International Journal of Students' Research In Technology & Management
Vol. 3(04), April 2015, ISSN 2321-2543, Pg. 333-335

# INTELLIGENT TRAFFIC CONTROL SYSTEM USING AD-HOC WIRELESS SENSOR SYSTEMS

J.Isaac Henderson, M.Aravind

*Thiagarajar college of Engineering, Madurai, Tamilnadu,India.*

isaachenderson@outlook.com, iamaravindm@gmail.com

***Abstract*— This paper deals with designing an automatic traffic control system which works on principle of TRAFFIC DENSITY monitored by Sensors on each side which provides direct information to microcontroller which performs decision making to allow traffic based on density. The three density zones are low, medium and high. In each zone an ad hoc sensor is placed. Each sensor will check the presence of the vehicle in the zone using infrared technology and then ad hoc sensor sends the data to master ad hoc. To locate the sensor, each sensor of different zone is addressed by user and that address is fed to the master ad hoc sensor. This master ad hoc sensor will arrange the data from various sensors in an 8 bit data format. It then performs the required processing to determine the green signal time for each side. It has an exceptional system for high priority vehicles like ambulance, as it senses the direction of arrival of these vehicles and gives a green corridor. The main advantage over conventional system is that a side with heavy traffic doesn't have to wait unreasonably while a side with no/less traffic gets an equal amount of time as that of heavy traffic side which is irascible. This is an improved system based on preference for urgency/density of traffic. This can prove useful in especially Junctions of importance, thereby mediating traffic flow correctly.**

***Index Terms*- AD-HOC wireless network$^{+}$, Intel 8051 MC, Intel 8255 Interfacing, Sound Sensor, Traffic density**

## I. INTRODUCTION

The conventional traffic system handles traffic without priority. The proposed system handles traffic with respect to its density and if there's equal density then its gives green for the side which first gives information and it also has a built in mechanism to allow the side from which ambulance is arriving.

## II. EXISTING SYSTEM

The conventional traffic system depends on the timers where the vehicle density is not taken into account. So the people need to wait for their turn to move irrespective of vehicle density on roads. For example, consider a junction which has four roads. There is no problem if the vehicle density is equally distributed. If it happens to be the case where the vehicle density in one side of road is larger when compared to all the other three, we can't let the area where there is least traffic have a green signal timing equal to that of a denser road traffic. This is the problem in conventional signals.

## III. PROPOSED SYSTEM

Here in the system that we propose works by analyzing the traffic in roads and gives priority to the high traffic density. (i.e.) it makes the high traffic to move first. Given above three density zones are shown. The three density zones are low, medium and high. In each zone an ad hoc sensor is placed. Each sensor will check the presence of the vehicle in the zone using infrared technology and then ad hoc sensor sends the data to master ad hoc. To locate the sensor, each sensor of different zone is addressed by user and that address is fed to the master ad hoc sensor. This master ad hoc sensor will arrange the data from various sensors in an 8 bit data format as shown in Fig 2.Where H1, H2, H3 and H4 are high density zone status bits and M1, M2, M3 and M4 are medium density zone status bits.

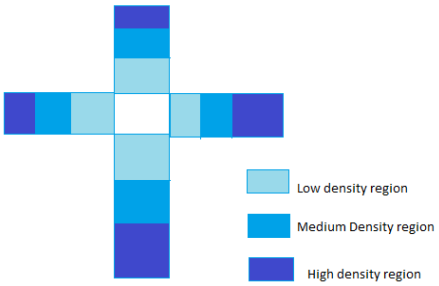



Fig 1: Various Density zones

### *A. Architecture*

The density of the traffic is determined and the present condition (whether the reception is there are not) is sent to the Intel 8255 which is interfaced with the MSC8051 microcontroller using Ad hoc sensors. Each Ad hoc sensor is addressed individually and the median Ad hoc sensor will arrange the data with respect to address of ad hoc sensor in 8 bit format and the data. Then the data is received to a specific location using various 8255 control words. The controller is programmed in such a manner that the priority is set for the four roads and then the signal is given to vehicle with respect to priority. The road which has high vehicle density is open first. Then again the density is checked and process repeats.

| H1 | H2 | H3 | H4 | M1 | M2 | M3 | M4 |
|---|---|---|---|---|---|---|---|

Fig 2: 8 Bit data format.

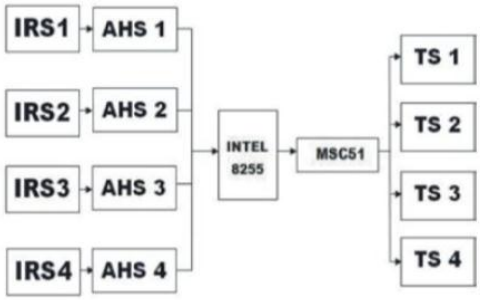



Fig 3: Block diagram of the system.

*B. Extra Features*

CASE 1: If Any 2/More Sides Have Equal Traffic Density:

If two/more sides have equal traffic density, then the side which gave first information about the corresponding side gets the first green signal.

CASE 2: If An Ambulance Arrives In Any Of The Side:

A Sound sensor is placed on the high density area of every side and it detects the sound of ambulance and processor does the work and green corridor is given immediately.

A typical sound sensor is given below.

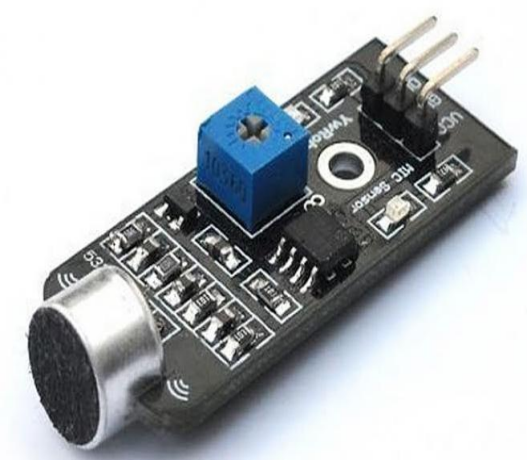


Fig 4: Sound sensor.

*C. Working of sound sensor*

This sound sensor consists of a microphone and LM393 module and gives a digital output. Initially the sound of the ambulance is recorded at different time intervals and it is stored in the microcontroller. When the ambulance arrives the signal which is received by the microphone is converted to analog voltage and it is compared with value stored in the controller using the LM393 module. Based on the intensity of the sound the analog voltage varies and that is used to find the arrival of the ambulance.

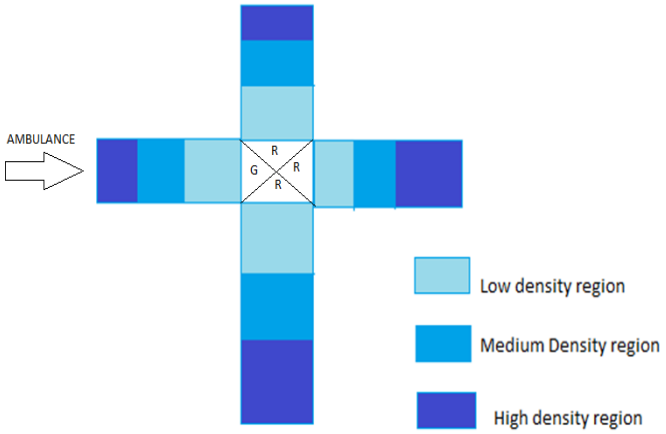
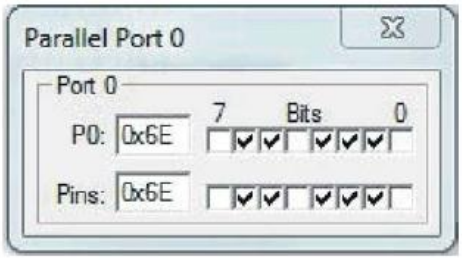



Fig 5: During arrival of ambulance.

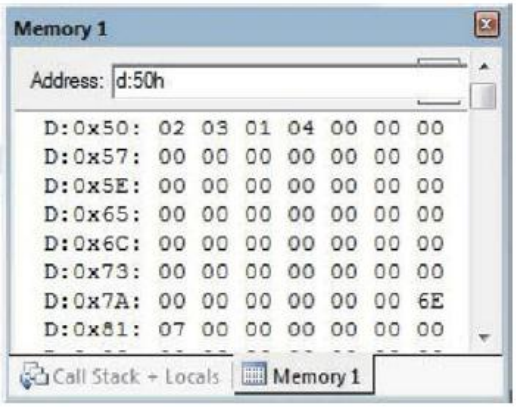
*D. Simulation*

The simulated input and output using KEIL simulator are shown .Intel 8051 microcontroller is used here to show the simulated output of this system. The 8bit data having the information about the road density is given to the parallel port 0 of the microcontroller. It shows that the road 2 and road 3 has high traffic density, road 1 has medium traffic density and road 4 has low traffic density. The output is shown in the data space. The road number is stored according to the priority order.

Input:




Output:



## IV. RESULTS AND DISCUSSIONS

In the existing system, even if there is no vehicle on one side others have to wait for their turn. But the proposed system gives priority to the traffic density. And also this system has the priority for emergency vehicles like ambulance.

## V. CONCLUSION

By implementing the above idea traffic signals system can be equipped with wireless technology which in turn avoids spreading wires across roads. Also an effective traffic clearing system can be established. This system can be implemented at an expense of more consumption of power due to the usage of number of wireless sensors. This can be reduced by implementing various non-conventional energy sources.

## REFERENCES

[1] Akanegawa, M., *et al*., 2001. Basic study on traffic information system using LED traffic lights, IEEE Transactions on Intelligent Transportation Systems, 2(4): 197-203.

[2] Cucchiara. *et al*., 2000. Image analysis and rule-based reasoning for a traffic monitoring system," IEEE Transactions on Intelligent

Transportation Systems, 1(2): 119-130.

[3] Chen, Wenjie. *et al*., 2005. A realtime dynamic traffic control system based on wireless sensor network, in ICCP, pp: 258-264.

[4] Dharma, P. Agrawal, Bin Xie, Encyclopedia On Ad Hoc and Ubiquitous Computing, 2010. World Scientific Publishing Co. Pte. Ltd, Singapore,

[5] Gangadhar, S., 2010. An intelligent road traffic control system, in Students' Technology Symposium (TechSym), IEEE, pp: 115-119.

[6] Fernando Losilla 1,*, Antonio-Javier Garcia-Sanchez 1, Felipe Garcia-Sanchez 1,Joan Garcia-Haro 1 and Zygmunt J. Haas 2" A Comprehensive Approach to WSN-Based ITS Applications:A Survey" Sensors 2011, 11, 10220-10265; doi:10.3390/s111110220

[7] Total Numberof Registered motor Vehicles in India 1951-2004, http://morth.nic.in/writereaddata/sublinkimages/table - 12458822488.htm

[8] TmoteSky Datasheet, http:// www.eecs. harvard.edu/~ konrad /projects/shimmer/references/ tmote-sky-datasheet.pdf

[9] ChipconCC2420Datasheet,inst.eecs.berkeley.edu/~cs 150/ Documents/CC2420.pdf

[10] Wenjie Chen, Lifeng Chen, Zhanglong Chen, and ShiliangTu, "WITS: A Wireless Sensor Network for Intelligent Transportation System", 2006 IEEE, IMSCCS'06

[11] John Wiley & Sons, Inc., Hoboken, New Jersey. "WIRELESS SENSOR NETWORKS Technology, Protocols, and Applications", 2007 in Canada

[12] HemjitSawant, Jindong Tan, "A Sensor Network Approach for Intelligent Transportation Systems",Electrical and Computer Engineering Michigan Technological Univ. Houghton, Michigan, USA