

REAL TIME EYE BLINK DETECTION USING COMPUTER VISION

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REAL TIME EYE BLINK DETECTION USING COMPUTER VISION

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Abstract-

New methods are proposed for identifying distracted drivers in real time and alerting drivers with sound warnings to prevent traffic accidents. The system takes in data from a camera and an audio sensor to identify and categories forms of driver distraction like texting while driving or falling asleep at the wheel. The camera records the driver's visual field and processes the data to identify signs of distraction. The driver's use of a phone or other electronic device can be tracked using an audio sensor. When the device detects a distracted driver, it sounds a siren to get their attention back on the road. The proposed approach aims to lessen the incidence of accidents brought on by inattentive motorists. As an added bonus, the system is developed to be inexpensive and simple to install in preexisting automobiles. The system is intended to be engaged by the driver or automatically through the use of various sensors and incorporated into the vehicle's onboard computer system. The system was also created to work with a wide variety of automobiles, lorries, and buses. Both theoretical and practical evaluations of the methodology demonstrate the system's viability in lowering the number of accidents caused by distracted drivers. The proposed method has the potential to become an effective weapon in the battle against distracted driving and to contribute to the mitigation of traffic accidents.

Keywords – CNN, Currency, Deep Learning

I. INTRODUCTION

The term "electronic commerce" is used to describe the exchange of goods and services that occurs over the internet and other forms of digital communication. With the proliferation of e-commerce, business dealings will be simplified, accelerated, and made more efficient. The expansion of the market will benefit consumers in a number of ways. These include increased access to a broader range of products and a more streamlined process for locating information that is tailored to their unique needs. However, in today's competitive business environment, when every dollar counts, it is more crucial than ever to deliver exceptional customer service. Finding out as much as possible about a consumer and their preferences is one of the finest methods to meet a customer's wants while still offering value. care for them as though they were people in their own right. Your customers need to know that you have a unique connection to the firm that makes you stand out from the crowd. Recommender systems are a useful tool that may help find answers to many of today's pressing issues. effort on one's own part is essential. Most of the data utilized by a recommender system comes straight from the customer. This could contain his evaluations, as well as many demographic specifics. also a great deal of background data about the things he's looking for. The recommender system may utilize a single

technique or a set of techniques to generate result. For a recommendation system to be reliable, it must fully grasp the user's preferences, requirements of the customer and consideration of individual preferences. The process of analyzing and deciding on the pleasantness of a smell is analogous to that of discussing works of art that are less subject to interpretation and intricacy, such as movies, records, and novels. Buyers often have a hard time understanding what makes a product special. Since consumers' preferences for these inherently subjective things change often depending on how they are feeling, it is not enough to try to comprehend a person based on the traditional profile that they fit alone, while taking into account these fresh constraints. Our number one goal is to figure out how to fix these problems, therefore we will. It is suggested that businesses use an Emotion-based Recommender System (or E-MRS) that can recall individual consumers' preferences, on the basis of their current mood. The ability to control one's emotions is essential since they have a significant impact on our ability to act rationally and sensibly. Constantly seek out the feedback of potential end-users and incorporate it into the design process. The following is the structure of this document. In this article, we'll look at the development of this field of research by, among other things, analyzing current suggestion generation strategies, as well as a few recommended movies. In this chapter's third section, we'll talk about how emotion is defined and identified in addition to the basic concept of emotion. In the next section, we'll talk about how the E-overall MRS is structured, a method for recommending movies that takes into account the user's current mood. This Both the strategy and the UML modelling of

our operational environment are covered in this section of the article. The process of determining whether or whether a claim is true, which may You might be able to identify a contrast between our approach and that of the competition

II LITERATURE REVIEW

[1] Despite variations in facial pose, detection accuracy can be improved by combining region tracking with Viola-Jones. Several methods have been presented for detecting blinks. Many different types exist, such as those involving optical flow, template matching, and contour analysis on difference images.

[2] The correlation coefficient is used repeatedly to teach a template for open and/or closed eyes in the template-matching technique. If the correlation coefficient drops below the threshold value, a new starting point is generated. If the correlation coefficient value between two consecutive frames falls below a threshold value, this indicates a blink.

[3] In order to identify eye blinks, a template matching technique based on a histogram of local binary patterns (LBPs) was implemented. Then, multiple still photographs are used to generate a template of an open eye. After a template is established, the Kullback-Leibler divergence is used to compare the histogram of local binary patterns (LBPs) from the eye region of following frames to the template. Using SG and the top hat operator, we may remove unwanted components of the waveform at the output. The test peaks are then identified as

possible eye blinks. Using unique settings for each dataset, this technique achieved a 99% identification rate on both the ZJU and Basler5 datasets. In, the weighted gradient descriptor (WGD) was initially implemented.

[4] To verify the eye region reported by cascade models, this work introduces a new localization approach. The method relies on determining the time-varying partial derivatives of each eye pixel. An input waveform is found by determining the y-coordinate difference between two weighted vectors, one generated in each orientation (up and down).

[5] The eye's opening and closing are represented by the waveform's negative and positive peaks, respectively. Local maxima and minima represent eye blinks after noise filtering. The best results for certain datasets using various parameters are reported here. The detection rate on the Basler5 and the ZJU datasets was reported to be around 90% and 98.8%, respectively, and a fresh dataset of five people captured with a 100 fps Basler camera was also introduced in.

[6] Frame differencing requires two or more consecutive frames for motion-based eye blink recognition algorithms, rather than relying on appearance criteria. Analysis of the degree of angular similarity in orientation between facial and ocular motion vectors is presented using optical flow.

[7] Instead than using video recordings, this technique has been tried on a collection of photographs, with 96.96% accuracy. Drutarovsky and Fogelton also

employed the Lucas-Kanade tracker to follow the eye. An estimated 255 trackers were deployed across a 3x3-cell area of the eye. The input waveforms for a state machine are then derived by computing motion vectors for each cell. In order to identify an eye blink, a state machine looks for a downward movement of the eyelid followed by an upward movement within 150ms. In this research, the Eyeblink8 dataset, notable for its lifelike face mimicry of recorded humans, was introduced. Eyeblink8 has an 85% recall compared to ZJU's 73%.

[8] In contrast, segmentation techniques such as those based on dynamic shape models are another viable option (ASMs). The 98 facial markers employed in the study were obtained with the help of dynamic shape models. Each eye has 8 markers used to approximatively determine its shape. Average eye height divided by inter-eye distance is a good proxy for how much one is able to open one or both eyes. If the degree of eye openness goes from above the detection threshold (thl) to below the detection threshold (ths), then an eye blink has occurred.

[9] This approach uses a constant threshold for blink detection, which means it is ineffective for recognising more nuanced facial emotions in real-world videos. ASMs are not ideal for clinical applications or large numbers of participants because to the extensive training period required for each individual. Robust real-time facial feature trackers that track a set of interest points on a human face have recently been presented as an improvement over existing systems that are fragile in the face of variations in illumination, image resolution, and face rotation.

[10] Extensive testing has shown that these trackers are reliable and accurate over a wide range of conditions, including but not limited to lighting changes, facial expressions, and head movement. In this research, we advocate for a straightforward method that makes use of a recently developed facial feature detector to identify blinks. Distance between the upper and lower lids is a good indicator of how wide one's eyes are open. Using a frame-by-frame series of eye openness estimations, we can filter the signal using an SG filter and look for peaks that stand in as eye blinks.

III DESCRIPTION OF THE PROPOSED MODEL/SYSTEM

Module 1: DATASET TRAINING

From the outset, data from a massive dataset is preprocessed. In this step, missing and null value records are removed, and the data is cleaned and pre-processed. Next, we'll pair new data with the pre-existing dataset to teach the System to offer more precise information more efficiently. A software may learn how to effectively use tools like neural networks to learn and deliver complex outcomes with the aid of training data.

Module 2: ALGORITHM BUILDING USING YOLO

When it comes to identifying a flutter of the eyelid, we rely on the YOLO algorithm. To ensure precision, a real-time eye-blink detection method proposes calculating an Eye Aspect Ratio (EAR) for each eye independently. Each eye is represented by a set of six (x, y)-

coordinates that radiate outward from the left corner of the eye (as seen by the observer) in a clockwise direction. The precise x, y coordinates would be analyzed and looked at. It will analyze in both dimensions and keep a clockwise eye on everything. Eye landing spots are correctly analyzed by computer vision.

Module 3: EYE BLINKING DETECTION AND NUMBER OF TIMES EYE BLINKING COUNT DETECTION

The process starts with a webcam picture of a person's face being processed by facial recognition software. The algorithm then employs a facial landmark approach to locate the eye, from which it derives the Eye Aspect Ratio (EAR). It chooses landmarks for the horizontal and vertical positions of the eyes, measures the distance between them, and determines the blink ratio for each by dividing the horizontal distance by the vertical distance. The suggested system has been tested and reviewed to see whether it meets the needs. It does this by keeping track of how many times an individual's eyes blink. Accurate detection relies on reliable eye tracking, which suffers greatly when either the eye being watched is missing or the eye isn't functioning well. Mobile apps, desktop software, websites, and more may all benefit from including eye tracking and blink detection technology.

RESULT

Distracted driving is a significant cause of road accidents, resulting in a high number of injuries and fatalities worldwide. With the increasing prevalence of electronic devices and technology, drivers are more prone to distractions while driving. Therefore, there is an urgent need for cost-effective and efficient solutions to detect and prevent distracted driving.

This paper proposes a real-time eye blink detection and counting system, coupled with audio sensor detection of electronic device usage, as a proactive measure to combat distracted driving. The system takes data from a camera and an audio sensor to identify and categorize forms of driver distraction like texting while driving or falling asleep at the wheel. When a distracted driver is detected, the system promptly sounds an alarm to alert the driver and prevent potential accidents.

The proposed system is inexpensive and simple to install in pre-existing automobiles, making it a versatile solution that can work with a wide range of vehicles. The practical evaluations of the methodology indicate the system's effectiveness in detecting distracted drivers, and it has the potential to become an effective tool in mitigating traffic accidents caused by inattention.

The ability of the system to accurately identify and count the number of eye blinks made by the driver, as well as detect the use of electronic devices such as phones while driving, is a significant advantage. Eye blinks are a sign of drowsiness or fatigue, and electronic devices are a common distraction while driving. By detecting these signs and sounding an alarm, the system can alert drivers to

potential dangers and help prevent accidents.

Overall, the proposed system is a valuable contribution to road safety and has the potential to save countless lives. It provides a proactive measure to combat distracted driving and can be integrated into the vehicle's onboard computer system. The proposed method has the potential to become an effective weapon in the battle against distracted driving and to contribute to the mitigation of traffic accidents.

CONCLUSION

In conclusion, the proposed methodology for real-time detection of distracted driving is a promising solution for preventing vehicle mishaps caused by driver distraction. The system utilizes a combination of camera and audio sensor inputs to detect and classify driver distraction in real-time. Data preparation, model training, model assessment, and model deployment are only few of the processes in the technique. Data preprocessing involves collecting and annotating a large dataset of camera and audio sensor recordings from various vehicles under different driving conditions. Model training involves using a subset of the labeled dataset to train a machine learning model that can classify the driver's state as distracted or not based on the input from the camera and audio sensor. Model evaluation is used to measure the model's performance and assess its ability to accurately detect and classify driver distraction. Model deployment involves installing the necessary software and hardware on the vehicle, such as the onboard computer system, camera, and audio sensor. The system can also be integrated with other safety systems in the vehicle and configured to send real-time

data to a remote monitoring center for further analysis. The proposed methodology has the potential to significantly reduce the number of vehicle mishaps caused by driver distraction and improve road safety.

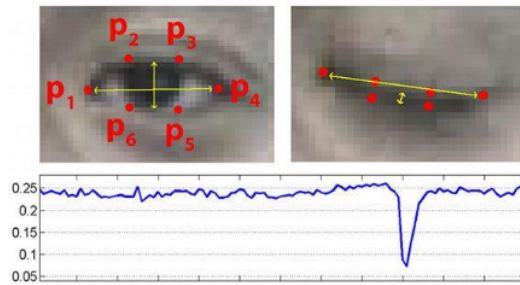


Fig 1.1 Sample Output

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