

Traffic Congestion Alert System using WSN (wireless sensor network)

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Abstract – *Traffic congestion is one of the major problem in now a days as cities are transforming into smart city this problem should be avoided. In the recent past, traffic congestion has emerged as one of the main challenge for engineers, planners and policy makers in urban areas. To overcome these problems, a system has to be designed which will able to alert for congestion and navigate for alternate path. “Traffic Congestion Alert System using WSN (wireless sensor network)” The suggested system detects the congestion on junction by IR sensors which are mounted on roads sided to monitor the traffic condition within a particular distance of meter. In each junction a transmitter and receiver will be present along with a LCD screen for display of message for congestion ahead. When congestion is reported an interrupt is sent to the controller by the array IR sensors and, CONGESTION AHEAD message is sent to the neighboring junctions and a unique blinking of traffic light takes place which help in making decision for two wheeler or four wheeler either to change the route . Thus the rider has alerted for the congestion condition in advance. This facilitates to the rider in taking an alternate route in congestion free, avoiding being stuck in the traffic jam. After the particular junction gets clears, the traffic lights continues its control as normal. This helps in diverting the traffic on other route and hence reducing congestion.*

Keywords: RF module, IR sensor, LCD, Real-time congestion detection.

INTRODUCTION

The main emphasis of the newly designed system is to compute total traffic density at targeted area which is then further used to reduce the traffic congestion caused by vehicles. During the busy hours of a day, mostly in morning and evening when number of vehicles on roads increased due to returning of peoples from offices the traffic is at high level and there are various problems related to traffic congestion. “fuel consumption”. An average of 1 and half hour is spent daily by a vehicle in congested traffic. People forget to switch off the engines which cause wastage of the non renewable resources such as petrol, diesel and LPG. This also incurs a heavy revenue loss to the country and the person itself also. In case of the emergency conditions such as ambulance, fire engines to pass through, the congestion poses hindrance. To recover the time lost in congestion people tend to hurry and disperse the congestion, causing accidents. Indian roads are the witness of accident in every minute and death on road .which can be easily reduced totally with this idea.



Fig1. Traffic congestion in city.

LITERATURE SURVEY

To resolve the traffic congestion related problem, we not only have to consider the volume of the traffic, but also several other factors like traffic density, traffic speed, road occupancy, etc. The several technologies has been urge for congestion detection, such as Li Fi Technology, inductive loop, magnetometer, infrared, acoustic, etc. Traveling is part of our daily lives. Everyone has to be on the road, may it be on going to work, school and anywhere. Traffic management is becoming one of the most important issues in rapidly growing cities. This study provokes several questions.

How can an 'acceptable' level of congestion to be determined and measured?

What are different criteria did the city use, and what alternate criteria exist?

These questions can be examined using literature.



Fig2. Proposed Model

1. PROPOSED CONGESTION DETECTION & MANAGEMENT SCHEME

The traffic status of the next junction is made available to peoples by using RF

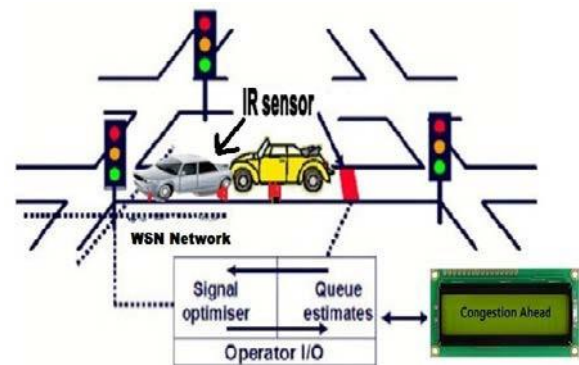
communication. As the traffic gets congested the roads gets jams and it creates lots of issues for the peoples travelling through it , but the working of our actual project will totally not only reduce it but also finish it as soon as the traffic at one junction gets jammed , within a second a message gets displayed on LCD which is placed on junction before that one where the junction has takes placed and a unique blinking of traffic signal helps the two wheeler or four wheeler to change their path from far away.

This system helps in the following places.

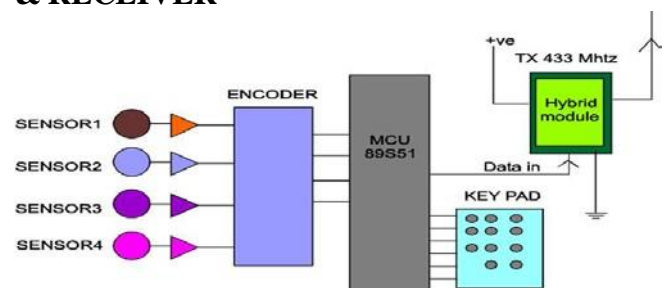
- Highway management system includes
- Traffic congestion control
- Safety management on highways
- Highway maintenance

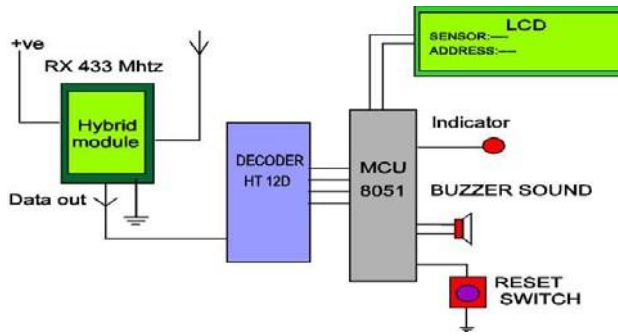
Traffic congestion is always there due to accidents, road repairing etc.

Increasing population leads to also increase in vehicles and result in huge traffic on roads. This project will concentrate on the detection of traffic congestion on highways .and also useful for emergency services likes ambulance.



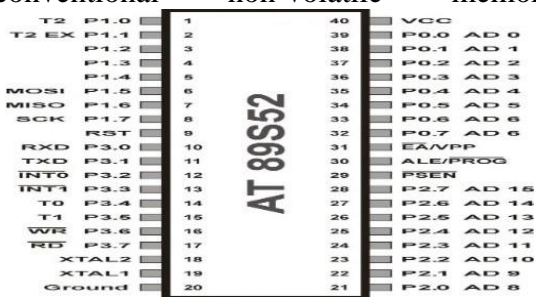
BLOCK DIAGRAM OF TRANSMITTER & RECEIVER





HARDWARE SPECIFICATIONS

A) AT89S52:-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 pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system



Fig(a): Pin dig. of AT 89S52

B) Proximity IR sensor

IR stands for Infrared which is a light with wavelength which is not visible to human eyes but cameras can see it. In a Proximity Sensor an IR LED and a Photodiode is used to find a obstacle. The IR LED transmits light in for a direction when an obstacle is ahead the light reflects and the Photodiode is activated by this method Obstacle is detected. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared) and looks for changes in the

field or return signal. The object being sensed is often referred to as the proximity sensor's target .Different proximity sensor targets demand different sensors. For example , a capacitive proximity sensor or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensors always requires a metal target.



Fig(b): IR sensor

C) RF module

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK). This RF module comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. 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.



Fig(d):RF Module

D) LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid

crystals. 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 pre set words, digits, and 7-segment displays, as in a digital clock. 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.



Fig(d):Liquid crystal display

PROPOSED APPLICATIONS

1. This system can be best served near the Traffic signals(where traffic probably gets congested everyday)
2. This system can also be employed near the School or college campus.
3. It can also be also used near Bridges and Flyovers
4. This system can helps reduce traffic One way road.
5. Generally the Market areas are always crowded so here we can also implement our system.

CONCLUSION

In this paper we have adopted the WSN technology to automatically detect and manage road traffic congestion in near real-time since it is cost effective, easily manageable and reliable. Moreover, this method provides comprehensive way of

congestion detection and management as a whole while most other methods are restricted only to congestion detection. The simulation results give us a fair idea of the extent of congestion occurred at a particular Square and how the proposed schemes of congestion management reduce the waiting time significantly. There are further scope of enhancement and extension of this idea to improve congestion management process ensuring smooth traffic flow in city in busy hours. An intelligent communication network is created in an effort to help traffic flow and alleviate traffic problems in large cities. The equipment is cost-effective and can be ported on automobiles for receiving the signal status and collision warning. The electronic units can be deployed at traffic junctions and toll gates for enforcing traffic regulation across cities.

7. REFERENCES

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