

An IOT solution for vehicle Speed Identification and Collision Avoidance System

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Abstract

As we know at present the technology was improved in all the areas of telecommunication, wireless communications and having applications in many fields. The crucial focus of this paper is to demonstrate the speed sign recognition with additional features. The paper depicts the characteristics of speed signs, necessities and difficulties behind completing a progressing base structure with embedded system, and how to oversee numbers using picture taking care of strategies fit as a fiddle and estimation examination. The paper also show the frameworks used for depiction and affirmation. Shading examination similarly expect an especially imperative part in various other particular applications for speed sign acknowledgment, this centers to various issues regarding steadfastness of shading disclosure in light of conditions, so nonattendance of shading model can drove a predominant course of action. In this attempt lightweight frameworks were essentially used as a result of obstruction of constant based application and Raspberry Pi limits. By using the ultrasonic sensor and LDR sensor we make framework to be more effective.

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I. INTRODUCTION

The research on the identification of signs is keep on going in the present technology even though it was started its journey since 1984. As per new trends man needs a vehicle to be automatically follow the instructions and to be moved on. Especially in this paper it demonstrate the detection of speed sign and controls it automatically by its own without the help of personal assistance or driver in order to avoid the manual blunder and causing of mishaps. Most importantly the activity rules will not be violated. The sign acknowledgement is done by the camera which works through the web with an image processing which will receive the information through the controller of Raspberry Pi. The major work is focused on the inserted Raspberry pi

which has the capability of doing all the works from preparing of word, handling of pictures to playing games as of a personal computer can do. The frame work was developed with an aim of giving simple and easily understandable solutions to PC programming and master coding .

The Cambridge university in computer labs made a discovery of Raspberry by David Brabeau with a firm called Broadcom. To prepare easy outcomes and the tasks to utilize the basic shapes and their calculations by optical character acknowledgement on Raspberry pi. OCR is an open source character recognition module for many various systems. It can identify letters and pictures which are in different forms. To enhance the precision of recognition pre preparing pictures are needed before to pass them to OCR motor.

Therefore the frame work can be extended to enhance the states of mechanized driving systems.

II. PROPOSED METHOD

To develop a method it might have the less power consumptions and low computational cost. The structure is designed for the geometry of signs and to enhance the picture levels, the ultimate objective of keeping the stream in the pipeline of Raspberry Pi to getting data continuously. The proposed system has the evidences of the speed signs that will be polished by two central stages that are recognition and confirmation. In the recognition stage image is pre arranged updated and split by properties of signs for example shading and shape measurements.

The major areas which were focused must be possible to identify the characteristics of the sign. In the process of acknowledgement the image captured will be synchronized and each one of them should process with the K-nearest algorithm. The square shape of the sign plays a role in differentiating the speed signs. The dimensions of the picture will gives us the required details to process further. Additionally now a days rate of accidents becomes more so that to avoid that collision or accidents we have introduced ultrasonic sensor to identify and recognize the nearest vehicle which will come in opposite direction which gives alert for making it to take the directions away.

To identify the pictures or images that are captured by web camera through digital image processing of MATLAB will read the rectangular or squared outline shape of the sign, then it calculates the circle contours. Based on the Python implementation edge and sifting detection will be done in order to produce errored outcome and clamor will be decreased to keep up the mark. Gaussian filter is used to smoothen the pictures. In a dual dimensional space Gaussian form of $F(x,y)$ is given by

$$F(x, y) = \frac{1}{(2\pi\sigma^2)} e^{\frac{-(x^2+y^2)}{2\sigma^2}}$$

A. Detection of Edge

The task behind the detection of edge is to reduce the measurement of data in the picture by converting into binary form. The edge recognition methods which equipped with the standard edge detection algorithms. The analysis of shape usually needs to verify the articles shape and depending on it identify the object.

First we check for shape that totally been captured then search for loops which are closed and forms a circle and it should meet the requirements to winding up rectangle. Contour estimation is a typical one which makes the progressive results after each picture identification. This will be used for finding convex points.

As soon as locales for the signs are diffrentiated they are fit to arrangement then OCR is done. Finally signs are discovered as max and midpoints in shape of rectangular.



Figure 3. Ultrasonic Sensor

III. INTERFACING WITH MATLAB

MATLAB gives you a chance to execute orders or gatherings of orders each one in turn, without accumulating and connecting, empowering you to rapidly emphasize to the ideal arrangement. For quick execution of overwhelming lattice and vector calculations, MATLAB utilizes processor-upgraded libraries. For broadly useful scalar calculations, MATLAB creates machine-code guidelines utilizing its JIT (Just-In-Time) gathering innovation.

Analyzing and Accessing the data will be done by following methods.

- Interpolating and wrecking
- Extracting segments of information, scaling, and averaging

- Thresholding and smoothing
- Correlation, Fourier examination, and separating
- 1-D pinnacle, valley, and zero finding
- Basic measurements and bend fitting
- Matrix examination.

The K nearest algorithm is not parametric. The Gaussian filter made centers in a 2D geometric which has anapartitionized ideas. Each of the data points to the information that has presented in the image. Generally K stands for number of adjacent vectors which impact the image and it is an odd number.

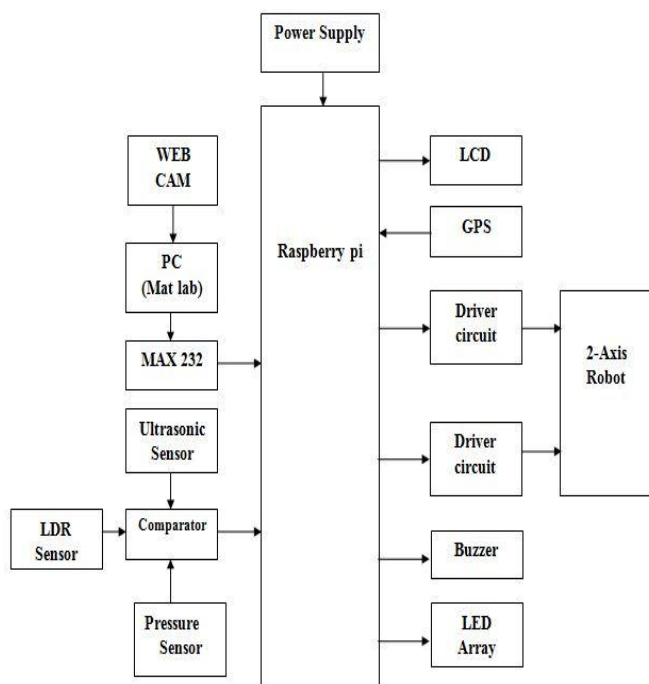


Figure 4. Block Diagram

IV. EXPERIMENTAL OUTCOMES

The designed framework based on Raspberry Pi board which runs on Python. The arranged system also have a GPS module in order to display the location and time of the instance.

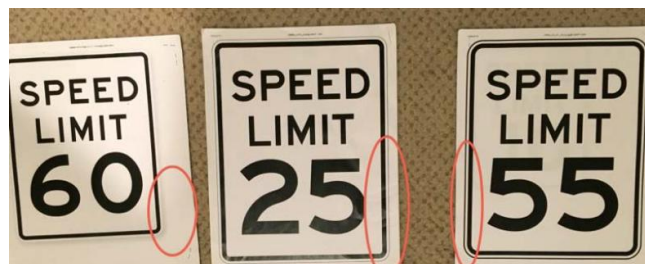


Figure 5. Testing of the signs

The Raspberry Pi does not boot as a conventional PC. The Video Core i.e. the Graphics processor really boots before the ARM CPU.

The boot procedure of the Raspberry Pi can be clarified as takes after:

- When the power is turned on, the main bits of code to run is put away in a ROM contribute the SoC and is incorporated with the Pi amid produce. This is the called the principal arrange boot loader.
- The SoC is hardwired to run this code on startup on a little RISC Core (Reduced Instruction Set Computer). It is utilized to mount the FAT32 boot segment in the SD Card with the goal that the second-organize boot loader can be gotten to. So what is this 'second-organize boot loader' put away in the SD Card? It's 'bootcode.bin'. This record can be seen while mount procedure of a working framework on the SD Card in windows.
- Now here's something precarious. The principal arrange boot loader has not yet instated the ARM CPU (which means CPU is in reset) or the RAM. Thus, the second-organize boot loader additionally needs to keep running on the GPU. The bootloader.bin document is stacked into the 128K 4 way set acquainted L2 reserve of the GPU and afterward executed. This empowers the RAM and loads start.elf which is likewise in the SD Card. This is the third-arrange boot loader and is likewise the most imperative. It is the firmware for the GPU, which means it contains the settings or for our situation, has guidelines to stack the settings from config.txt which is likewise in the SD Card. We can think about the config.txt as the 'Profiles settings'.

Outcomes of the developed framework:

- The calculation was done moderately and time

taken for both recognizing and declaring the output takes approx 1.5(fps) seconds on a 700MHZ Broadcom .

- The differentiating stage based upon shape how quickly it will collect the data and other pictures which are in ready. To reduce the blunders caused by images the processor will slows for little time.
- Speed signs recognized in the daytime. To avoid the light absence in the night time LDR Sensor and LED array is introduced to identify the pictures.
- Python is a winding up the principle which runs behind the arrangements or the frame work to interface PC to Pi and parallelly works through the code which was developed. It is faster for execution.

V. CONCLUSION AND FUTURE WORK

The frame work is explained by two fields that are recognition and the location .The recognition part is undertaken by shape based algorithms that magnifies the shade based divisions. In a wide range we have many algorithms like hereditary calculations and Hough changes.

The location part is taking care of Global Positioning System (GPS).The future work is concentrated on more additional features according to the present trends. for future work, the utilization of auto's flow (bearing, direction, speed changes and so on.) ought to be considered to enhance the framework's heartiness of the speed sign perusing process. A correlation of the execution inside an inserted arrangement of this task will give the gauge of the upgrades.

Nonetheless, the absence of an open source assessment structure for comparative makes it difficult to play out that correlation. Our work bolsters guarantees that the multifaceted nature of activity sign acknowledgment frameworks will keep on being diminished soon as implanted innovation propels.

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