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Fatigue Detecting Facial Features using Support Vector Machine Classifier

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Abstract: Driver fatigue is one of the major reasons for these accident. According to the recent survey accident rates have become higher, Because of ceaseless and long-lasting driving, the driver gets depleted and tired that prompt a mischance. consequently, it is a required framework that can distinguish the facial highlights of the driver that he or she is feeling lazy or somewhere in the vicinity. They have to install a camera on or in the dashboard that can sense the fatigue on the face. The camera detects the facial features and checks for the alertness of the driver the facial features include eyes and mouth and reacts accordingly.
Keywords: Fatigue and facial detection, Convolutional neural networks, Decision tree, Support Vector Machine Classifier(SVM).

I. INTRODUCTION

As per WHO, around 1.25 million individuals kick the bucket internationally every year because of street accidents. This figure is errored in perspective of the under-listing. Inadequacy driving is one of the key purposes behind these incidents. India is one of the best supporters of this number. Today there are different measures of advances conveyed for inadequacy checking. The sluggish state discovery framework can be characterized into three sorts. The first depends on a quality, for example, guiding wheel development, path position, increasing speed, separation to the adjacent vehicles, and so forth. In any case, these kind of framework is compelled by impediment like street state, away of driving, the vehicle utilized, and so on. In the second sort of framework, a physiological flag, for example, electroencephalogram (EEG), electromyogram (EMG), electrooculogram (EOG), electrocardiogram (ECG) is utilized to perceive the exhaustion level. Physiological pennant based structure is the most consoling weariness territory framework yet they require sensor joined to the skin which may affect the client by causing skin disturbance, repugnance, hating, aversion, and so forth. The third sort of framework utilizes qualities like eye squinting, yawning, head posture, and so forth to screen the conduct of the driver and caution the driver if any of tiredness indications are recognized. In view of this three sort of frameworks and their combinations there are a few kinds of items are financially accessible in the market. Be that as it may, some of them make an alert when the driver perhaps goes to the small scale rest and caution awakens the driver and perhaps turn into the reason for unexpected response of the driver which may induce a setback. Various other possible frameworks which are subject ward and require strategy for proper working. In this paper, we propose a more steady, subject independent, strong, change free, behavioral based system.

II. FRAMEWORK

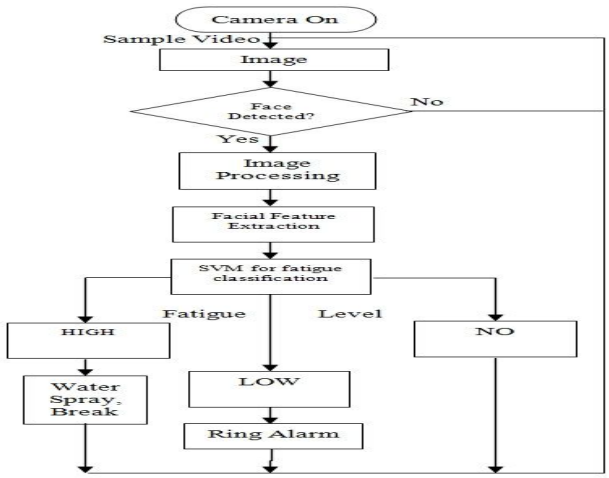

Fig 1: DATAFLOW DIAGRAM

The above Work Flow explains the detailed process that how the fatigue detection unit works from the start. Machinelearning algorithm is used for this classification. The camera is placed on the dashboard and the facial features of the the driver or the person driving is been looked at and then checked with the data present using the facial features extracted and named if that state is fatigue or not, if the person is drowsing or is in a state of fatigueness that will be confirmed by the SVM classifier (i.e) the Support Vector Machine classifier so that according to that the organized data present if the person is just at a normal fatigue state an alarm rings and if he is too much into fatigue states an heavy alarm rings to wake up the driver from the state of fatigueness and avoid accident. If there is no such state of the driver then the camera just keeps running until it starts to detect any state of fatigueness. Decision trees and convolution neural network helps in detecting the facial and fatigue features. The process also includes daydreaming, lack of focusing, blinking frequently, partially closed eye, yawning after every small period, head nodding and poor concentration are also a part of the progress that help in the detection of fatigue process.

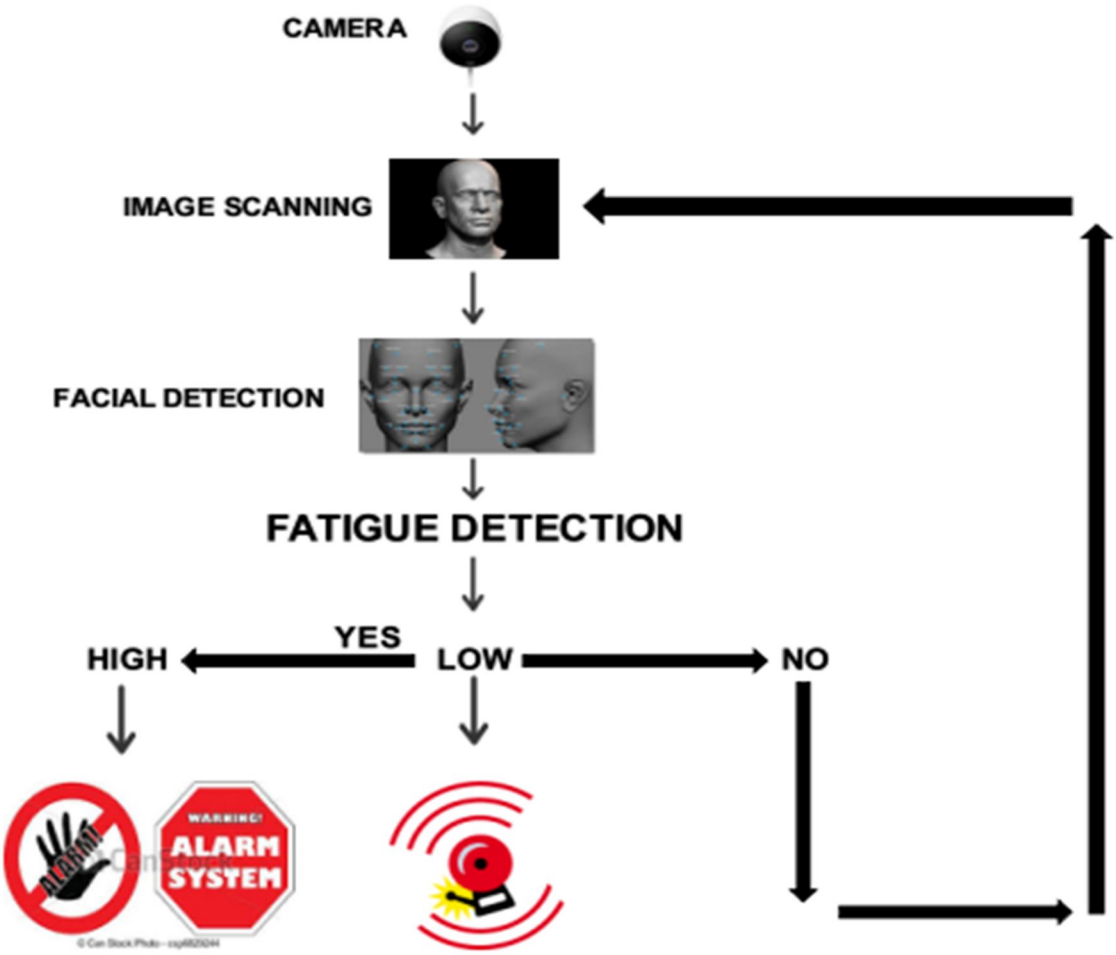

Fig 2: ARCHITECTURE DIAGRAM

Utilizing the driver disarray status indicator, an auto route framework can proactively bolster the driver when he/she is befuddled. A corpus of information was gathered amid on-street driving in rush hour gridlock utilizing a route framework and an auto instrumented with an assortment of sensors. The information was physically clarified with the driver's perplexity status and with numerous highlights speaking to driver's conduct and the activity conditions. We looked at changed sorts of classifiers prepared from the information: calculated relapse, a bolster forward neural system, an intermittent neural systems, and a long here and now memory (LSTM)- based repetitive neural system. The exactness was assessed utilizing F-max and also accuracy/review. We found that the LSTM outflanked alternate models.

III. ALGORITHM

A. Reading

```
FFMPEG_BIN = "ffmpeg" #
FFMPEG_BIN = "ffmpeg.exe"
import subprocess as sp
command = [ FFMPEG_BIN,
                    '-i', 'myHolidays.mp4',
                    '-f', 'image2pipe',
                    '-pix_fmt', 'rgb24',
                    '-vcodec', 'rawvideo', '-'] pipe=sp.Popen(commandout = sp.PIPE, bufsize=10**8)
import numpy
# read 420*360*3 bytes (= 1 frame)
raw_image = pipe.stdout.read(420*360*3)
# transform the byte read into a numpy array
image =    numpy. fromstring (raw_image, dtype='uint8')image = image.reshape((360,420,3))
# throw away the data in the pipe's buffer.
pipe.stdout.flush()
command = [FFMPEG_BIN,
                  '-ss', '00:59;59',
                  '-i', 'myHolidays.mp4',
                  '-ss', '1',
                  '-f', 'image2pipe',
                  '-pix_fmt', 'rgb24',
                  '-vcodec','rawvideo', '-']
pipe = sp.Popen(command, stdout=sp.PIPE, bufsize=10**8)
command = [FFMPEG_BINARY,'-i', 'my_video.mp4', '-']
pipe = sp.Popen(command, stdout=sp.PIPE stderr=sp.PIPE)
pipe.stdout.readline()
pipe.terminate()
infos = proc. stderr.read()
```

B. Writing

```
command = [ FFMPEG_BIN,
                  '-y', # (optional) overwrite output file if it exists
                  '-f', 'rawvideo',
                  '-vcodec','rawvideo',
                  '-s',    '420x360', # size of one frame
                  '-pix_fmt', 'rgb24',
                  '-r', '24', # frames per second
                  '-i', '-', # The imput comes from a pipe
                  '-an', # Tells FFMPEG not to expect any audio
                  '-vcodec', 'mpeg'",
                  'my_output_videofile.mp4' ]
pipe = sp.Popen( command, stdin=sp. PIPE, stderr=sp.PIPE)
pipe. proc.stdin. write( image_array. tostring() )
```

Theabove algorithm (i.e) the reading and writing part helps to read the image that is been live displayed and the reading helps to detect the fatigue from the data present in the work

IV. CONCLUSION AND FUTURE ENHANCEMENT

Our proposed structure can be a significantly proficient framework to screen weakness level in a driver and can overwhelm over obstructions from ahead of time made systems by utilizing both eye and mouth fuse set and besides with a goliath pool of information. This structure requires just a camera to screen the driver's face, consequently decreasing its equipment cost. This structure works just on the required piece of face picture i.e. eyes and mouth, rejects the rest. This development lessens the pointless highlights in the summary of capacities. Eye and mouth affirmation is less right than the face territory, that is the reason we utilize the face disclosure to get the eye and mouth picture some piece of the driver. It makes the structure advanced regarding time and exactness. The division of system prepared unit into three units is a profitable strategy to alert the driver. It works with the end goal that the driver isn't subjected to sudden attack, which may incite a setback. Hereafter in future they can add on information for identifying individuals who are drinking and driving and in addition for the ones who utilized cell phones and smoke while driving.

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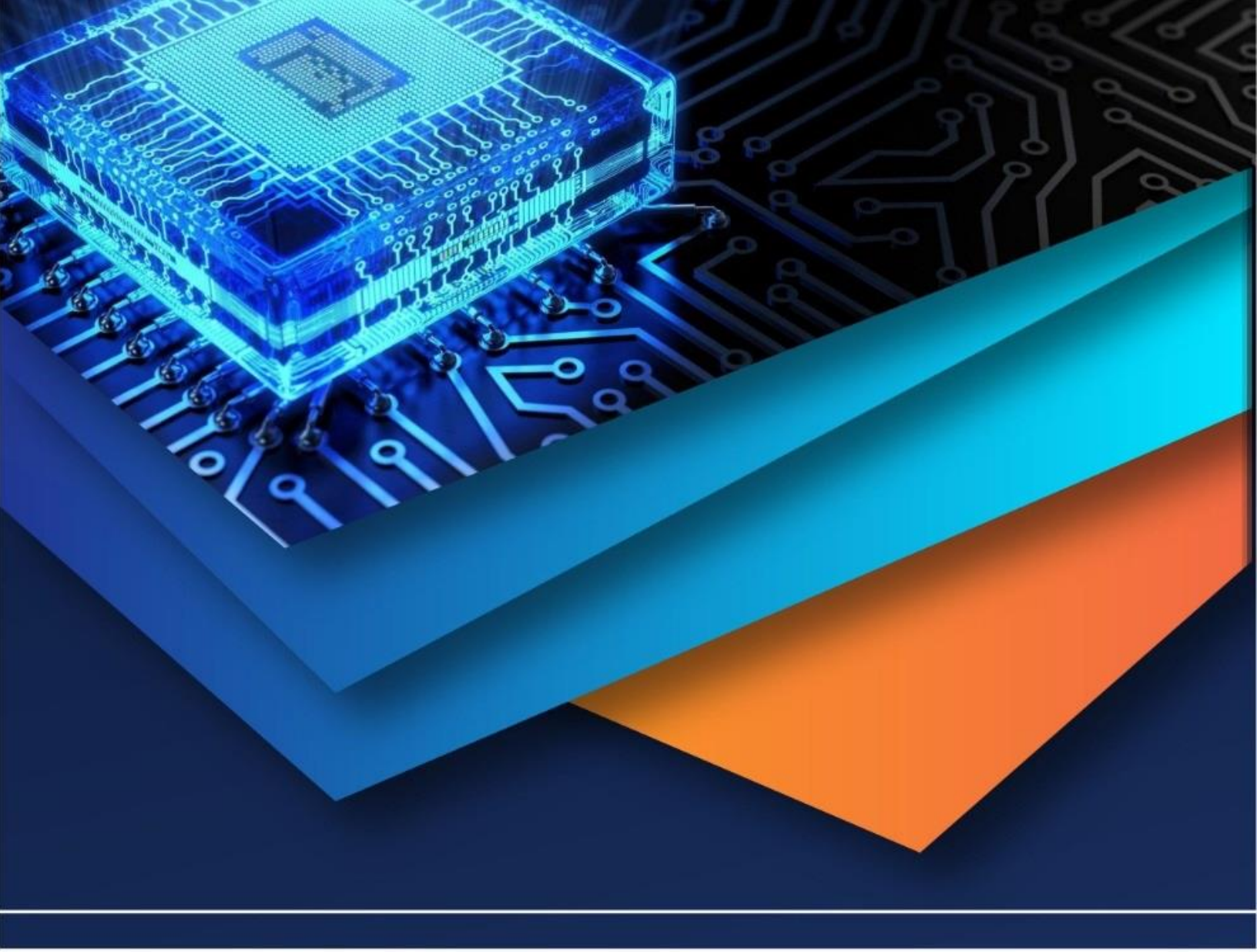

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