IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 4, April 2016

Proposed Paper on Portable Road Side Sensor Base Real Time Vehicular System

Minal A. Kahurke[1], Shubhangi Dhengre[2], Sagar Pradhan[3]

M.Tech Student, Electronics & Communication, Abha Gaikwad Patil College of Engg, Mohgaon, Nagpur (MS) [1]

Assistant Professor, Department of ECE, Abha Gaikwad Patil College of Engg, Mohgaon, Nagpur (MS) [2]

PG-Coordinator, Department of ECE, Abha Gaikwad Patil College of Engg, Mohgaon, Nagpur (MS) [3]

Abstract: This paper focuses on the development of a portable roadside magnetic sensor system for vehicle counting, classification, and speed measurement. This paper describes a portable sensing system that can be placed adjacent to a road and can be used for vehicle counting, vehicle classification, and vehicle speed measurements. The proposed system can make these traffic measurements reliably for traffic in the lane adjacent to the sensors. The developed signal processing algorithms enable the sensor to be robust to the presence of traffic in other lanes of the road. Project proposed to add RFID device for vehicle classification.

Keywords: ARM7LPC2148platform; Globle positioning System; Portable Sensor platform; Wireless Sensor Network.

I. INTRODUCTION

The sensor system consists of wireless anisotropic magnetic devices that do not require to be embedded in the roadway—the devices are placed next to the roadway and measure traffic in the immediately adjacent lane. An algorithm based on a magnetic field model is proposed to make the system robust to the errors created by larger vehicles driving in the nonadjacent lane. These false calls cause an 8% error if uncorrected. The use of the proposed algorithm reduces this error to only 1%. Speed measurement is based on the calculation of the cross correlation between longitudinally spaced sensors. Fast computation of the cross correlation is enabled by using frequency-domain signal processing techniques. An algorithm for automatically correcting for any small misalignment of the sensors is utilized. A high-accuracy differential Global Positioning System is used as a reference to measure vehicle speeds to evaluate the accuracy of the speed measurement from the new sensor system. The results show that the maximum error of the speed estimates is less than 2.5% over the entire range of 5–27 m/s (11–60 mi/h). Vehicle classification is done based on the magnetic length and an estimate of the average vertical magnetic height of the vehicle. Vehicle length is estimated from the product of occupancy and estimated speed.

The average vertical magnetic height is estimated using two magnetic sensors that are vertically spaced by 0.25 m. Finally, it is shown that the sensor system can be used to reliably count the number of right turns at an intersection, with an accuracy of 95%. The developed sensor system is compact, portable, wireless, and inexpensive. Data are presented from a large number of vehicles on a regular busy urban road in the Twin Cities, MN, USA.

II. PROPOSE WORK

The use of the proposed algorithm reduces previous problems. Speed measurement is based on the calculation of the cross correlation between longitudinally spaced sensors. Fast computation of the cross correlation is enabled by using frequency-domain signal processing techniques. An algorithm for automatically correcting for any small misalignment of the sensors is utilized. A high-accuracy differential Global Positioning System is used as a reference to measure vehicle speeds to evaluate the accuracy of the speed measurement from the new sensor system. The work in the project proposed to add RFID device to the WIM sensor. An RFID Tag responds to the magnetic field of each vehicle (just like an inductive loop). RFID Tags are currently already being used as traffic sensors. RFID Tags cannot measure the number of axles or the weight of any axle. However, they can reliably count vehicles, differentiating one consecutive vehicle from another. Herewith we develop the system with data identification system and data monitoring system. Data identification system with sensorized arrangement with magnetic sensor and RFID reader. It provides input to ARM7 according to application. ARM7LPC2148 get location form GPS with 2D position of system then information about every vehicle transfer to DATA monitoring unit.

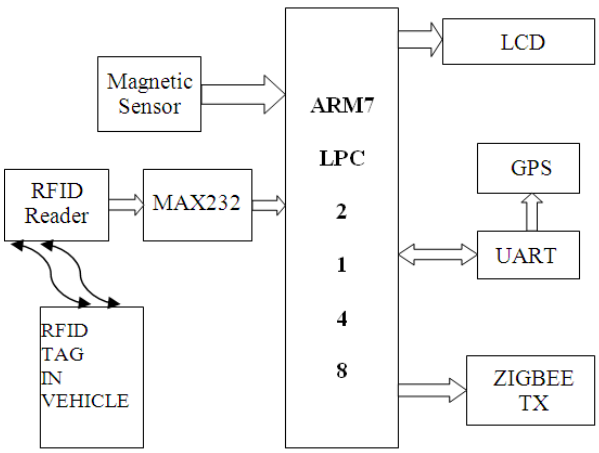

Fig: Data Identifier System

DOI 10.17148/IJIREEICE.2016.4456

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 3, Issue x, Xxxxx 2015

A. ARM7 Processor

The LPC2141/2/4/6/8 microcontrollers are based on a 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalt

B. Features of ARM7

- ARM7 is 32bit Microcontroller.
- Operating voltage of IC LPC2148 is 3.3V.
- It is 64 pin IC.
- There are Two Port (Port0,Port1) operating voltage 5V.
- Operting Frequency upto 60Hz.
- RAM – 8kb to32kb.
- ROM- 512kb.

III. PROBLEM DEFINATION

The sensor system consists of wireless anisotropic magnetic devices that do not require to be embedded in the roadway—the devices are placed next to the roadway and measure traffic in the immediately adjacent lane. An algorithm based on a magnetic field model is proposed to make the system robust to the errors created by larger vehicles driving in the nonadjacent lane. These false calls cause an 8% error if uncorrected.

IV. MOTIVATION

This paper describes a portable sensing system that can be placed adjacent to a road and can be used for vehicle counting, vehicle classification, and vehicle speed measurements. This paper presents an improved algorithm based on Saber Taghvaeeyan and Rajesh Rajamani' Portable roadside sensors for Vehicle counting, Classification, and Speed Measurement'

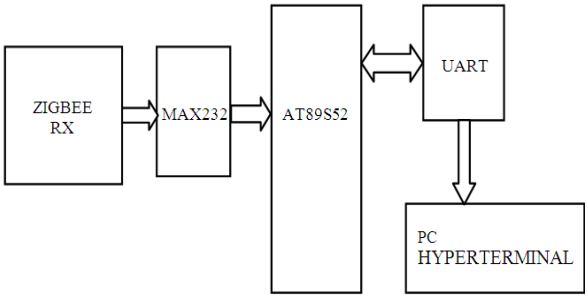

Fig: Data Monitoring System

The increasing traffic volume over the last decades poses high challenges on today's traffic research and planning. Detection, Counting and classification of vehicles in a video has become a potential area of research due to its numerous applications to video-based intelligent transportation systems. For most traffic surveillance systems, major stages are used to estimate desired traffic parameters, i.e., vehicle detection, Counting, tracking, and classification. Each year, motor vehicle crashes account for about thousands deaths, more than million injuries. Counting vehicles over a period of time on a busy intersection will help the concerned authority to efficiently control the duration of traffic signal on road thus reducing the level of traffic congestion during rush hours. It helps in minimizing the possibilities of fraudulent activities in toll collection. It is necessary to provide better traffic surveillance to reduce the accidents. So the main Goal of our paper is to provide better traffic surveillance.

The proposed method has several advantages.

1. To avoid the Traffic in Cities.
2. Stolen vehicle or theft vehicle detection With This system
3. Using Classification we can classify vehicle types.
4. Local network implementation.
5. Magnetic sensors have also been evaluated for vehicle classification
6. RFID have also been evaluated for vehicle

V. RESULT

The Display shows position, speed and the type of Vehicles.

VI. FUTURE SCOPE

Currently in our system we are just accessing the system from embedded based system. So in future we can implement a system with IOT using Wi-Fi. Then we manage complete network by web portal.

VII. CONCLUSION

In the project, we have presented a computer vision system which uses a video to count and classify vehicles with the aim of replacing ILDs, particularly on highways. Additionally, this system distinguishes itself from other computer-vision-based approaches in the way in which it can handle the system without the need for any hardware other than cameras, such as GPS. This makes the system inexpensive to use. In this, we have presented two different parameters for the traffic surveillance system, one is counting the vehicles and other is classification of the vehicles. The processing is carried out on pre recorded video. Vehicle counting is done by finding the centroid and the distance between the marked border and the vehicle. Classification is done by finding the area and thresholding method. New traffic sensing devices based on wireless sensing technologies were designed and tested. Such devices encompass a cost-effective, battery-free, and energy self-sustained architecture for real-time traffic measurement over distributed points in a transportation

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 3, Issue x, Xxxxx 2015

system. This scalable technology can monitor traffic parameters such as flow, occupancy, point speed, and vehicle classification on road systems in real-time.

REFERNCES

[1] S. Jeng and S. Ritchie, "Real-time vehicle classification using inductiveloop Page 1994 signature data," Transp. Res. Rec., J. Transp. Res. Board, vol. 2086, pp. 8–22, 2008. [Online]. Available: http://dx.doi.org/10.3141/2086-02.

[2] S. Gupte, O. Masoud, R. F. K. Martin, and N. P. Papanikolopoulos, "Detection and classification of vehicles," IEEE Trans. Intell. Transp. Syst., vol. 3, no. 1, pp. 37–47, Mar. 2002.

[3] H. Cheng, H. Du, L. Hu, and C. Glazier, "Vehicle detection and classification using model-based and fuzzy logic approaches," Transp. Res. Rec., J. Transp. Res. Board, vol. 1935, pp. 154–162, 2005. [Online]. Available: http://dx.doi.org/10.3141/1935-18.

[4] J. Medina, M. Chitturi, and R. Benekohal, "Effects of fog, snow, and rain on video detection systems at intersections," Transp. Lett., Int. J. Transp. Res., vol. 2, no. 1, pp. 1–12, Jan. 2010. [Online]. Available: http://dx.doi. org/10.3328/TL.2010.02.01.1-12.

[5] M. J. Caruso and L. S. Withanawasam, "Vehicle detection and compass applications using AMR magnetic sensors," in Sens. Expo Proc., 1999, pp. 477–489.

[6] S. Cheung, S. Coleri, B. Dundar, S. Ganesh, C. Tan, and P. Varaiya, "Traffic measurement and vehicle classification with single magnetic sensor," Transp. Res. Rec., J. Transp. Res. Board, vol. 1917, pp. 173–181, 2005. [Online]. Available: http://dx.doi.org/10.3141/1917-19.

[7] S. Kaewkamnerd, J. Chinrungrueng, R. Pongthornseri, and S. Dumnin, "Vehicle classification based on magnetic sensor signal," in Proc. IEEE ICIA, 2010, pp. 935–939.

[8] M. Bottero, B. Dalla Chiara, and F. P. Deflorio, "Wireless sensor networks for traffic monitoring in a logistic center," Transp. Res.— Part C: Emerg.Technol., vol. 26, pp. 99–124, Jan2013.