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Drowsiness Detection using Emotion Detection based on Facial Expressions to Reduce the Accidents

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Abstract – *This project presents a method to automatically detect emotional duality and mixed emotional experience using Linux based system. Co- ordinates, distance and movement of tracked points were used to create features from visual input that captured facial expressions, head, face gestures and face movement. Spectral features, prosodic features were extracted using the web camera. Face API was used for calculation of features. A combined feature vector was created by feature level fusion and cascade classifier was used for emotion detection. Live participants and actions are to be used for recording simultaneous mixed emotional experience. As per calculated result system we generate the sound when driver any emotion driving the car. If we analysis then accident ratio is minimized on road.*

***Key Words*: Facial expressions, Eye detection, Drowsiness detection, Machine learning.**

1. INTRODUCTION

Emotion recognition has important applications in the field of medicine, education, marketing, security and surveillance. Machines can enhance the human- computer interaction by accurately recognizing the human emotions and responding to those emotions. Existing research has mainly examined automatic detection of single emotion. But psychology and behavioral science studies have shown that humans can concurrently experience and express mixed emotions. For instance, a person can feel happy and sad at the same time. In this research combinations of six basic emotions (happiness, sadness, surprise, anger, fear, disgust and neutral state) were used.

The aim of this study is to develop features that capture data from facial expressions to identify multiple emotions. In case of single-label classification problem each annotated feature-vector instance is only associated with a single class label. However, the multiple concurrent emotion recognition is a multi-label classification problem. In a multi-label problem, each feature vector instance is associated with multiple labels such as presence or absence of one of each six basic emotions. The multi-label classification is receiving increased attention and is being applied to a many domain such as text, music, images and video-based systems, security and bioinformatics.

This system examined recognition of emotional ambivalence and mixed emotions. Additionally, the study examined two concurrent emotions (emotion duality) to limit the scope of the research based on availability of scenarios. This was done so that the experimental design was realistic. The subjects could express dual emotions with ease and observers could annotate the data without ambiguity. This study implemented a multimodal emotion recognition system with multiple check box input to facilitate the annotation of concurrent emotions in the user interface software.

2. PROBLEM STATEMENT

Sometimes it is found that in case of emergency or in case of long drive it may happen that the car driver may undergo in bad mental state due to personal busy schedule. Sometimes they may be too tired and realize its own drowsiness. In that case we require a system that perfectly recognizes the facial expression of driver and that system should be so much perfect that it will analyze the situation automatically and should take the necessary action. So, recognition of emotion and mood of the driver is a key technology through which driver assistance system judges the safety States itself.

3. PROPOSED SYSTEM

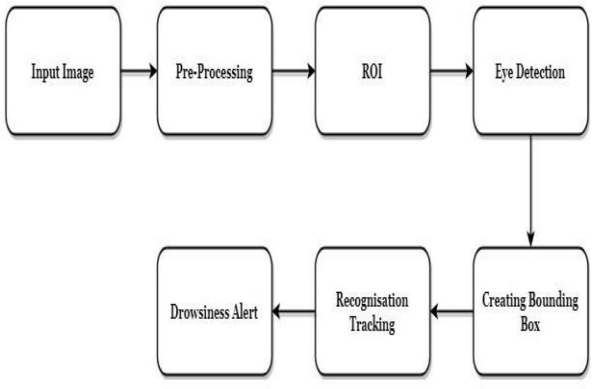

Fig 1. Block diagram

3.1 IMAGE PROCESSING MODULE

This module will aim at processing the acquired video images. The processing will target to detect the drivers face from the video stream; once the face is detected, the region of interest that is the eyes will then be located from the facial

features. The state of the eye will then be computed using the pixel intensity difference and a threshold value.

3.2 DROWSINESS DETECTION MODULE

This module determines the drowsiness levels of the driver based on the statistical information obtained the predecessor stage.

4. PROPOSED ALGORITHM

Face Recognition System The proposed model for face recognition system is the main modules used are:

Dataset Generation: In this stage, face dataset of the user is created, in which images of each user are taken and the attributes used are user ID and username. The Linear Discriminate Analysis performs a class specified dimensionality reduction. In order to find the combination of features that separates best between classes to within-classes scatter. Fisher faces heavily depends on the input data. The idea is simple: same classes should cluster tightly together, while different classes are as far away as possible from each other in the lower-dimensional representation.

1. Compute the average (Euclidean distance) of all faces.
2. Compute the average of each face.
3. Subtract (2) from (1).
4. Build two scatter matrices- within the class and between classes.
5. Generate a matrix, W, that maximizes the difference.
6. Columns of W are eigenvectors.
7. The project faces into the LDA-space.

4. RESULT AND DISCUSSION

Implementation of drowsiness detection with Python and OpenCV will done which includes the following steps: Successful runtime capturing of video with camera. Captured video was divided into frames and each frame were analyzed. Successful detection of face followed by detection of eye. If closure of eye for successive frames were detected, then it is classified as drowsy condition else it is regarded as normal blink and the loop of capturing image and analyzing the state of driver is carried out again and again. In this implementation during the drowsy state the eye is not surrounded by circle or it is not detected, and corresponding message is shown.

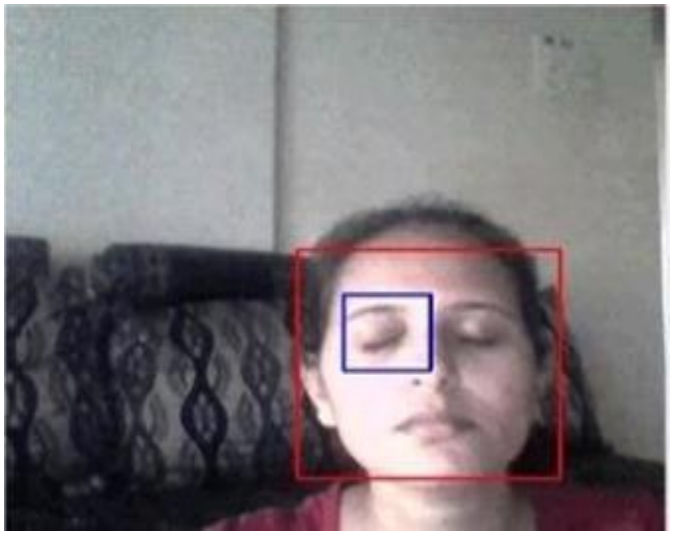

Fig 1. Simple example for drowsiness detection

5. CONCLUSION

This system work presents a comprehensive and simultaneous detection of Emotion and its application in all driving system. The proposed system is found a novel approach to assist the driver and safeguard the vehicle by switching into auto mode driving need. It is very well helpful for detection of an emergency to switching vehicle control from manual to automatic mode.

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