Automatic Road Sign Detection And Driver Assistance System

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ABSTRACT

In today's world, road conditions have been drastically improved as compared with the past decade. Express highways equipped with increased lane size. Obviously, speed of the vehicle increased. So, on driver point of view there might be chances of neglecting road sign board while driving. This work has proposed system to help driver about the road sign detection to avoid road accidents. The automatic road-signs recognition is an important part of Driver Assistance System (DAS) which helps driver to increase safety and driving comfort. In this work, we are going to develop a system that alerts the vehicle driver about approaching road sign board at an optimum distance before encountering them. The objective is to design a wireless system that delivers road signs (and other road-related information) to the commuter inside his/her vehicle visually and aurally, at an appropriate distance before encountering the corresponding road aberrations. The final aim is to bring about a change in the current road safety standard by providing a more efficient and economic electronic alternative to static road signs. In addition to reducing dependency on road signs, the device will also aid in diverting accidents and traffic jams, and in better implementing traffic rules and regulation.

Keywords – Driver Assistance System (DAS), Road sign, visually and aurally.

INTRODUCTION

The road signs are typically placed either on a roadside or above the roads. They provide important information regarding to guiding, warning, or regulating the drivers in order to make driving safer and easier.The main purpose of driver assistance systems is to significant information for drivers in order to reduce their effort in safe driving. Drivers have to pay attention to various conditions, including vehicle speed and orientation, the distance between vehicles, passing cars, and potential dangerous or unusual events ahead. If driver assistance system can collect such information a prior, it will greatly reduce the burden of driving for drivers and make driving safer and easier.Driving information could be detected by many kinds of devices, such as infrared rays, ultrasonic waves, microwaves, radar, and a computer vision system. These devices can be utilized to extract various kinds of data from the driving environments.

Traffic sign boards which are installed in road sides are important to instruct a driver to follow the rules, as they provide important information regarding to guiding, warning, or regulating the drivers in order to make driving safer and easier. But we usually fail to check these road sign boards while we are in drive, which are accomplished by, mandatory road- signs indication of enforcing the law, while cautionary road-signs are installed in hazardous areas to alert accidents, informative road-signs provide directions, locations and other information.

PROPOSED SYSTEM DESIGN

The present system of knowing the road sign board is by manually looking at the sign board in driving. While in driving some of the sign board may not be seen clearly or may not be known its message. So, to avoid this we have come up with an idea by making the road sign board not just a sign board but a transmitting device, which is capable of transmitting a signal containing its data for a certain range from its location. When the vehicle passes at this particular range in that locality the vehicle receives the transmitting signal by its receiving antenna placed in the vehicle, the coded data will be matched with a stored information in a microprocessor. The matched result shows the image of a sign in a display screen installed in dashboard of the vehicle and a corresponding audio commands will be played for the safety of driver.

Raspberry Pi.

Raspberry pi is a small seized computer consisting of cortex-A53 64-bit quad core processor clocked at 1.4 GHz and holds 1GB RAM. Pi board has 4 USB port for connection of keyboard, mouse and other peripherals. And also consist of 40 general purpose input/output pins (GPIO) which allows the user to control at the run time. The pi board runs on its own Raspbian operating system (OS). The required code to run our project is written in python language, which is a high-level general-purpose programming language. By the aid of python, we will be creating a database of images and voice commands for each of the sign boards, the relevant image and voice commands will be taken as output based on the matched data received by RF transmitting signal.

REQUIREMENT SPECIFICATIONS
HARDWARE DESIGN
Raspberry Pi module

The Raspberry Pi was created with the goal of education in mind. This ultra-tiny computer was designed to be small and cheap so that schools could easily afford them in order to teach students about computers in the classroom. This is great for two reasons, the first is that it provides extremely cheap access to a computer, and second it is a great tool for learning more about computers. In this work the Raspberry Pi has on it. In the model B, you get an HDMI out, RCA video out, 2 USB ports, an SD card slot, a head phone jack, and an Ethernet port. The board itself has half a gigabyte of RAM and an onboard ARM processor.
The model A has all of the same features of the model B minus one of the USB plugs, the Ethernet port, and half of the RAM.

RFID Module
RFID is an acronym for "radio-frequency identification" and refers to a technology whereby digital data encoded in RFID tags or smart labels (defined below) are captured by a reader via radio waves. RFID is similar to barcoding in that data froma tag or label are captured by a device that stores the data in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. The most notable is that RFID tag data can be read outside the line-of- sight, whereas barcodes must be aligned with an optical scanner. If you are considering implementing an RFID solution, take the next step and contact the RFID experts at AB&R.

RFID has come a long way from its first application of identifying airplanes as friend or foe in World War II. Not only does the technology continue to improve year over year, but the cost of implementing and using an RFID system continues to decrease, making RFID more cost-effective and efficient.

SOFTWARE REQUIREMENTS
RASPBIANOS

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make the Raspberry Pi run. However, Raspbian provides more than a pure OS, it comes with over 35,000 packages, pre-compiled software bundled in a nice format for easy installation on the Raspberry Pi.

One line answer to the about question would be, "Pi is a single-board computer". Pi is a small scale computer in the size little bigger than a credit card, it packs enough power to run games, word processor like open office, image editor like Gimp and any program of similar magnitude.

Pi was introduced as an educational gadget to be used for protyping by hobbyists and for those who want to learn more about programming. It certainly cannot be a substitute for our day to day Linux, Mac or Windows PC.

PYTHON 3

Python is a general-purpose interpreted, interactive, object- oriented, and high-level programming language. It was created by Guido van Rossum during 1985- 1990. Like Perl, Python source code is also available under the GNU General Public License (GPL).

I have observed that there are 3 main popular applications for Python: Web Development. Data Science-including machine learning, data analysis, and data visualization Scripting.

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

RESULTS

Experimental results of the road sign detection and driver assistance system module demonstrate the superiority of the proposed approach which has achieved the successfull detection of the road sign boards. Our work have occlusion in real traffic images including high noisy, bad illumination conditions.

In the proposed system, As soon as the car enters the approximate radius of sign board it automatically detects the sign (binary code) assigned to it and display the sign board images on the monitor with audio output. Below mentioned are the sign board symbols we used in this project.

Conclusion

The system has been implemented which can deliver road signs and other road related mandates inside commuter's vehicles. Rather than erecting more road signs continually, which only add to driver distraction, we introduce a possible shift in the way cautions and other information provided to vehicle drivers by means of display screen and voice commands. Drivers can receive route suggestions and directions at regular intervals even if their vehicle is not equipped with a GPS module. Dependency on road sign installation. The wireless signal is used as an intermediate at a cost effective for getting prior information to the driver, who is approaching near to the particular zone. Further the overall system is more attractive which allows us to interact with environment with more speed in less time.

Future scope

In future using some of the advanced technology we can implement autonomous driverless cars. Road signs notify road users of regulations and provide warning and guidance needed for safe, uniform and efficient operations. Traffic sign reduce the traffic congestion along the road and also provide facilities for the road users.

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