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An Overview of Speed Recognition and Drowsiness Detection

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AN OVERVIEW OF SPEED RECOGNITION AND DROWSINESS DETECTION

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ABSTRACT:

Minimum Speed helps to control the car from accidents. The accidents are said to be the big cause which tends to death. More over 1.2 millions of public are facing death. Therefore, Speed is an important role to pay attention to accidents. Formulating the over speed in the super highways had denied the fault for drivers/riders. The people in large numbers are traveling in super highways in anytime. The drivers may have lacking sleep and they can be diverted by any kind of interference, or using the mobiles and all these can lead to accidents. To overcome these types of road accidents, we came forward to propose a effective system to alert the drivers using such techniques. Detecting the face is based on image processing technique. This is done by using camera. If the driver feels drowsy, the alert pings him with sound. The sensor is introduced to stop the alert sound. The system here proposed with large techniques with facial and eyes detection.

KEYWORDS: Car, driver, accident, techniques, detection, Recognition, technologies, algorithms, Facial and eye detection.

INTRODUCTION:

In current situation, the persons are needed with more and more absorptions. The drivers must be in good concentration towards the road and be very alert to face the quick incidents causing on the road. If there is a lack of concentration, there cause the accidents. The speed also be controlled and drivers must not be fatigue. Therefore, came in execution to create and to develop the system that will detect the drivers condition. This system is helpful in reducing accidents and to be more concentrate on drivers/riders. The system is also proposed with high technical support with face and eye detecting algorithms. This is introduced to deep detecting method, so that it is useful to predict that the drivers are drowsy or not. The method is implemented using many techniques by template matching algorithms, distance based algorithms, introducing the logical methods and so on. Finally the speed recognition is going to be done and the detection of face and eyes are checked according to the drivers drowsiness.
Therefore, this paper is mentioned for drivers drowiness detecting and other techniques like alerts, sensor based alerts etc. The main purpose is to prediction of facial and eye based detecting process.

TERMS OF INDEX:

Techniques for speed recognition, Detecting drivers motive, Facial detection, Drowsiness recognition, Alert pinging, Proposed algorithms for detection.

[1] TECHNIQUES USED TO RECOGNIZE SPEED:

The Technologies used are :

- Python
- OpenCV
- dlib.

Tasks which are followed by,

Vehicle Detection

Haar cascade classifier - is used to identify the object(here the object is vehicle).

Vehicle Tracking - (refering id to object(vehicle))

Processing the correlation tracking method from the dlib library system.

Speed Calculation and detection of Vehicle using pixel measures:

- Here the speed is calculated with pixel measures, and the distance is calculated using the vehicle nearby meters measures. According to that the speed is recognised using meter per second method.
- By using this distance calculation we can easily predict the speed calculation technique.

Under the Image processing methodology the **Image classification technique** are based on **ImageNet**- this contains the images which are properly predicted and trained with the help of several datasets. Then the images which are said to be finely debugged are seperated without any partitions or classification. Finally, the prediction of algorithm shows the perfect labels of the object which are there in the images. The algorithm helps in prediction of nearby objects also for deep detection process.

The common factor of the computer visioning technique uses the pipelines. Those pipelines are said to be in multi-levels. The multilevel pipeline techniques are sometimes are been complicated in analyzing the particular nodes. So the parameters are used to overcome for reusing this method for easy prediction of the nodes. This method is been sucessful in multilevel prediction also.

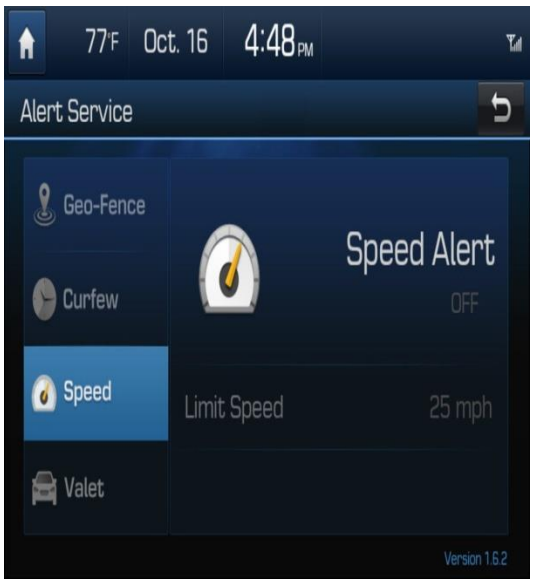
The next term is to concentrate on the sensor based technique. The sensor which is connected inside the car to help the drivers. The main task is to identify the object that which respond to the sensor. This device makes the driver to be alert and pings them to reduce the speed.

The sensor is connected to the other device which can be of speedometer, then if the speed exceeds, the sound alert is made to respond the driver to thumbs up or to

This shows about the small pixels areas,

touch the device. Finally the alarm stops only after the driver respond towards the device.

If we are using the **Sliding Sensor Technique** like the way we detect and identify speed, we need to apply a connecting process to many different related devices. This sensor which is connected with speed and this option helps to recognize the limit. It can be of any model that is suited with car model. Using in dashboard is very much helpful for the drivers to respond as quick as possible. The driver responding in quick manner helps to off the device without any disturbance. The disadvantage of this device may be irritating but is much effective.



The other technique with advanced is the region based convolutional neural networks. This is shortly called R-CNN model. This model is worked in advance with large speed and high efficiency. This is used as a advance computing technique in future purpose. The detection in this model, reaches the higher position for good prediction. The object in R-CNN model has number of classification, that detects in general forms based algorithm and easier to understand. The technology in later versions are said to be highly improving and the performance is in large development stage.

[2] DETECTING THE DRIVERS CONCENTRATION:

Here we proposed **Multi tasking Monitoring Framework** to detect motive of drivers. Using image detection , we use face detection particularly for deep detecting. The multi-task technique predicts the facial parts with eyes, head, mouth and drowsiness.

Face detection:

There are three models in convolutional networks.

P-Net (Pixel based detection and mapping system)

- Image is detected by transfering as object.
- Produce multi-level duplications of images.
- The image is transfered later to P-Net.
- Resulting in P-Net image.

R-Net (Relation based detection)

- The image is related to each other and bounded with near by objects.
- The image is transfered as R-Net images.
- Resulting in R-Net image.

O-Net (Oximetric detection)

- This is same as R-Net but relates to oximetric images.
- The image is get into O-Net images.
- Resulting in O-Net image.

Result process

The above detection models join togetherly develop a fine combination as a dictionary or library. This library detects the whole process to output it in a same level of model. (i,e) P-Net outputs as P-net image. These models mold the image into its own detection.

These models is helpful to process many kinds of detection based on the face.

The processed image below shows several stages that how P-Net,R-Net and O-Net works in a face deetction. The image which is mentioned with vertical position as the input and the horizontal position with the output result.The images are bounded together and gives the resized images as the ouput.

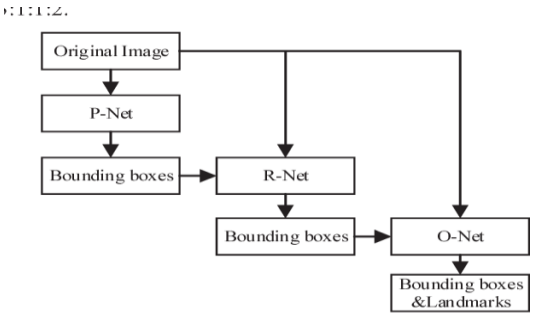
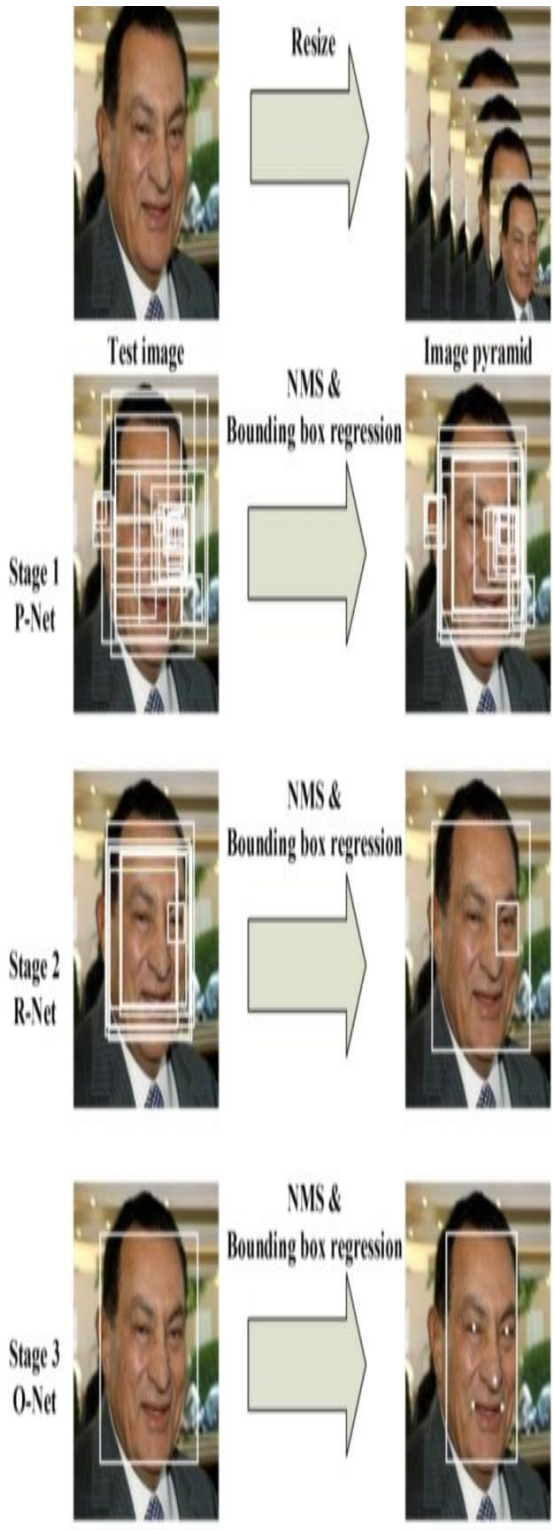
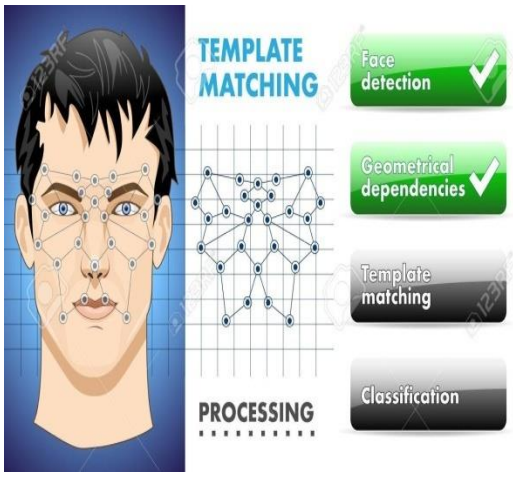


Fig. 1. Flow chart of the training data preparation



The another image below which shows basic biometric detection. But the below image is proposed with various methodologies with the use of convolutional neural networks.



The image with the three models which are performed with multi level of nodes are classified with several predictive models. These models are packed with some of the basic predictive techniques, they are as follows,

EX: This shows the **three types of predictions**.

They are as follows:

- **face classification**
- **bounding box regression**
- **facial landmark localization.**

These above three models are not at all directly connected to each other. They perform like a one after other processing. That is when one round finishes, the next one starts and so on until the third process is finished.

This kind of model works in advance processing the images from one stage to another. To achieve this type there proposed a model called **non maximum suppression. (NMS)**

The NMS which makes the every stage of the process to bound into another. For example: The images processed in P-Net model is bounded with region and it transfered into another type of model as R-Net to check the relation of the particular image.

The face detection is done by using OpenCv technique, This is processed by using two conditions, they are:

- The first step is to find the particular location of the face and to predict where the face is presented. Then to calculate the bit pixels of the face.

- The Second step is to find the vector position of the face. This can be embedded using any system. So that the system finds the all faces in a particular images. This technique is useful to find the face detection in one images.

The above two conditions which satisfies only with the grayscale images. There is also needed to detect the color image. The convertion of the grayscale image into the color image is done using two methods. They are,

1. Scalefactor.

2. MinNeighbours.

The **scalefactor** determines the reduction of the image and shows the scale function of each and every images.

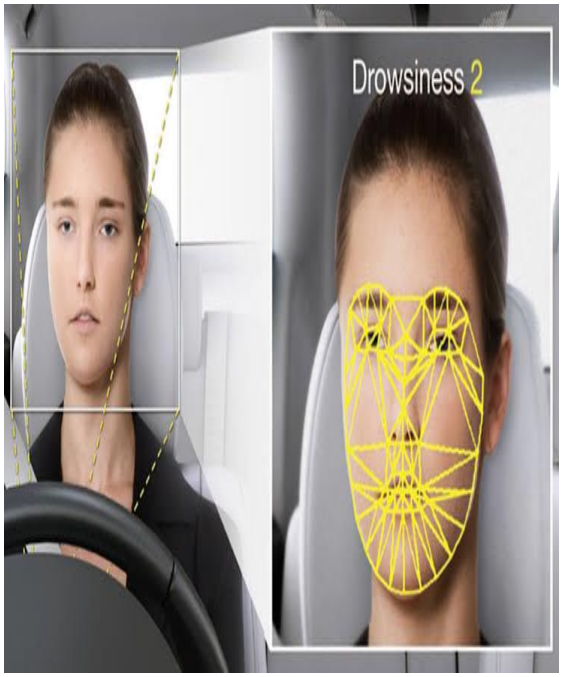
The **minNeighbours** determines the numbers of objects are said to be the neighbour one which present in particular image.

These two factors are used for facial detection and nearby objects recognition process.

[3] DROWSINESS DETECTION TECHNIQUES USING EYES:

Eye detection:

The detection of eyes is the new technology to prevent accidents. This technology is based on the sensors and it identifies that the drivers are drowsy or not. Eye detecting methodology supports actions of eye like motioning, blinking and closing. The below image shows the detecting process.



Template matching and eyeball detection (BTMED):

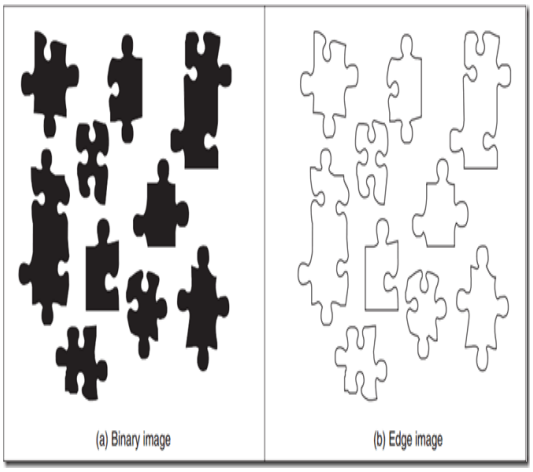
The template matching technique uses the principle of matching the image region which ressembles the template based mainly on similarity. This also detects the image edges and transform to duplicate copy of an image.

- **Binary level template matching:**

The template is usually a small image which is called bi-level image . It finds the template in a source image with a yes or no option**.**

- **Grey-level template matching:**

The template matching schema here working in grey level is not resulting in perfect grey level. It uses the difference of images instead of using yes or no approach.

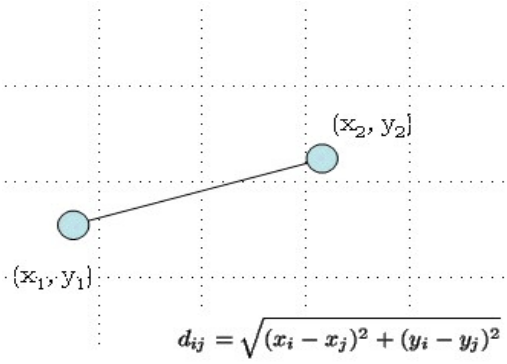


- **Euclidean distance approach:**

It uses some formalative process and relates the templates.

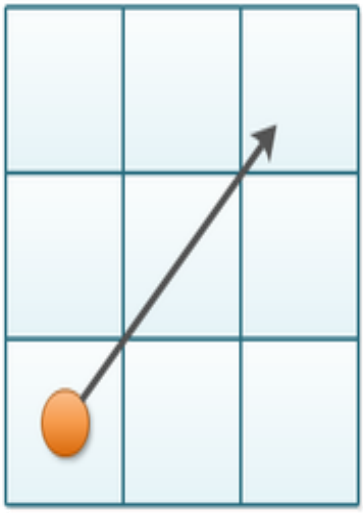
The Euclidean distance is used to measure the distance between the two points in either plane or three dimensional space which measures the length of a whole segment connecting to the two points. This plays obvious way for representing the distance between the two points.

The points x and y determines the distance of the image and the object. The points determines the detecting rules and recognize the result. The Euclidean distance plays major role for applying algorithm purpose for good detection and easily to understand.



This calculation is done after plotting graph method, so that it is considerable and moving up to formulate the detection.

Euclidean Distance



$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

- **Correlation:**

The correlation satisfies when the two variable matches. It is not conditioned with actual value but in the general behaviors. Grey-level also supports the correlation methods for sharp detection.

[4] ALERTING THE DRIVERS USING ALARM SETTINGS:

There are many straight forward methods of setting alarm. Some coding techniques which supports alarm are as follows:

playsound: It is the straightforward package file . It plays WAV or MP3 files.

winsound: This allows WAV format files but it supports only in windows platform.

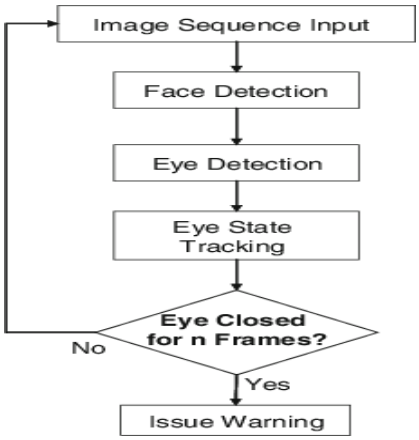
pydub: It contains pyaudio for playback sound with ffmpeg installed which supports large range audio system.

python-sounddevice: It uses WAV file format. It supports in all platfoms. Also it provides library audios.

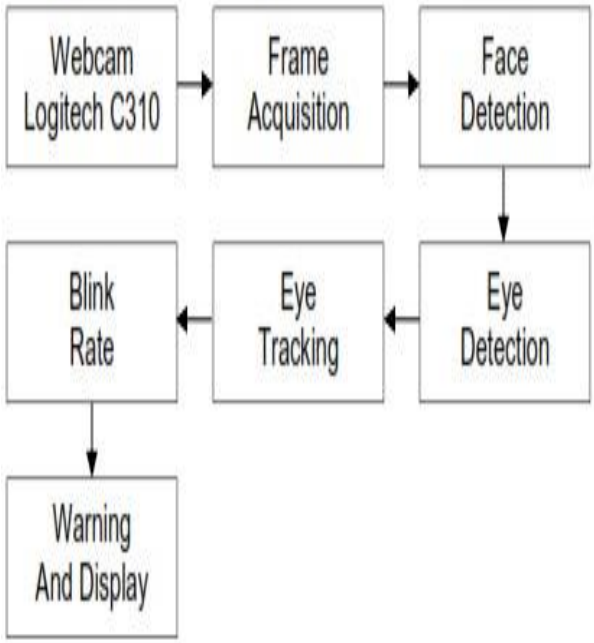
simpleaudio: It plays under WAV file format and NumPy arrays to check that the audio is still playing or not.

[5] OVERALL PROCESSING OF DROWSINESS DETECTION:

This detection is based on camera which captures the image of the driver, then does the face detection, if the driver is fatigue, it goes to eye detection and matches template, then finally applies the alarm to alert the driver.



This image shows the process is done while driving.



[6] CONCLUSION:

Speed recognition makes the drivers to be alert and safe. The speed must be very control and if the vehicle is out of control because of drivers fatigue, then this technology is very helpful to prevent accidents. The speed control method is based on tracking and calculating the vehicles speed and distance. It also

compares the other vehicles which is travelling nearby our vehicle. If any speed exeeds, the alert sound is raised to be safe. Another technique used here is drivers drowsiness detection. This is based on camera which captures the image of the driver and detects the face and eyes using several methods. Then pings them with the help of alert sound. This is also proposed using various methods. Finally this kind of project is useful to prevents accidents.

[7] PROPOSED AREAS:

Proposed techniques are applied on algorithms and which are processed using python. The template matching algorithms are proposed with edge detection method.

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