IMPLEMENTATION OF TEXT-BASED TRAFFIC SIGNS RECOGNIZING AND DETECTION

Ms .B.NANTHENI DEVI [1], V. AJITHKUMAR [2], V.JEGASEEVARAMAN [3]

Assistant Professor [1], Student [2,3], Department of Electronics and Communication Engineering, Krishnasamy College of Engineering and Technology, Cuddalore. Tamilnadu, India

ABSTRACT-*The automatic detection and recognition of traffic signs is a challenging problem, with a number of important application areas, including advanced driver assistance systems, road surveying, and autonomous vehicles. We approach this problem by detecting large numbers of text-based traffic sign candidates using basic shape and color information. We then reduce the large number of detected candidate regions by making use of the structure of the scene, as well as its temporal information, to eliminate unlikely candidates. The proposed system comprises two main stages: detection and recognition. By matching these regions through consecutive frames, temporal information is used to further eliminate FP detected regions, based on the motion of regions with respect to the camera and the structure of the scene.*

Keywords: Traffic sign detection, Traffic sign recognition, Color-based description, Shape-based description, Uncontrolled, Environments, Multi-class classification.

I. INTRODUCTION

Recognition of road signs is a challenging problem that has engaged the attention of the Computer Vision community for more than 30 years. Since then, a number of methods have been developed for road sign detection and identification. The cars are fitted with a PC system for acquiring the videos, or specialized hardware for driving assistance applications.

Organization

The rest of this paper is organized as follows. Section II present is Methodology. Section is III is Architecture and Section IV is System testing and Finally the Section V is Conclusion and Future Scope.

II. METHODOLOGY

Traffic sign recognition systems have three main parts:

- Location of the region of interest and segmentation
- Detection by verification of the hypothesis of the presence of the sign
- Categorization of the type of traffic sign

Type of traffic sign

Color-Based Sign Detection

Sign detection using color is based on the five

typical colors defined in standard traffic signs (red, blue, yellow, white and black).

Fig.1.1. A real outdoor scene of a road with traffic sign.

Shape-Based Sign Detection:

Depending on its distance from the acquisition system, the traffic sign's size can vary and its spatial resolution may be very low (e.g. 30–40 pixels).

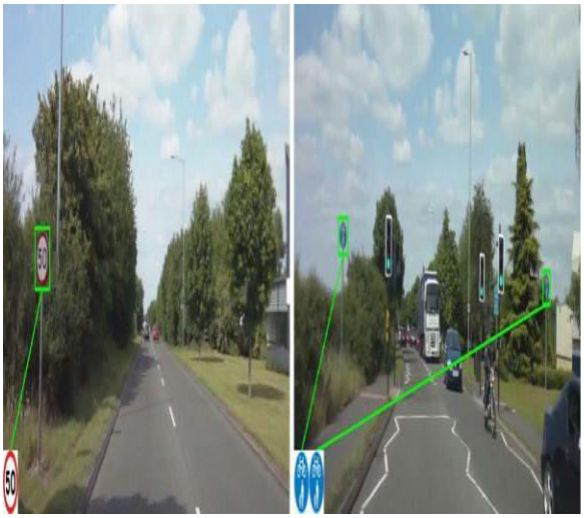

Fig.1.2. A shape based scene of a road with signal

This project aims to present a signal obeyed car for this it uses colour segmentation approach for traffic sign recognition based on LVQ neural network and also focuses on triangular edge detection and feature extraction based on Hough transformation and HOG respectively.

At first samples of images in different weather conditions are collected and then RGB images are converted into HSV colour space.

The samples are then trained using LVQ depending on the hue and saturation values of each pixel and then tested for colour segmentation. The edges of the triangular segmented images are then detected using Hough Transformation.

Features

- Compatible with MCS®-51 Products.
- 8K Bytes of In-System Programmable (ISP) Flash Memory – Endurance: 1000 Write/Erase Cycles.
- 4.0V to 5.5V Operating Range.
- Fully Static Operation: 0 Hz to 33 MHz.
- Three-level Program Memory Lock.
- 256 x 8-bit Internal RAM.
- 32 Programmable I/O Lines.
- Three 16-bit Timer/Counters.
- Eight Interrupt Sources.
- Low-power Idle and Power-down Modes.
- Interrupt Recovery from Power-down Mode.
- Watchdog Timer.
- Dual Data Pointer.
- Power-off Flag.
- Fast Programming Time.

Block diagram of a traffic signs detection:

Aims to present a signal obeyed car for this it uses colour segmentation approach for traffic sign recognition based on LVQ neural network and also focuses on triangular edge detection and feature extraction based on Hough transformation and HOG respectively. The samples are then trained using LVQ depending on the hue and saturation values of each pixel

and then tested for color segmentation. The edges of the triangular segmented images are then detected using Hough Transformation.

III. BLOCK DIAGRAM

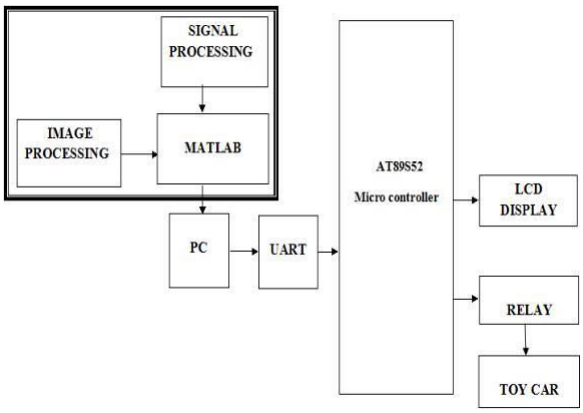

Fig.3.1. Block diagram of a traffic signs detection:

Watchdog Timer:

The WDT is intended as a recovery method in situations where the CPU may be subjected to software upsets. The WDT consists of a 14-bit counter and the Watchdog Timer Reset (WDTRST) SFR. The WDT is defaulted to disable from exiting reset. To enable the WDT, a user must write 01EH and 0E1H in sequence to the WDTRST register (SFR location 0A6H).

Micro Controller:

All the operations within the microcontroller are performed at high speed and quite simply, but the microcontroller itself would not be so useful if there are not special circuits which make it complete. In continuation, we are going to call your attention to them.

Fig.3.2. AT89s52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.

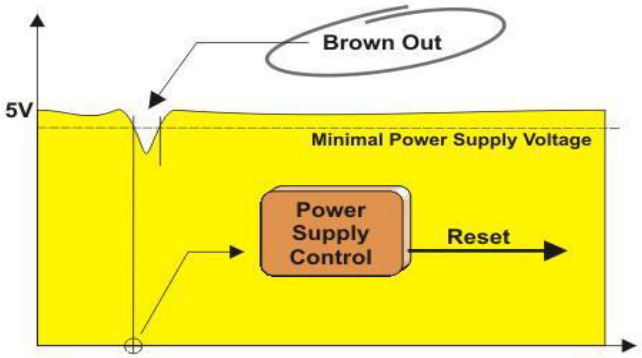

Fig.3.3 Concern of microcontroller power

Power Supply Circuit :

There are two things worth attention concerning the microcontroller power supply circuit:

Lighting:

Fluorescent and LED lights use 50 to 80 percent less energy than their incandescent counterparts. No wonder U.S. and European governments are pushing vendors for lighting solutions that rely on high frequency electronic ballasts. Successful ballast design depends on a few key tradeoffs:

- Balancing ease of use against design complexity and cost.
- Balancing voltage and current control against design complexity and board space.
- Balancing functionality against low power consumption.

LCD Display:

LCD is electronically modulated optical device that uses the light-modulating properties of liquid crystal combined with polarizer. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.

- Pin-1 Vss- Ground
- Pin-2 VDD- Power 5V
- Pin-3 VEE- LCD Contrast Adjustment

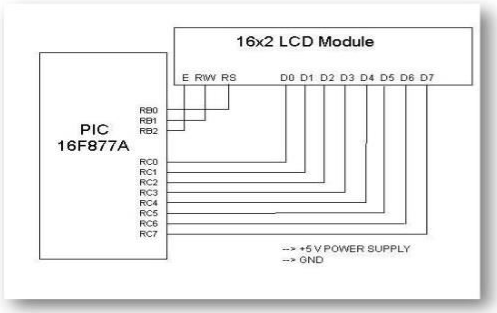

Fig.3.4. PIN diagram of LCD

Display UART

A universal asynchronous receiver/transmitter is a type of "asynchronous receiver/transmitter", a piece of computer hardware that translates data between parallel and serial forms. UARTs are commonly used in conjunction with other communication standards such as EIA RS-232.

The Universal Asynchronous Receiver / Transmitter (UART) controller is the key component of the serial communications subsystem of a computer. The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. Serial transmission of digital information (bits) through a single wire or other medium is much more cost effective than parallel transmission through multiple wires. A UART is used to convert the transmitted information between its sequential and parallel form at each end of the link. Each UART contains a shift register which is the fundamental method of conversion between serial and parallel forms.

Relays:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

Fig.3.5 Switch design of a Relay

8051 Derivatives

A number of 8051 derivatives are available that provide enhanced .Performance while remaining compatible with the 8051 core. These derivatives provide additional data pointers, very fast math operations, and reduced instruction sets.

- Atmel 89x8252 and variants (2 data pointers).
- Dallas 80C320, 80C420, 80C520, 80C530, 80C550 an variants (2 data pointers).
- Infineon C517, C517A, C509, and variants (high-speed 32-bit and 16-bit binary arithmetic operations, 8 data pointers).
- Another behind them, making the relay DPDT.

MATLAB

Matlab is a software program that allows you to do data manipulation and visualization, calculations, math and programming. It can be used to do very simple as well as very sophisticated tasks. We will start very simple. Right now the difference between two consecutive values of x is 1. To change this, we

put the step between two consecutive values between the maximum and minimum values, i.e. type x=1:0.5:10. You will get x = Columns 1 through 8

1.0000 1.5000

2.0000 2.5000

3.0000 3.5000

4.0000 4.5000

Columns 9 through 16

5.0000 5.5000

6.0000 6.5000

7.0000 7.5000

8.0000 8.5000

Columns 17 through 19

Now x still ranges from 1 to 10, but now it takes on 19 values with a step of 0.5. Since we redefined x, we now need to redefine f(x) as well.

IV. SYSTEM TESTING

TESTING OBJECT

Testing is a set of activities that can be planned in advance and conducted systematically. Testing often accounts for more effort than any other software engineering activity.

Type of Testing

There are two type of testing according their behaviors

1. Unconventional Testing
2. Conventional Testing

TESTING STRATEGIES

- Integration testing
- White box testing
- Black box testing
- Interface testing
- Module testing

EMBEDDED C

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems.

Simulation Output

Haar-like features are digital image features used in object recognition and were used in the first real-time face detector.

Testing the sample LM

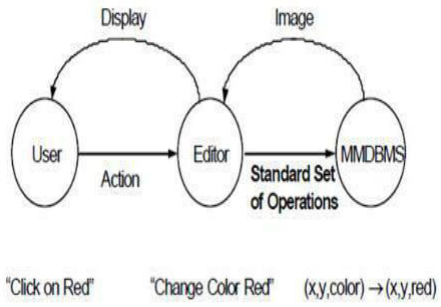

Fig.4.1 Testing sample of LM Simulation output

In this paper, an algorithm for the detection of road traffic signs has been proposed. The segmentation-based detection algorithm is found to be robust for its ability to mark a road sign as an ROI. This proposed work would detect the road sign when the sign is partially occluded, rotated or tilted. The proposed algorithm improves the efficiency, by detection of small scaled road signs.

V. CONCLUSION AND FUTURE SCOPE

Traffic sign recognition (TSR) represents an important feature of advanced driver assistance systems, contributing to the safety of the drivers, pedestrians and vehicles as well. Developing TSR systems requires the use of computer vision techniques, which could be

considered fundamental in the field of pattern recognition in general. . In this paper, we present a comparative and analytical study of the two major approaches for traffic sign detection and recognition. The first approach is based on the color segmentation technique and convolutional neural networks (C-CNN), while the second one is based on the fast region-based convolutional neural networks approach (Fast R-CNN).

REFERENCES

[1] S. Maldonado-Bascón, S. Lafuente-Arroyo, P. Gil-Jimenez, H. Gomez- Moreno, and F.Lopez-Ferreras, "Road-sign detection and recognition based on support vector machines," *IEEE Trans. Intell. Transp. Syst.*, vol. 8, no. 2, pp. 264–278, Jun. 2007.

[2] F. Zaklouta and B. Stanciulescu, "Real-time traffic-sign recognition using tree classifiers," *IEEE Trans. Intell. Transp. Syst.*, vol. 13, no. 4, pp. 1507– 1514, Dec. 2012.

[3] J. Greenhalgh and M. Mirmehdi, "Traffic sign recognition using MSER and random forests," in *Proc. EUSIPCO*, Aug. 2012, pp. 1935–1939.

[4] J. Greenhalgh and M. Mirmehdi, "Real-time detection and recognition of road traffic signs," *IEEE Trans. Intell. Transp. Syst.*, vol. 13, no. 4, pp. 1498–1506, Dec. 2012.

[5] A. Møgelmose, M. M. Trivedi, and T. B. Moeslund, "Vision-based traffic sign detection and analysis for intelligent driver assistance systems: Perspectives and survey," *IEEE Trans. Intell. Transp. Syst.*, vol. 13, no. 4, pp. 1484–1497, Dec. 2012.

[6] J. Zhang and R. Kasturi, "Character energy and link energy-based text extraction in scene images," in *Proc. ACCV*, 2010, no. 2, pp. 308–320, Springer.

[7] W. Wu, X. Chen, and J. Yang, "Detection of text on road signs from video," *IEEE Trans. Intell. Transp. Syst.*, vol. 6, no. 4, pp. 378–390, Dec. 2005.

[8]Jesmin F. Khan, Sharif M. A. Bhuiyan, and Reza R. Adhami "*Image Segmentation and Shape Analysis for Road-SignDetection*"*IEEETransactionsonIntelligent TransportationSystems,Vol.12,No.1,*pp.113-117,March2011.

[9] M. A. García-Garrido *et al.*, "Complete vision-based traffic sign recognition supported by an I2V communication system," *Sensors*, vol. 12, no. 2, pp. 1148–1169, Jan. 2012.

[10] P. Clark and M. Mirmehdi, "Recognising text in real scenes," *Int. J. Document Anal. Recog.*, vol. 4, no. 4, pp. 243–257, Jul. 2002.