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Drowsiness Detection and Alert System Using Open Cv

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ABSTRACT

According to the road accidents reported in the recent years, the major cause of those accidents are due to drowsy or sleepy drivers so to deal with this problem, an Open CV system is developed. Open CV System is developed utilizing a minimal monochrome observation camera that concentrates clearly towards the driver's face. In such a case, whenever an eye landmark is changes are recognized, an alarm system is given to caution the operator. This report portrays the best approach to understand the eyes, to affirm if the eyes region unit detects the number occasion's eye flickering. Recognizing by the system and once time desolate, shut on that point ringer ring for alerting.

Keywords: Open CV, Landmark, Eyes, alarm.

1. INTRODUCTION

Open CV is a python library used for cross-platform which is used to develop real-time computer vision applications. It focuses on image, video processing and analysis in the face and object detection features. It is an open source initiative, everyone can make their contributions to the documentation, library. It will help us to empower to prevent the disasters which are produced by motor vehicle operator due to tiredness, fatigue, exhaustion. Many reports cautioned, 20% of crash is fatigue-linked. Other system discovers dozy. The grouping of mechanics for detection or prevention of dozy is a fundamental challenge in the field. Because of this rise, the drowsiness which happens during the travel, an algorithm is developed to reduce these misfortunes. The purpose of this methodology is to give better prototype model for drowsiness detection. The consciousness of model is to reveal the eye blink rate. In this, a camera is used to measure the eye factors. The vectors measurements are done by the raspberry. The hardware and software requirements are: Hardware-Raspberry pi, Camera, Buzzer, Gas sensor, Heat beat sensor, Meme sensor, Seat belt sensor, GPS. Software - Python, Linux OS, OpenCV, keras, Tensorflow.

2.EXISTING SYSTEM

Man-made reasoning calculations are utilized to handle the Image data to find, follow and investigate both the driver's face and eyes to process the sluggishness and interruption lists. This continuous framework works during night time conditions because of a close infrared lighting framework. At last, instances of various driver pictures taken in a genuine vehicle at evening time are appeared to approve the proposed calculations [1].

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Visual examination of eye state and head present (hp) for consistent checking of readiness of a vehicle driver is done. Most existing ways to deal with visual location of non-ready driving examples depend either on eye conclusion or head gesturing points to decide the driver laziness or interruption level. The proposed conspire utilizes visual highlights, for example, eye record (ie), student movement (dad), and hp to extricate basic data on no sharpness of a vehicle driver. It decides whether the eye is open, half shut, or shut from the proportion of understudy tallness and eye stature. Dad estimates the pace of deviation of the understudy place from the eye community throughout a time span. Hp discovers the measure of the driver's head developments by tallying the quantity of video portions that include an enormous deviation of three euler points of hp, i.e., gesturing, shaking, and shifting, from its typical driving position. Hp gives the valuable data on the absence of consideration, especially when the driver's eyes are not obvious because of impediment brought about by huge head developments. A help vector machine (SVM) orders an arrangement of video fragments into ready or non-ready driving occasions. Trial results show that the proposed plot offers high grouping exactness with acceptably low blunders and bogus alerts for individuals of different nationality and sex in genuine street driving conditions [2].

At present rules, we can't recognize where the mishap has happened and consequently no data identified with it, prompting the passing of a person. The exploration work is continuing for following the situation of the vehicle even in dull awkward territories where there is no organization for accepting the signs. In this undertaking GPS is utilized for following the situation of the vehicle, GSM is utilized for sending the message. Consequently with this task execution we can distinguish the situation of the vehicle where the mishap has happened so we can give the medical aid as ahead of schedule as could really be expected. The disadvantages are: Lack of intelligence in the system, Failure in track of status MATLAB based image processing.

3. PROPOSED SYSTEM

The main components used in the block are Raspberry Pi 3, Raspberry Pi cam, GPS. The system consists of different modules which are interfaced to the Raspberry pi. The RPi is a small, cheap computer and it will provide you with a low-cost, silent, non-heating machine that fits easily into a vehicle, and with very low power consumption of electricity. Its low weight, low cost and GPIO outputs coupled with the possibility of adding modules, for example radio modules, the Raspberry Pi is currently the best possible choice as an embedded computer.

- Record driving history.
- Using IOT we can track the driver’s health condition making the Intimation on Webpage.
- Just counting a eye blinking for drowsy detection is don’t need any large processing time so it applicable in real time.
- MEMS Sensor is more sensitive sensor to identify a condition of the head.

3.1.ARCHITECTURE:

There are four layers we used in our system which are:

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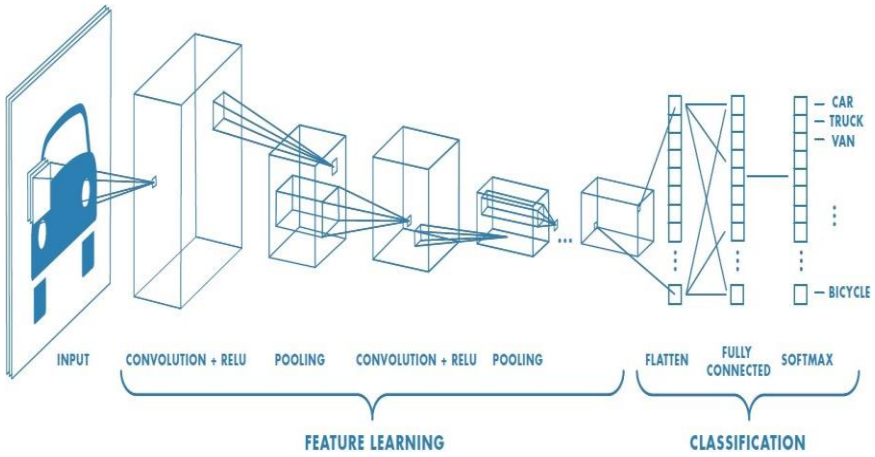

Fig 1: Architecture of openCV System

1. Convolution layer – This process a 2D image as input with dot products between weights and channels

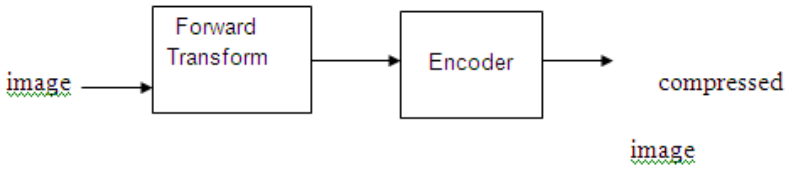

Fig 2: Image Encoding process

Hyper parameter used are Number of filters, Their Spatial extent, the stride and the amount of zero padding.

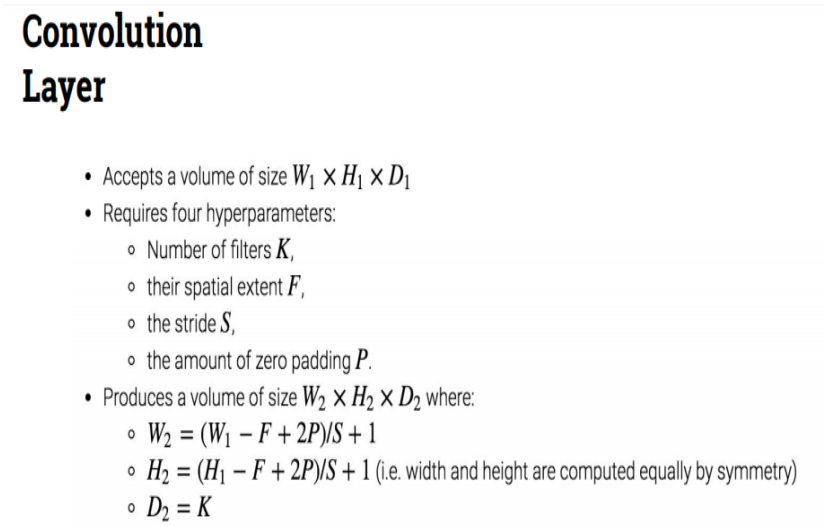

Fig 3: Convolution layer

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2.Activation Layer – It is used to increase non-linearity of the CNN without affecting the vector values.Prefer one is ReLU activation, LeakyReLU and Softmax

$$P(y = j \mid \mathbf{x}) = \frac{e^{\mathbf{x}^\mathsf{T}\mathbf{w}_j}}{\sum_{k=1}^{K} e^{\mathbf{x}^\mathsf{T}\mathbf{w}_k}}$$

Given sample vector input **x** and weight vectors $\{\mathbf{w}_i\}$, the predicted probability of y = j

Softmax – Used at the FC layer for Normalized Exponential Function and produce a discrete probability vector

$$\sigma(\vec{z})_i = \frac{e^{z_i}}{\sum_{j=1}^{K} e^{z_j}}$$

3. Pooling Layer – Provides activation maps , applies non-linear down samples on activation maps.Hyper parameter used are the stride and the spatial extent.

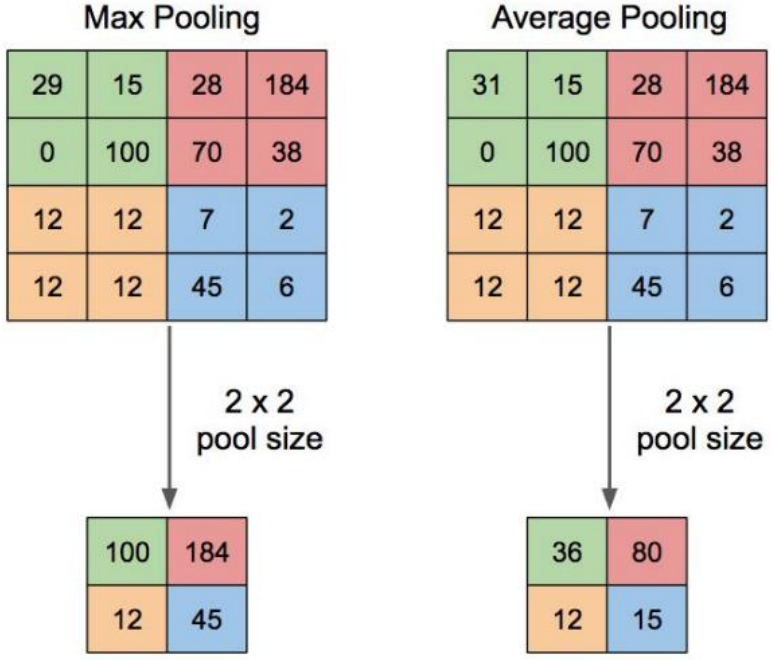

Fig 4: Pooling

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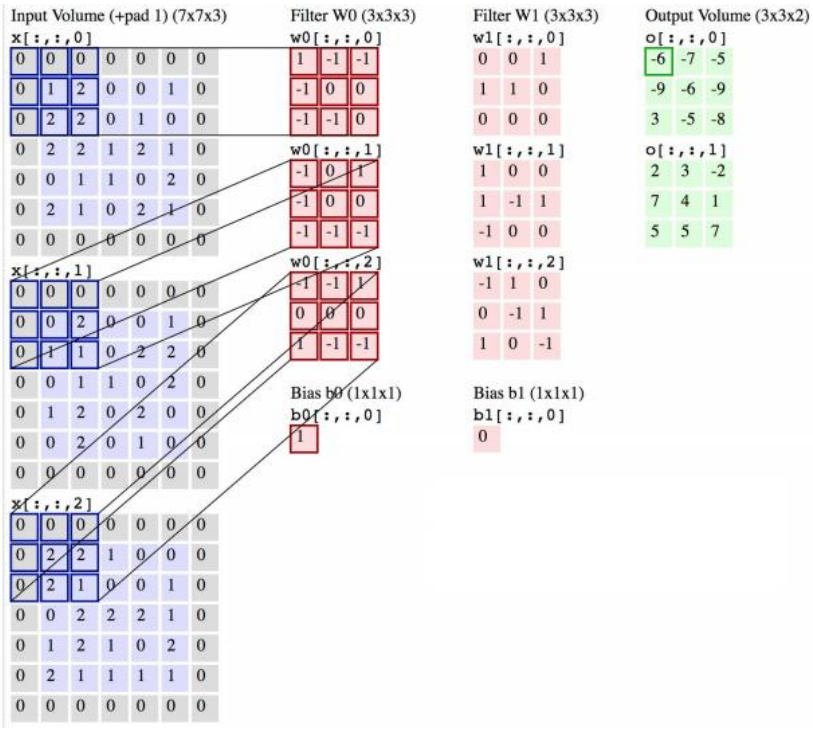

Fig 5: Overall process upto pooling layer

4.FC Layer - Final learning phase, extract image features to desire result to encode tasks passed by softmax.

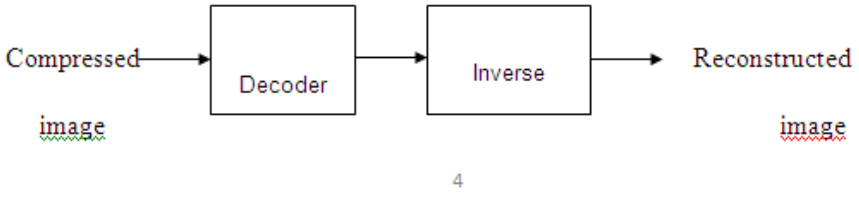

Fig 6: Image Decoding Process

After the four process eye landmark and Euclidean vector and Euclidean distance between eye marks is calculated, then the blinking rate is calculated if rate of blinking decreases alarm will turn on.

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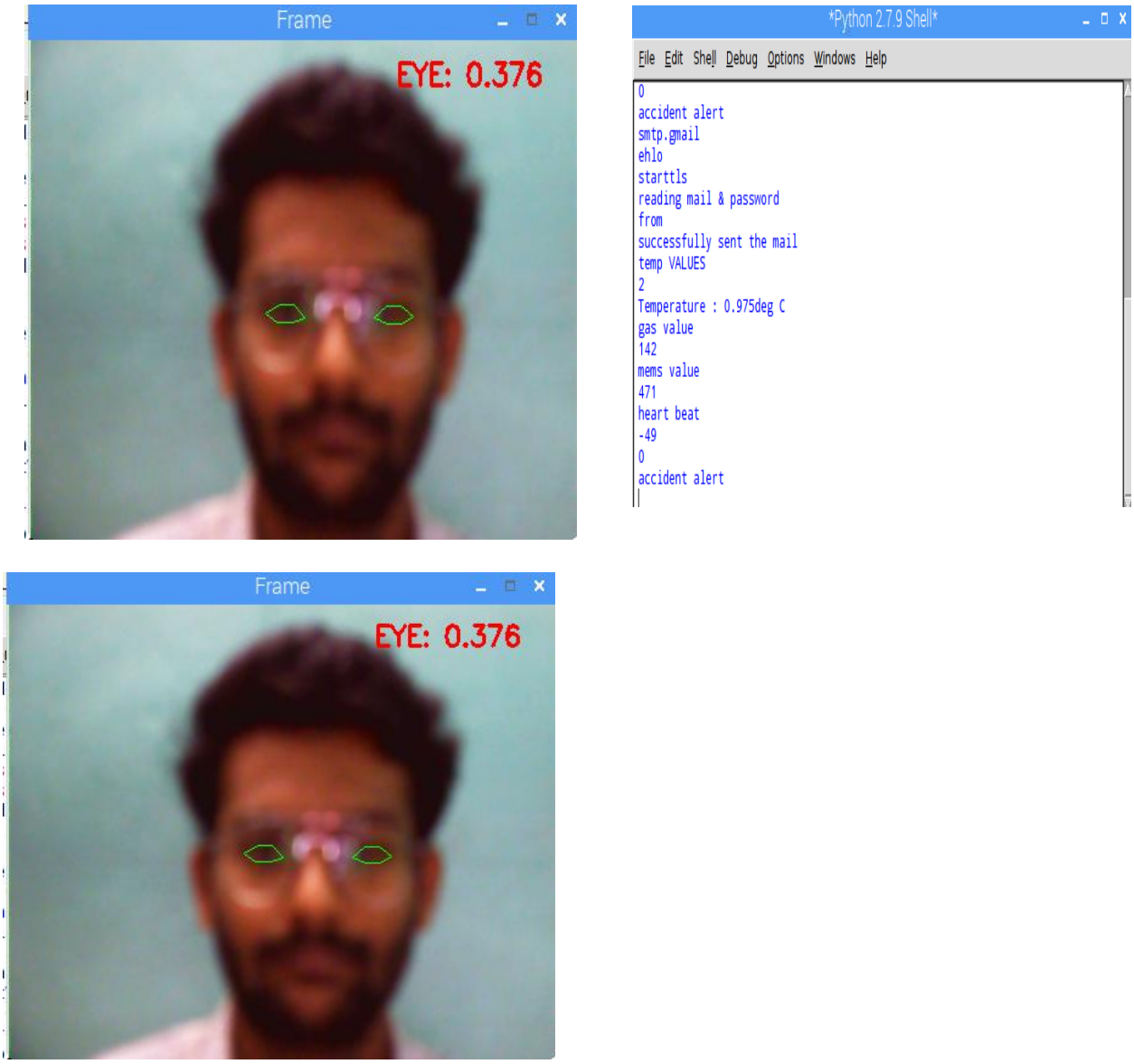

Fig 7: Output

4.ALARM CONTROL

One piezoelectric signal and one 6-volt DC engine are utilized for the alert instrument. Both are joined to the cap and constrained by the microcontroller dissemination has been connected to the engine's shaft for solid vibration. The caution instrument is frequently reset physically or when any of the HR or the EBR is refreshed to the customary reach once more.

5.HARDWARE IMPLEMENTATION

The hardware connection of drowsiness detection system and alert using the open cv is shown in the below Fig 8. The sensors (temperature sensor, MEMS sensor, heart beat sensor, gas sensor) interfaced with raspberry pie through MPC3008 which act as a ADC. The GPS module,

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camera are also interfaced with raspberry pi. The components are connected by male and female connector wires.

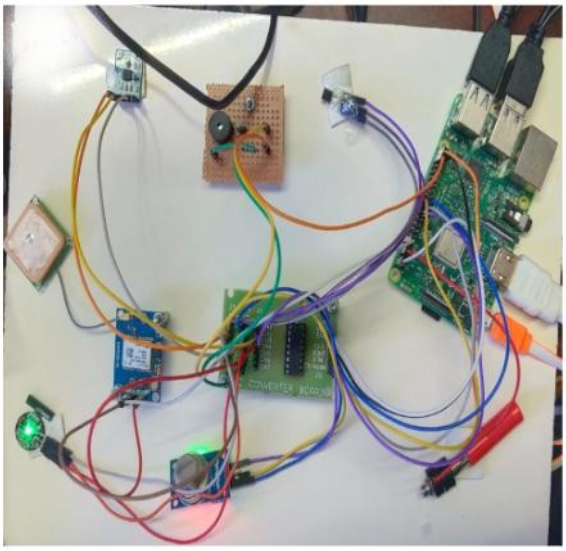

Fig 8: Hardware Implementation

6.CONCLUSION

Using this Open CV system it will be easy for mounting inside the car of several sensors together with the processing and alarm device. With the advent of science and technology in every walk of life the importance of vehicle safety has increased, and the main priority is being given to reduce the alarming time when an accident occurs, so that the wounded lives can be attended in lesser time by the rescue team, and we can also avoid accidents by providing alerts systems that can stop the vehicle to overcome the accidents. The driver alert mode is adjustable to the user needs, can go from silent and only visual but it can be also loud. The buzzer used in this system produces a low frequency sound, which is not disturbing for the car passengers.

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