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# DRIVER DROWSINESS DETECTION, RELAXING AND ALERTING SYSTEM USING ARTIFICIAL INTELLIGENCE

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## ABSTRACT

Car twist of fate is the foremost purpose of death wherein round 1.three million humans die each year. The majority of those injuries are precipitated due to distraction or the drowsiness of the driver. Construction of high-velocity toll road roads had dwindled the margin of mistakes for the driving force. The infinite wide variety of humans drives for lengthy distance each day and nighttime on the toll road. Lack of sleep might also additionally cause a twist of fate. Drowsiness and Fatigue of drivers are among the big reasons of avenue injuries. Every year, they boom the quantities of deaths and fatalities accidents globally. To prevent such injuries we endorse a gadget which indicators the caretaker if the driving force feels drowsy. Facial landmarks' detection is used with assist of image processing of pix of the face captured in the usage of the camera, for detection of drowsiness.

**Keywords:** driver drowsiness detection transportation safety, behavioral actions.

## I. INTRODUCTION

In this undertaking, a module for Advanced Driver Assistance System is provided to lessen the wide variety of injuries because of drivers fatigue and as a result growth the transportation protection; this device deals with automated driving force drowsiness detection primarily based totally on visible facts and Artificial Intelligence. This undertaking proposes a set of rules to locate, track, and examine each of the driver's eyes and mouth to degree EAR (Eye Aspect Ratio) and MAR (Mouth Aspect Ratio), a scientifically supported degree of drowsiness related to gradual eye closure and mechanically generates alert. And additionally the emotion of the motive force is diagnosed the use of the emotion recognition set of rules and if the motive force is observed to be burdened the best song is played. If the air luggage is enabled because of a collision the GPS place of the motive force is dispatched. Mechanically to the caretaker through a SMS.Thus this undertaking allows to store lifestyles of human beings as properly as keep street protection the use of AI.

## II. PROBLEM STATEMENT

The driver's drowsiness brought on a visitors accident. Currently, transportation structures are important a part of mortal activities. Any motorist may be the targets of sleepiness even as driving, actually later too squat night time sleep and converted carnal sickness or thru prolonged trips. The consciousness of snooze decreases the motorist's degree of attentiveness producing dangerous situations and raises the chance of an occurrence of fates. Driver tiredness and weariness are among the vital reasons of toll road misfortunes. Each year, they escalation the quantity of demises and mortalities wounds globally.

## III. EXISTING SYSTEM

In the existing system, focuses on identifying the driver drowsiness using deep learning technology. The system identifies the driver drowsiness based upon the driver eye closure and yawning frequency of the mouth.

### DISADVANTAGES OF EXISTING SYSTEM

The existing system does not provide any alert to the caretaker or concerned person when the driver is tired. The system does not effectively recognize the emotion of the driver and give any solution at that moment. The system does not have an option to provide the caretaker an SMS of the location of the driver when he/she meets with an accident.

## IV. PROPOSED SYSTEM

The proposed device proposes the method to find, pathway, and analyze collectively the motorists eyes and mouth to degree EAR (Eye Aspect Ratio) and MAR (Mouth Aspect Ratio), a systematically strengthened quantity of tiredness related with comfortable eye closure and routinely generates alert. Also the emotion of the motive force is identified the usage of the emotion reputation set of rules and if the motive force is

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determined to be confused nice song is played. If the air luggage is enabled because of a collision, the GPS location of the motive force is dispatched routinely to the caretaker via a SMS. Thus, this project enables to shop existence of people as nicely as hold street protection the usage of AI.

**ADVANTAGES OF PROPOSED SYSTEM**

Alerts to the caretaker or concerned person when any accident takes place with GPS location.It Saves the life of people.And Reduces accidents due to drowsiness and stress.

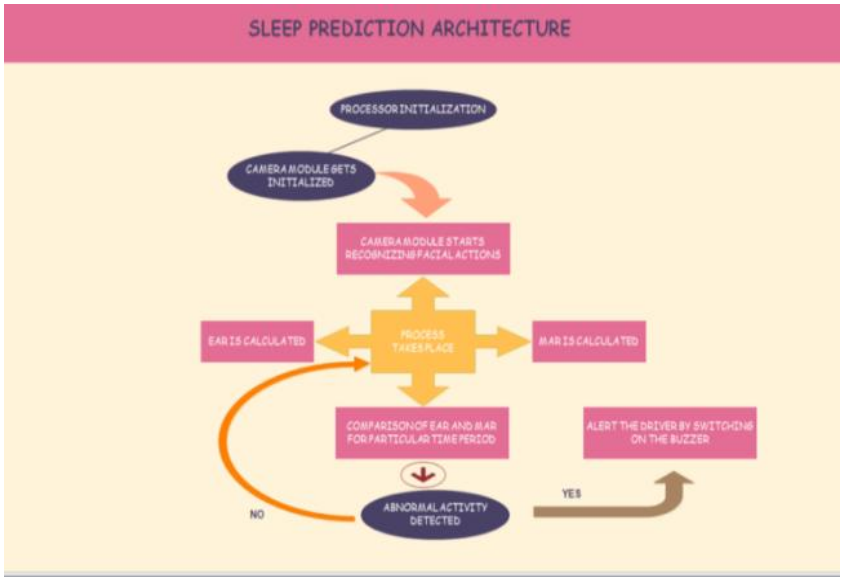


**Figure 1: Sleep Prediction Architecture**

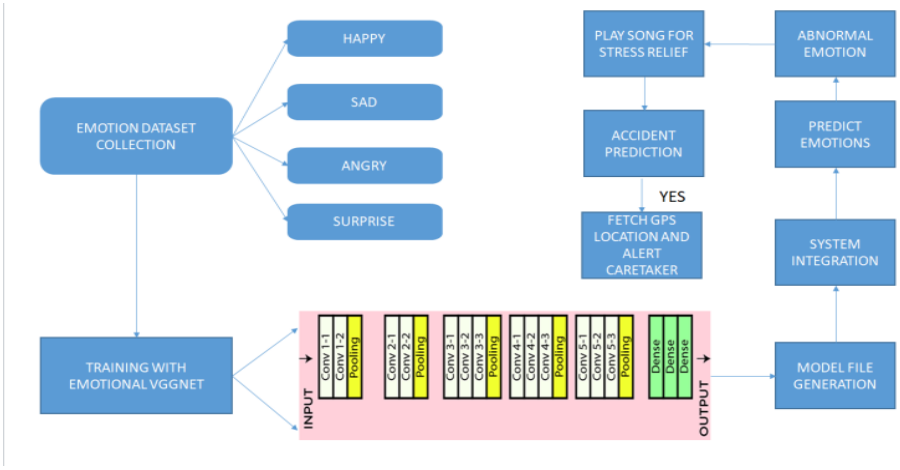


**Figure 2: Emotion Prediction Architecture**

## V. TYPES OF MODULES

A. Emotion Collection
B. EAR
C. MAR
D. Emotional Prediction

### A. EMOTION DATASET COLLECTION

In this, the dataset of the facial images are taken as preparation data set. This the genuine data set which is much needed for training the model to achieve different activities. After training, tuning, we have to select the prototypical for testing, this was helpful to practice the procedure and to identify the way to initiate the concepts especially in the domain mainly the neural networks, which acquire and yield results. It contains mutually console data, estimated output.

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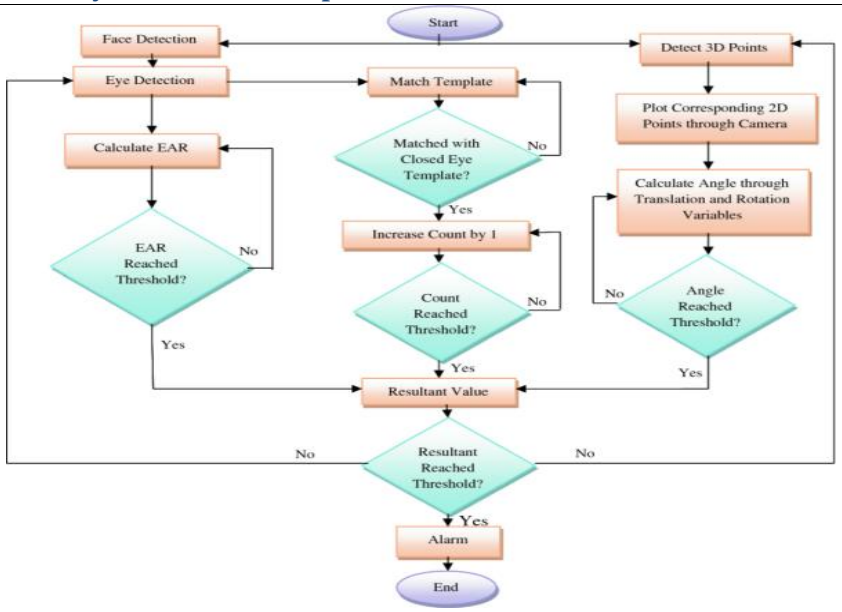


**Figure 3: Approach of real time drowsiness detection**

The data which is used for testing gives the result to examine how fine your algorithm was trained with the training data set.

## B. EAR & MAR

To guess the face, eye area in the live audio-visual stream, figure analyst is used. By calculating the eye aspect ratio the drowsiness is measured, the parameters are conceded to already defined dataset and facial innovative detection is carried out. In all the sequence of video, the eye innovations are positioned. The width and height of the eye is calibrated with aspect ratio. Similar to EAR, the mar is calculated and the convex hull is visualized. Counting yawns is the same as counting blinks: every time a new frame is captured, the counter is incremented when there is a yawn or reset when the time has passed.

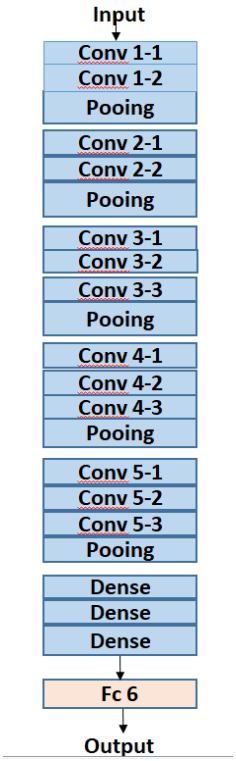


**Figure 4: VGGNet Architecture**

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### C. SMS API INTEGRATION

A SMS API is well-described software program interface which permits code to ship quick messages through a SMS Gateway. As the infrastructures for SMS communications and the net are commonly divided, SMS APIs are frequently used to bridge the space among telecommunications carrier networks and the broader net. SMS APIs are used to permit net packages to effortlessly ship and obtain textual content messages via common sense written for general net frameworks. We might be the usage of textual content neighbourhood SMS API for our integration which permits us to effortlessly combine our SMS offerings together along with your website, software program or CRM software in PHP, ASP, .NET, Java or some other language.

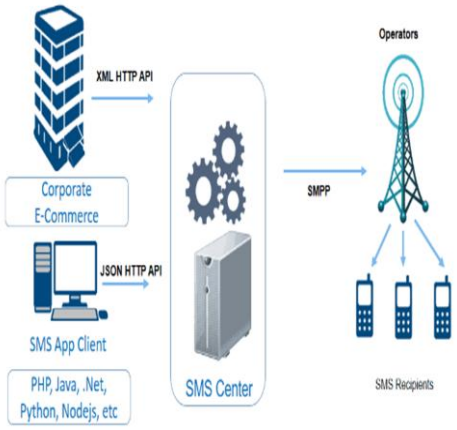


**Figure 5: SMS API Integration Architecture**

## VI. RESULTS AND DISCUSSION

To begin with, testing of the trained model, we can split our project into modules of implementation that is done. Dataset collection involves the process of collecting different face emotion dataset. Various datasets were collected and one example among the collected dataset can be found below


**Figure 6: Dataset Collection**

The below image shows the dataset collected for every emotion:

| | Standard emotion | Standard pixels |
|---|---|---|
| 1 | | |
| 2 | 0 | 70 80 82 72 58 58 60 63 54 58 60 48 89 115 121 119 115 110 98 91 84 84 90 99 110 126 143 153 158 171 169 172 169 165 129 110 113 1 |
| 3 | 0 | 151 150 147 155 148 133 111 140 170 174 182 154 153 164 173 178 185 185 189 187 186 193 194 185 183 186 180 173 166 161 147 133 1 |
| 4 | 2 | 231 212 156 164 174 138 161 173 182 200 106 38 39 74 138 161 164 179 190 201 210 216 220 224 222 218 216 213 217 220 220 218 217 2 |
| 5 | 4 | 24 32 36 30 32 23 19 20 30 41 21 22 32 34 21 19 43 52 13 26 40 59 65 12 20 63 99 98 98 111 75 62 41 73 118 140 192 186 187 188 196 |
| 6 | 6 | 4 0 0 0 0 0 0 0 0 0 0 0 3 15 23 28 48 50 58 84 115 127 137 142 151 156 155 149 153 152 157 160 162 159 145 121 83 58 48 38 21 17 7 |
| 7 | 2 | 55 55 55 55 55 54 60 68 54 85 151 163 170 179 181 185 188 188 191 196 189 194 198 197 195 194 190 193 195 184 175 172 161 159 150 |
| 8 | 4 | 20 17 19 21 25 38 42 42 46 54 56 62 63 66 82 108 118 130 139 134 132 126 113 97 126 148 157 161 155 154 154 164 189 204 194 168 18 |
| 9 | 3 | 77 78 79 79 78 75 60 55 47 48 58 73 77 79 57 50 37 44 56 70 80 82 87 91 86 80 73 66 54 57 68 69 68 68 49 46 75 71 69 70 70 72 72 7 |
| 10 | 3 | 85 84 90 121 101 102 133 153 153 169 177 189 195 199 205 207 209 216 221 225 221 220 218 222 223 217 220 217 211 196 188 173 170 1 |
| 11 | 2 | 255 254 255 254 254 179 122 107 95 124 149 150 169 178 179 179 181 181 184 190 191 191 193 190 190 195 194 192 193 196 193 192 188 |
| 12 | 0 | 30 24 21 23 25 25 49 67 84 103 120 125 130 139 140 139 148 171 178 175 176 174 180 180 178 178 182 185 183 186 186 178 180 172 175 |
| 13 | 6 | 39 75 78 58 58 45 49 48 103 156 81 45 41 38 49 56 60 49 32 31 28 52 83 81 78 75 62 31 18 19 19 20 17 20 16 15 12 10 11 10 23 36 65 |

**Figure 7: Dataset Representation**

After this the final implementation is done where the training process takes place and the results are obtained:

The below image shows the format of the modal files:

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**Figure 8: Dataset format**

The below image shows the emotion recognition in flow:

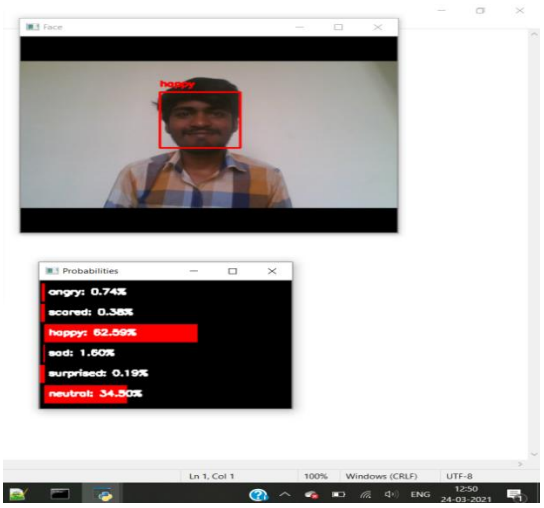


**Figure 8: Emotion Prediction**

The below image shows the drowsiness detection of the driver using EAR and MAR:

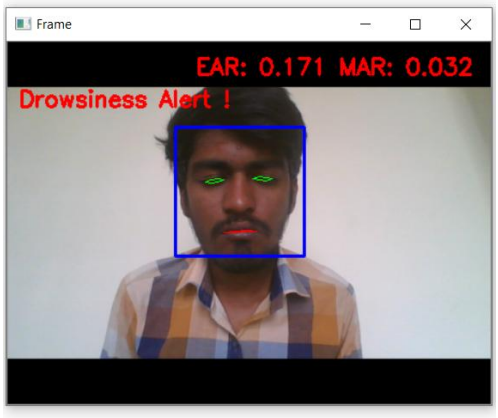


**Figure 9: Drowsiness detection**

The below image shows the yawning detection of the driver using EAR and MAR:

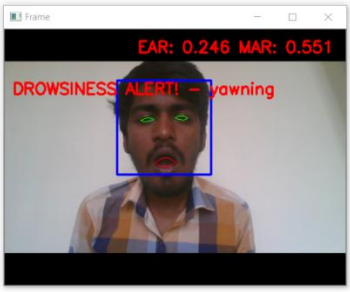


**Figure 10: Yawning detection**

On driver being found drowsy and yawning an SMS alert is sent to the caretaker. The below image shows the SMS alert sent to the caretaker:


**Figure 11: SMS Alert**

## VII. CONCLUSION

In this, we have identified the approaches accessible to regulate the sleepiness state of a motorist. However there is no generally acknowledged description for tiredness, the several descriptions and the explanations behind them were discussed. The several trials used to perceive sleepiness comprise eye, mouth condition behavioral actions also deliberated in aspect and the benefits and detriments of each portion were designated. Though the precision ratio of using behavioral measures to perceive tiredness is extraordinary, these are extremely invasive. This invasive environment can be determined by using GPS location. Hence, it would be value combining behavioral actions, for example Emotions, conditions of eye and mouth in the expansion of effective drowsiness detection.

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