Vehicle Detection Using FishEye Camera

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ABSTRACT-An approach for detecting and tracking vehicles are proposed in this paper. Traffic safety applications using vehicle-to-vehicle communication is an emerging and promising area within the environment. By using a single rear-mounted FishEye camera and multiple detection algorithms to find the blind zone of the vehicle. It is a driving safety supported system. Furthermore, the effects of FishEye distortion are at their most pronounced toward the extremities of the image, rendering detection of a target vehicle entering the blind zone even more difficult. As a function of distance between host and target vehicles are categorized the detection performance and testing frameworks are presented. Vehicle to vehicle in between distances are less than 6m then its brakes are automatically applied, if it is in 10m warnings are given by using of playback device.

KEYWORD: FishEye camera, eye blink sensor, LCD, microcontroller, playback device, vibrator.

1. INTRODUCTION

The lane-change task requires drivers to divide their attention between monitoring the forward roadway, their surroundings, steering the vehicle, regulating the vehicle’s speed, and using the turn signal. A blind-zone of a vehicle can be described as “areas around the vehicle that cannot be seen directly by the driver by looking forwards or by using any of the vehicle’s standard rear-view mirrors (internal and external) from the normal sitting position. Radar-based systems provide a high degree of accuracy in detecting longitudinal motion, however lateral movement of vehicles with respect to a sensor in applications such as blind-zone detection can yield inconsistent results. Camera-based blind-zone monitoring systems are being increasingly used either as a stand-alone technology or to complement radar. Cameras offer significant advantages to radar systems such as more accurate capturing of lateral motion, higher resolution and lower unit costs. FishEye camera used in this project to view the blind zone of vehicle. Viewing angle of fisheye camera is 360 degree.

1. FISHEYE CAMERA

A fisheye camera is an ultra-wide-angle camera that produce a strong visual distortion intended to create a wide panoramic or hemispherical image. The popular 35mm film format, typical focal length of fisheye lenses are between 8mm and 10mm for circular images and 15-16mm for full-frame images. For digital camera using smaller electronics imagers such as 6.4mm (1/4in) and 8.5mm(1/3in) format CCD, the focal length of fisheye lenses can be as short as 1 to 2mm. It capture the viewing angle is 360 degree. Use fisheye camera to get high viewing angle of behind the care just by adding few filed instrument we made a confided for comfortable and fireless driving. They are used in a wide range of applications. The data set will be expanded to include urban and suburban driving situations as well as in adverse weather conditions.
II. VEHICLE TRACKING AND DETECTION

The detection of vehicles at distance using Ada Boost, and detection at closer range using Hough Circle detection and wheel arch detection using a new approach. Both of these approaches operate at the level of individual frames, therefore, in order to increase robustness against occasional front-of-vehicle and wheel detection failures, and to increase computational efficiency, the front of a target vehicle, and front and rear wheels are tracked using a combination of Harris corner and optical flow algorithms. Many blind-zone/fisheye detection papers, apply their proposed detection algorithm on a frame-by-frame basis. However, this can be computationally expensive for some methods of detection and can impact on real-time performance. A common alternative approach is to match features from the current frame to a confirmed detection in a previous frame and is known as tracking. Tracking can be divided into 3 main categories: optical flow, mean-shift and motion estimation. Optical flow initially requires the isolation of corners. Corners are points in the image that contain strong derivatives (edges) in at least two orthogonal directions and are common to both frames such that they can be identified from one frame to the next.

![Detection of vehicle with respect to the host vehicle in the context of visible-zones.](image1)

![Camera setup](image2)

III. BLOCK DIAGRAM

The block diagram explains the parameters that are interfaced with the PIC microcontroller. The analyzes the current and the voltage ranges at which the display is about to start. Relay is used to reduce the time in 2ms speed.LCD is used to display the contents in 8digit format.Horn/vibrator is used to give an alarm or a sound to the people in case of any difficulties or to inform driver.

A. POWER SUPPLY UNIT

There are many types of power supply. Most are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronics’ circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. Regulator ICS: IC7805 , IC7812.3 Pins- 1 pin(input) - 2 pin(negative) - 3 pin(output).Some power supplies have a manual switch for selecting input voltage, while others are automatically adapt to the main voltage.
FIGURE 6: Power Supply

This circuit can give +5V output at about 150mA current, but it can be increased to 1 A when good cooling is added to 7805 regulator chip. If you need other voltages than +5V, you can modify the circuit by replacing the 7805 chips with another regulator with different output voltage from regulator 78xx chip family.

B. PIC MICROCONTROLLER

PIC starter Kit is based on Pic 18f4520 Based, Boot loader Based , No need Of programmers. Thru Rs232 port Easy Hex can Be downloaded using Flash Utility Example Codes based on Micro C compiler -Example Codes for - LED-LCD-ADC-UART-PWM .some features of pic microcontroller are RS232Tx, Rx interface with MAX232 IC on socket, 18f4520 microcontroller, ULN 2803 To Drive Stepper Motor & Relays, Quartz crystal 20Mhz,2 LED,2 Push Button, RTC, Reset button, Power plug-in jack, Extension slot on every uc pin, GND bus, VCC bus Four mounting holes 3,3 mm (0,13”).

FIGURE 7: Pic Microcontroller

C. LCD

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). LCs does not emit light directly. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have replaced cathode ray tube (CRT) displays in most applications. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are, however, susceptible to image persistence.

FIGURE 8: LCD

D. PLAYBACKDEVICE

Today’s consumers demand the best in audio/voice. They want crystal-clear sound wherever they are in whatever format they want to use. APLUS delivers the technology to enhance a listener’s audio/voice experience. The aPR33A series are powerful audio processor along with high performance audio Analogto Digital converters (ADCs) and digital-to-Analog converters (DACs). The aPR33A series are a fully integrated solution offering high performance and unparalleled integration with Analog input, digital processing and Analog output functionality. The aPR33A series incorporates all the functionality required to perform demanding audio/voice applications. High quality audio/voice systems with lower bill-of-material costs can be implemented with the aPR33A series because of its integrated Analog data converters and full suite of quality-enhancing features such as sample-rate converter. The aPR33A series C2.0 is specially designed for simple key trigger, user can record and playback the message averagely for 1, 2, 4 or 8 voice message(s) by switch, It is suitable in simple interface or need to
limit the length of single message, e.g. toys, leave messages system, answering machine etc. Meanwhile, this mode provides the power-management system. Users can let the chip enter power-down mode when unused. It can effectively reduce electric current consuming to 15µA and increase the using time in any projects powered by batteries. It is suitable in simple interface or need to limit the length of single message, e.g. toys, leave messages system, answering machine etc. Meanwhile, this mode provides the power-management system.

E. MOTOR

A DC motor is an electric motor that runs on direct current (DC) electricity. DC motors were used to run machinery, often eliminating the need for a local steam engine or internal combustion engine. DC motors can operate directly from rechargeable batteries, providing the motive power for the electric vehicles. The motor principal of operation in any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field.

FIGURE 10: Power Motor

It generates the rotational motivation. The above diagram shows a common motor layout with the rotor inside the stator (field) magnets.

IV. CONCLUSION

Future work will focus on applying the outlined detection methods to front views to enable the development of detection algorithms for applications such as forward collision warning through the use of a single (front-mounted, forward-facing) fisheye camera. The data set will be expanded to include urban and suburban driving situations as well as in adverse weather conditions. Future work will also explore the potential of embedding software FPGA or DSP to true real-time performance. Once this is achieved, it may be also feasible to explore various computationally intensive options to improve detection rates. While extensive testing has been carried out in this paper to determine correct parameters for the system, the issue is exacerbated by a co-dependency between parameters, even applied to differential algorithms, address such issues, Bayesian approach known as the Sequential Monte method (or Particle Filter), will be used to estimate parameter by dynamically updating the state estimate such as proposed. This method is used to overcome the issues of road accidents, in case of any problems. It is mainly invented and developed in rural areas to avoid accidents.

SIMULATION OUTPUT:

FIGURE 11: Circuit Diagram

REFERENCES:
