter transmits the radio wave toward the receiver which is placed in the vehicles for the reception of the signal. All the communication between vehicles and the traffic light is done by using the radio wave which called as the radio access network.

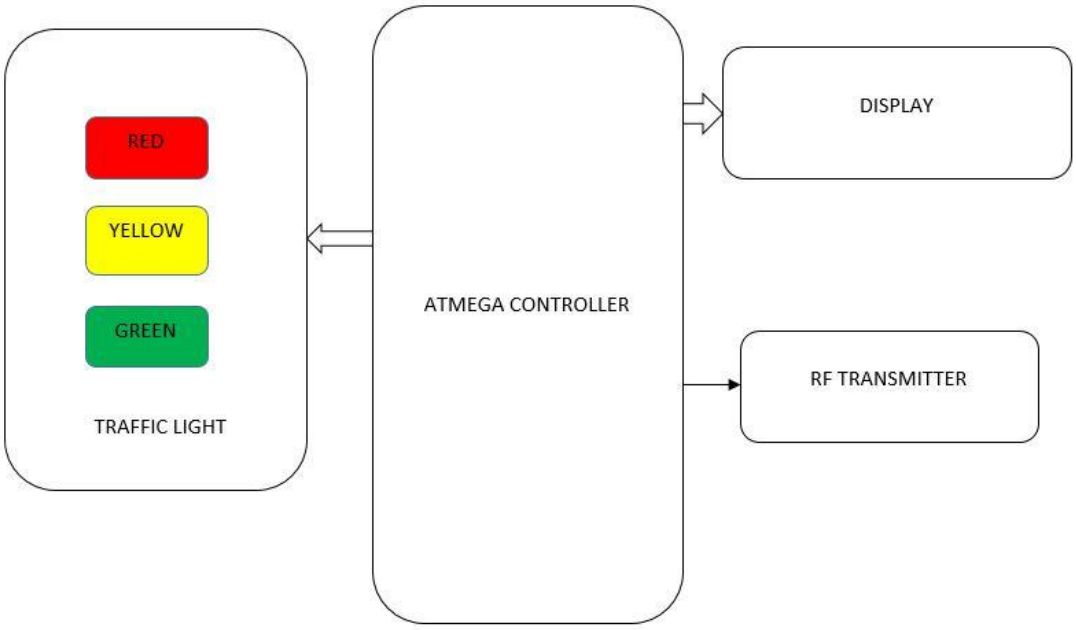

Fig.1 Block Diagram of Transmitter Section

Traffic Light

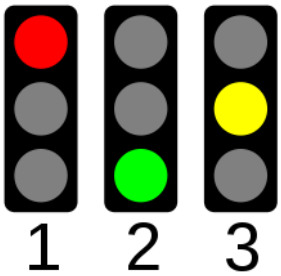

Fig. 2 Traffic Light Meaning

Traffic lights change their colors in the same order every time. In most English Speaking countries, traffic lights usually change in this order:

1. RED light on: This tells drivers to stop.
2. GREEN light on: This means the driver can start driving or keep driving.
3. YELLOW light on: This tells drivers to stop when it is safe to, because the light is about to turn red.

Atmega Controller

The high-performance Microchip 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three 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 five software selectable power saving modes. The device operates between 1.8-5.5 volts.

By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.

Display

A liquid-crystal display (LCD) is a flat panel display that uses the light-modulating properties of liquid crystal. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and seven segment display, as in a digital lock They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

RF transmitter

Fig.3 RF transmitter module

An RF transmitter module is a small PCB Sub accembeley capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which can be transmitted. RF transmitters are usually subject to recruitment which dictate the maximum allowable transmitted power output, harmonics, and band edge requirements.

IV. RECEIVER SECTION

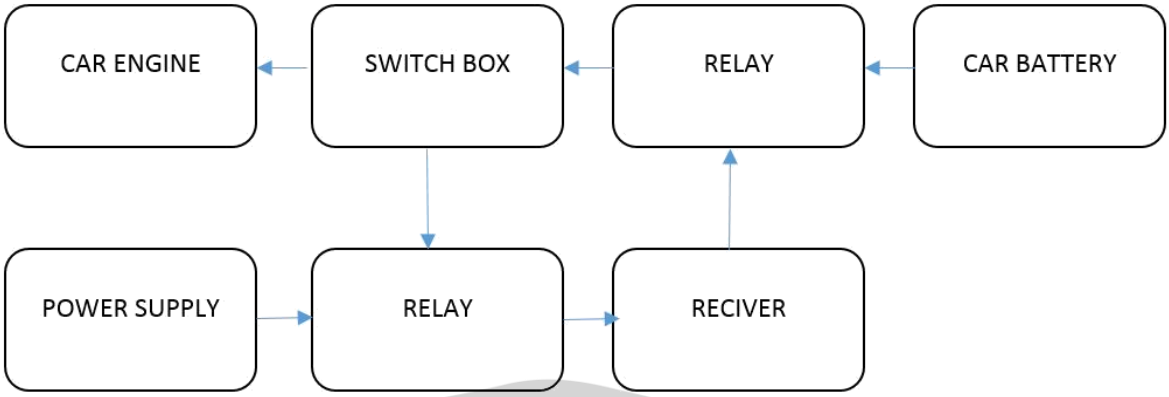

Fig.4 Block Diagram of receiver section

Fig.4 shows the block diagram of the receiver section of the system. As shown in block diagram the receiver is placed in between the switch box and the battery section. An adjustment is made in such way that when the vehicles is running the supply to the receiver is cut down so that the receiver get off. And second adjustment is made that when receiver receives the signal then the relay between car battery and the switch box get energies this result to that breakdown of the connection between switch box and the battery due to this the car ignition get off. But the receiver only receives the signal when the vehicles is stopped at the traffic light and the red signal is on. And the transmitter in traffic light signal is transmitting the signal. In this way the whole system works.

Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relay. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations. Fig.5 shows the image of the relay.

Fig. 5 Image of Relay

RF receiver

An RF receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: superhydrodyne receiver and super generative receiver. Super-regenerative modules are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave. Super-regenerative modules are generally imprecise as their frequency of operation varies considerably with temperature and power supply voltage. Super heterodyne receivers have a performance advantage over super-regenerative; they offer increased accuracy and stability over a large voltage and temperature range. This stability comes from a fixed crystal design which in the past tended to mean a comparatively more expensive product. However, advances in receiver chip design now mean that currently there is little price difference between super heterodyne and super-regenerative receiver modules. Fig.6 shows the image of the RF receiver.

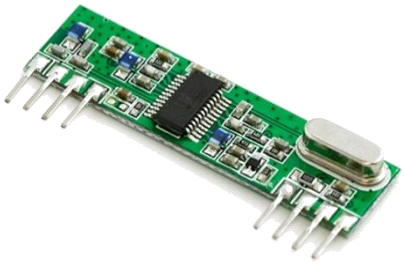

Fig.6 RF receiver module.

V. RESULTS AND DISCUSSION

The system is implemented as a demo level and the system is working fine. If the system is implemented at original traffic light it will going to work fine too. The system also can be used for the avoiding the rush drivers for those who does rush driving at traffic light. The system also has a facility that whenever an emergency vehicles come at traffic light then the particular lane get cleared by providing the path to that emergency vehicles.

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