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ADVANCED ROAD SAFETY SYSTEM PRIORITIZING VEHICLES PASSING SHARP CURVES IN MOUNTAINOUS AREAS USING SMART CAMERA

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ABSTRACT

"Speed Kills", but still people don't care enough to act safe while driving on road. Road traffic accidents and deaths caused by them are most critical issues now a day. Percentage of accident in ghat area is increasing day by day. Severities of these accidents are non-reparable. So, it is first important to control this scenario and have some safety measures in ghat area. In this project we will be designing a smart vehicle alert system for ghat roads where we will be monitoring the vehicles coming across the hairpin bend on both sides and automatically analyzes the vehicle type. When the system analyzes the vehicle type it will automatically indicate the smaller vehicle to wait on one side and puts a barrier in front of it, while the heavy vehicles can cross it, giving them the priority. We will also integrate ambulance system such that if ambulance sound comes from one side and on recognition of the vehicle the other side vehicles will be stopped giving the ambulance the priority.

EXISTING SYSTEM

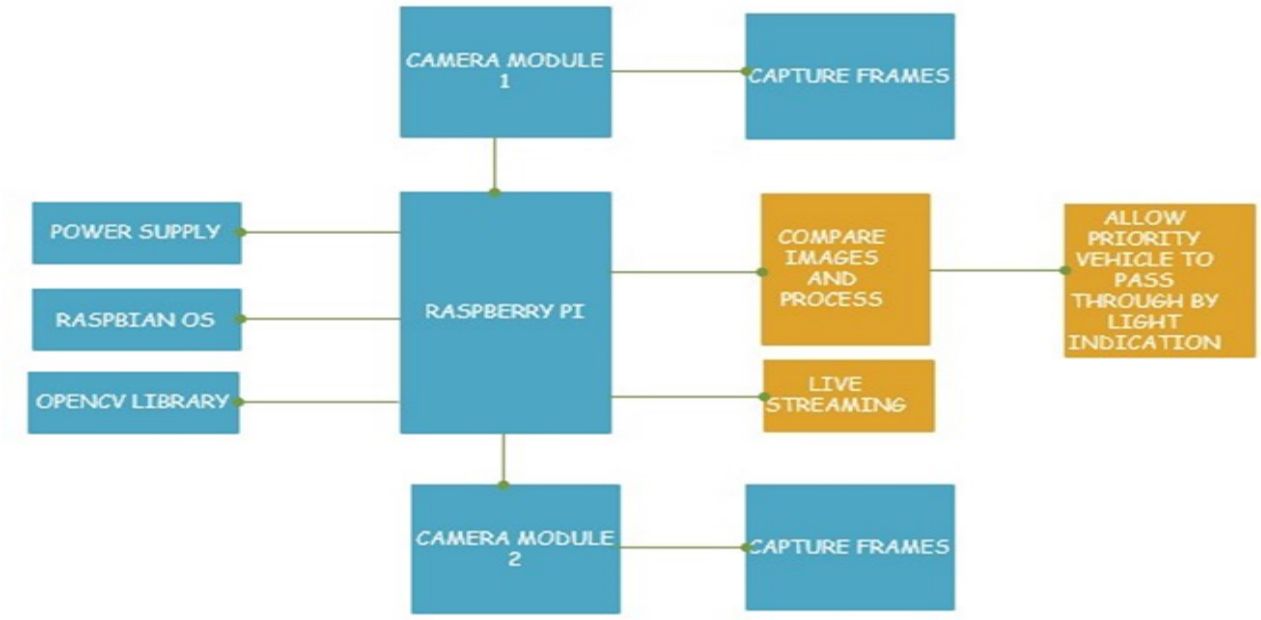
The existing system has focused on avoiding collisions with vulnerable road users. Motion-specific and video-based pedestrian motion classification is only performed. Normal roads are monitored for this collision prediction Curved roads are not studied

PROPOSED SYSTEM

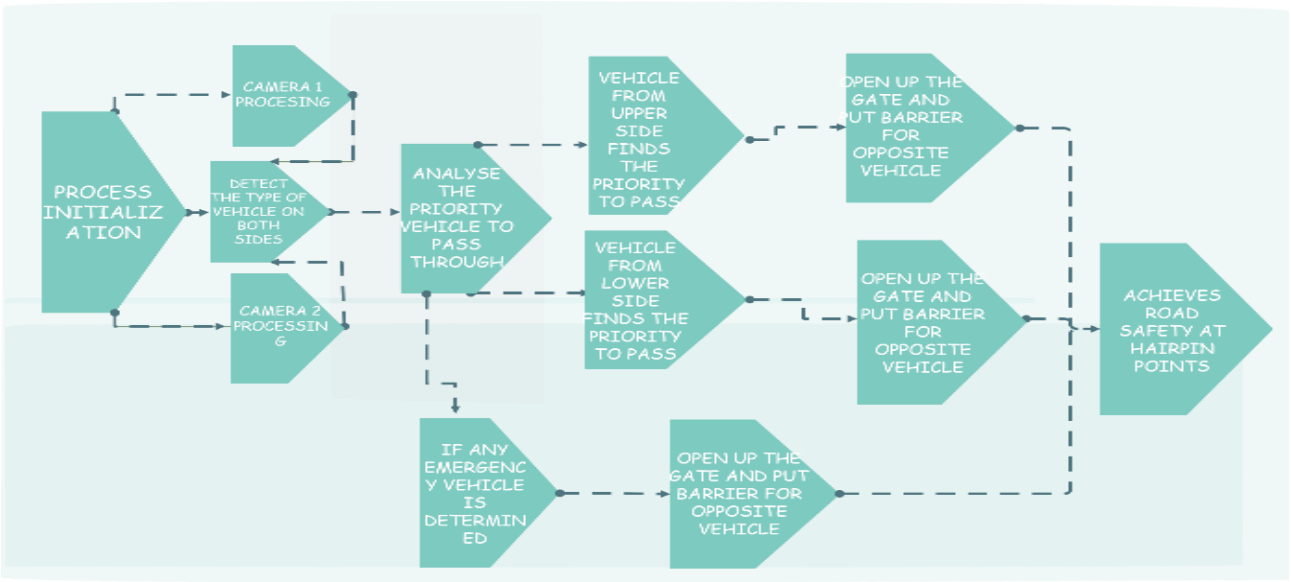
In this project we will be designing a smart vehicle alert system for ghat roads where we will be monitoring the vehicles coming across the hairpin bend on both sides and automatically analyzes the vehicle type. When the system analyzes the vehicle type it will automatically indicate the smaller vehicle to wait on one side and puts a barrier in front of it, while the heavy vehicles can cross it, giving them the priority. We will also integrate ambulance system such that if ambulance comes from one side and on recognition of the vehicle the other side vehicles will be stopped giving the ambulance the priority.

This system can also be implemented in other normal roads also. For implementing this we will be making use of the raspberry pi boards as well as cameras. We will be using the Alexnet architecture to train the model for analyzing the vehicle type and prioritizing. Thus, our project aims at saving the life of the people as well as increasing the safety of the roads.

BLOCK DIAGRAM



FLOW DIAGRAM



POWER SUPPLY

The power supply circuit consists of step-down transformer which is 230v step down to 12v.In this circuit 4diodes are used to form bridge rectifier which delivers pulsating dc voltage & then fed to capacitor filter the output voltage from rectifier is fed to filter to eliminate any ac. components present even after rectification.

Output Current up to 1A

Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V

Thermal Overload Protection

Short Circuit Protection

RASPBERRY PI

The Raspberry Pi is a series of small single-board computers. Raspberry pi 3b+ It is a modified form of its predecessor Raspberry Pi 3 B that was introduced in 2016 and came with CPU, GPU, USP ports and I/O pins.

CPU is 64 bit with 1GB RAM (random access memory)

Contains Broadcom BCM2837B0 chipset

Comes with 1.4GHz Quad-Core ARM Cortex-A53, 4 cores

Consists of 40 pin header (26 GPIOs)

Stereo audio and composite video are supported by 3.5mm jack connector

4 USB 2.0 ports

USB CAMERA

A webcam is a video camera that feeds or streams an image or video in real time to or through a computer to a computer network, such as the Internet.

Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware.

Image resolution interpolated to 25 mega pixels with 6 light sensors

16 MP Image Resolution

USB Interface

Night Vision

USB Cable Length: 1m

VEHICLE DETECTION USING TENSORFLOW

TensorFlow is Google's Open Source Machine Learning Framework for dataflow programming across a range of tasks.

Tensors are just multidimensional arrays, an extension of 2-dimensional tables to data with a higher dimension.

There are many features of TensorFlow which makes it appropriate for Deep Learning.

The task of image classification is a staple deep learning application.

Here, you feed an image to the model, and it tells you its label.

DEPLOYING IN THE HARDWARE

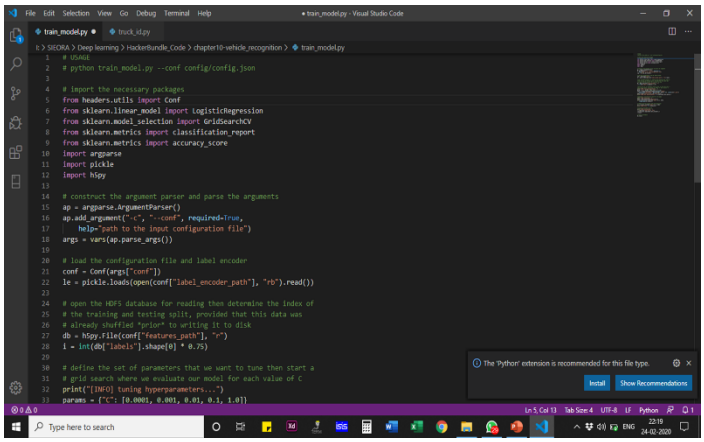
This model after testing in the software and getting successful results we deployed it in the hardware which consists of raspberry pi and two cameras.

In the initial stages the output was not so accurate in the hardware but after training the system continuously we obtained a perfect hardware model to display.

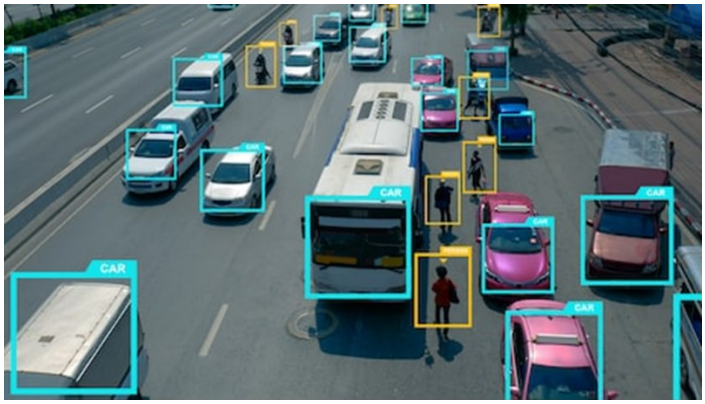
Thus, we accomplished the project in the hardware successfully.

OUTPUT

VEHICLE RECOGNITION CODE



RECOGNIZING THE VEHICLE PRESENCE



HARDWARE SETUP FOR REAL TIME PROCESSING

CONDITION OF TRUCK AND CAR

CONDITION OF TRUCK AND CAR IN OPPOSITE DIRECTION

CONDITION OF TRUCK AND TRUCK

CONDITION OF AMBULANCE

APPLICATIONS

To predict the vehicles passing through the hairpin point in ghat roads

To prioritize which vehicle to pass through

Applicable in all roads where curved bend is constructed

Saves life of people

Promotes safe road system

REFERENCE

[1] Optimal control of vehicle dynamics for the prevention of road departure on curved roads, Yangyan Gao, Timothy Gordon [2019,Vol No: 1534-4320]

[2] Intentions of Vulnerable Road Users—Detection and Forecasting by Means of Machine Learning, Michael Goldhammer, Sebastian Köhler , Stefan Zernetsch , Konrad Doll , Member, IEEE, Bernhard Sick, and Klaus Dietmayer [2019, Vol No: 1524-9050]

[3] Adaptive Collision Avoidance Using Road Friction Information, Yunhyoung Hwang and Seibum B. Choi , Member, IEEE [2018, Vol No:1524-9050]

[4] Measuring the Motion of Vulnerable Road Users Relative to Moving HGVs, Yanbo Jia and David Cebon [2018, Vol No:1524-9050]