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Drowsiness Detection using emotion Detection Based on Facial Expression to reduce road Traffic 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 minimize on road.

Keywords: Emotion detection, Facial expression, drowsiness detection, machine learning.

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I. 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 domains 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.

II. 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.

III. LITERATURE SURVEY

[1] S. Patwardhan, "Augmenting Supervised Emotion Recognition with Rule-Based Decision Model", arXiv, 2016. Description: In this paper, we investigate the effect of transfer of emotion-rich features between source and target networks on classification accuracy and training time in a multimodal setting for vision based emotion recognition.

[2] M. Liu, R. Wang, S. Li, S. Shan, Z. Huang, and X. Chen. Combining multiple kernel methods on riemannian manifold for emotion recognition in the wild. ICMI, 2014. Description: Emotional expressions of virtual agents are widely believed to enhance the interaction with the user by utilizing more natural means of communication. However, as a result of the current technology virtual agents are often only able to produce facial expressions to convey emotional meaning.

[3] A. S. Patwardhan, "Augmenting Supervised Emotion Recognition with Rule-Based Decision Model", arXiv, 2016. Description: This paper presents a method to automatically detect emotional duality and mixed emotional experience using multimodal audio-visual continuous data. Co-ordinates, distance and movement of tracked points were used to create features from visual input that captured facial expressions, head, hand gestures and body movement. Spectral features, prosodic features were extracted from the audio channel.

[4] SE. Kahou, C. Pal, X. Bouthillier, P. Froumenty, C. Glehre,R. Memisevic, P. Vincent, A. Courville, Y. Bengio, RC. Ferrari and M. Mirza. Combining modality specific deep neural networks for emotion recognition in video. Proceedings of the 15th ACM on International conference on multimodal interaction, 2013. Description: This paper presents the initial implementation of a system of multimodal recognition of emotions using mobile devices and the creation of an affective database through a mobile application. The recognizer works into a mobile educational application to identify user's emotions as they interact with the device.

[5] A. S. Patwardhan and G. M. Knapp, "Multimodal Affect Analysis for Product Feedback Assessment," IIE Annual Conference. Proceedings. Institute of Industrial Engineers-Publisher, 2013. Description: In this paper, we investigate the effect of transfer of emotion-rich features between source and target networks on classification accuracy and training time in a multimodal setting for vision based emotion recognition.

IV. PROPOSED SYSTEM

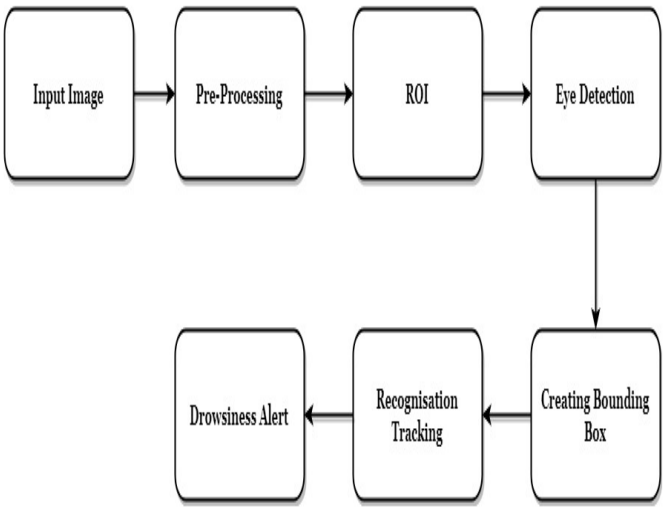


Fig 1. Block diagram

IMAGE PROCESSING MODULE

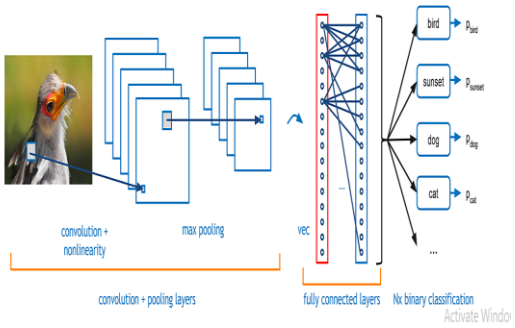
This module will aim at processing the acquired video images. The processing will target to detect the drivers face from the video stream; once the face is detected,

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.

DROWSINESS DETECTION MODULE

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

V. ALGORITHM PROCESS



Step 1: Convolution Operation

In this step, we will touch on feature detectors, which basically serve as the neural network's filters. We will also discuss feature maps, learning the parameters of such maps, how patterns are detected, the layers of detection, and how the findings are mapped out.

Step 2: Pooling

In this part, we'll cover pooling and will get to understand exactly how it generally works. Our nexus here, however, will be a specific type of pooling; max pooling. We'll cover various approaches, though, including mean (or sum) pooling. This part will end with a demonstration made using a visual interactive tool that will definitely sort the whole concept out for you.

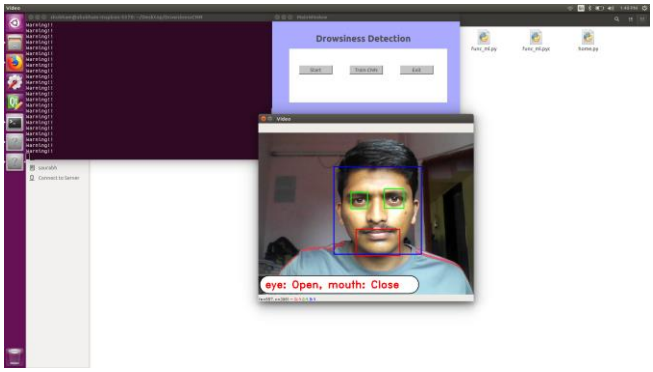
Step 3: Flattening

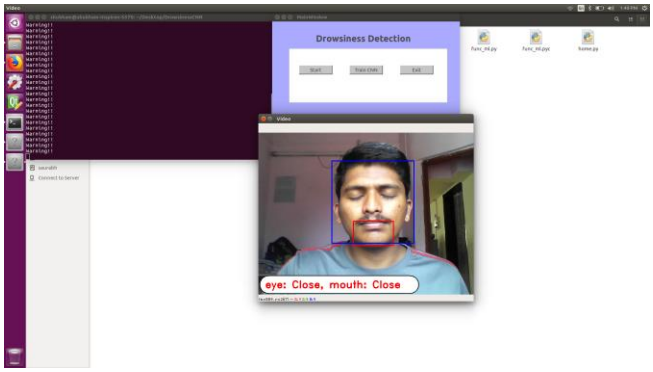
This will be a brief breakdown of the flattening process and how we move from pooled to flattened layers when working with Convolutional Neural Networks.

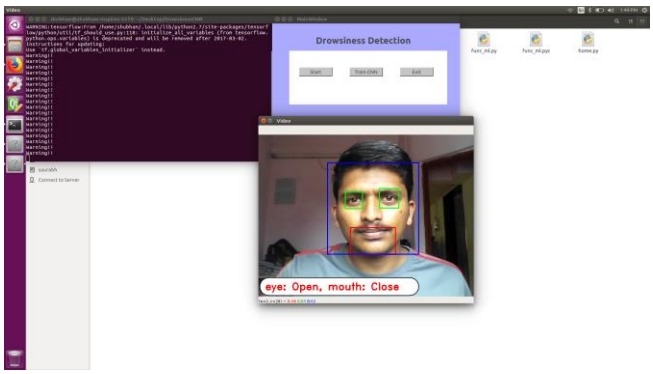
Step 4: Full Connection

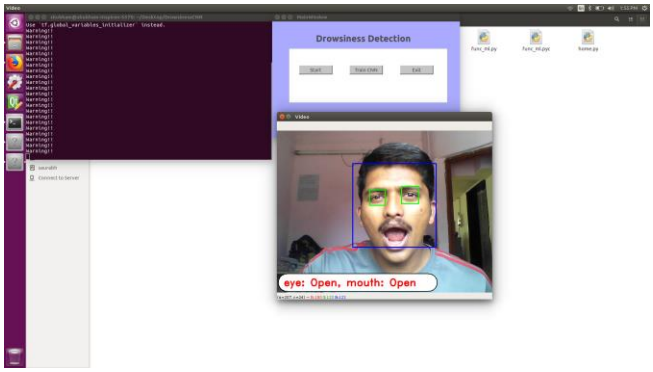
In this part, everything that we covered throughout the section will be merged together. By learning this, you'll get to envision a fuller picture of how Convolutional Neural Networks operate and how the "neurons" that are finally produced learn the classification of images.

VI. RESULT









VII. CONCLUSION

This system work presents a comprehensive and simultaneous detection of Emotion and its application in car 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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[1] A. S. Patwardhan, "Augmenting Supervised Emotion Recognition with Rule-Based decision Model", arXiv, 2016.

[2] A. S. Patwardhan and G. M. Knapp, "Affect Intensity Estimation Using Multiple Modalities," Florida Artificial Intelligence Research Society Conference, May. 2014.

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[4] SE. Kahou, C. Pal, X. Bouthillier, P. Froumenty, C. Glehre,R. Memisevic, P. Vincent, A. Courville, Y. Bengio, RC. Ferrari and M. Mirza. Combining modality specific deep neural networks for emotion recognition in video. Proceedings of the 15th ACM on International conference on multimodal interaction, 2013.

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