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Drugged Eye Detection Using Image Processing

Mrs.M.Premalatha[1], A. Heymath Kumar[2], M.Manoj kumar[3], P.Pavithran[4], K.Shatyadeep[5]
[1]*Assistant Professor,* [2,3,4,5]*UG Scholar, Department of Computer Science and Engineering, Nandha Engineering College (Autonomous), Erode, Tamilnadu, India*

Abstract: ***Drugs are a major problem in economic and many losses in worldwide. In this project, an image processing approach is proposed for identifying drugged eye based on convolutional neural network. According to the CNN algorithm, eye image details are taken by the existing packages from the front end used in this project. However, it can take a few moments. So, this proposed system can be used to identify drugged eyes quickly and automatically. The eye images dataset are taken from Kaggle. These images are taken as a training set for this drugged eye detection. This proposed approach is composed of the following main steps that getting input image, Image Preprocessing, identifying reddish places, highlight those affected places, Verifying training set, showing result. Few types of eyes like drugged socially may missed to identify. This approach was tested according to drugged eye type and its' stages, such as drug consumed and not consumed. The algorithm was used for detecting the white area of eye present in given input image. Images were provided for training, such as drugged eye images and normal eye images. Before the image processing, images were converted to color models, because of find out the most suitable color model for this approach. Local Binary Pattern was used for feature extraction and Support erosion method was used for creating the model. According to this approach, drugged eyes can be identified in the average accuracy of 95%.***

I. INTRODUCTION

The classical approach for detection and identification of drugged eyes is based on the naked eye observation by the experts. In some developing countries, consulting experts are expensive and time consuming due to the distant locations of their availability. Automatic detection of drugged eye is essential to automatically detect the symptoms of drug consumers.

Drugs can cause major losses in many industrial fields. To know what control factors to take next year to avoid losses, it is crucial to recognize what is being observed. However, detection of defects is still problematic due to natural variability of white area of eye in different types of eye, high variance of defect types, and presence of red area.

The studies of eye can be determined by apparent patterns of specific types and it is critical to monitor reddish area within an eye. Deep learning, also called neural networks, is a subset of machine learning that uses a model of computing that's very much inspired by the structure of the eye.

Deep learning is already working in Google search and in image search; it allows you to image-search a term like 'hug.' It's used to getting you Smart Replies to your Gmail. It's in speech and vision. It will soon be used in machine translation, I believe." said Geoffrey Hinton, considered the Godfather of neural networks. Deep Learning models, with their multi-level structures, as shown above, are very helpful in extracting complicated information from input images.

Convolutional neural networks are also able to drastically reduce computation time by taking advantage of GPU for computation which many networks fail to utilize. Image classification using CNN is most effective. First and foremost, we need a set of images. In this case, we take images of eyes, as our initial training data set. The most common image data input parameters are the number of images, image dimensions, number of channels, and number of levels per pixel. The objectives of the study are:

1) To give eye image input as well as with drug consuming can be given for finding the name of disease.
2) To initiate the given input image for image processing.
3) To convert the RGB image into binary format to make sure it is drugged.
4) To highlight the reddish area of eye.
5) To apply the training image set to find the drug consumed eye.
6) To provide accurate result about the given input image.

II. RELATED WORKS

In this paper [1] the authors stated that over the past two decades, biometric recognition has been exploded into a plethora of different applications around globe. This proliferation was attributed to high levels of authentication accuracy and user convenience which biometric recognition systems afford end-users.

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However, in-spite of the triumph of biometric recognition systems, there are a count of outstanding problems and concerns pertaining to various sub-modules of biometric recognition systems that develop an element of mistrust in their use - both by scientific community and also public at large. Some of the problems contain:

1) Questions related to the system recognition performance,
2) Security (spoof attacks, adversarial attacks, template reconstruction attacks and the demographic information leakage),
3) Uncertainty over the bias and fairness of systems to all users,
4) Explainability of seemingly black-box decisions made by the most recognition systems,
5) Concerns over the data centralization and the user privacy.

In this paper, the authors provided an overview of each of the above aforementioned open-ended issues. They surveyed work that has been conducted to address each of the concerns and highlight these issues requiring future attention. Finally, the authors provided insights into how biometric community can address the core biometric recognition systems design problems to better instill trust, fairness, and the security for all. They concluded that accurate as well as reliable automatic person identification was becoming a necessity in a host of applications including the national ID cards, access control, border crossings, payments, etc. Biometric recognition stands as perhaps the well equipped technology to meet the need. Indeed, biometric recognition systems have now matured to point at which they can surpass the human recognition performance or the accuracy under certain conditions.

However, many unsolved problems remain prior to the acceptance of biometric recognition systems with trustworthy. In this paper, it is highlighted 5 major areas of research that must be worked in order to establish the trustworthiness in biometrics: a) Performance Robustness and Scalability, b) Security, c) Explainability, Interpretability d) Biasness and Fairness and e) Privacy.

In each of these areas, the authors have provided a problem definition, explained importance of the problem, cited the existing work on each respective topic, and also concluded with suggestions for future research. By better addressing each of the major areas, biometric recognition systems can be made not only trustworthy, but also accurate. These benefit the researchers behind recognition systems, general public using the systems, and the policy makers regulating the systems.

One practical potential avenue for encouraging more trustworthy biometric recognition systems is the “The Grand Challenge in Trustworthy Biometrics”. Perhaps such a challenge, hosted by the government agency, say NIST, evaluates the biometric recognition systems on each of five categories listed above. Systems that met certain the quantitative thresholds for these 5 categories could be certified as “trustworthy”. In this manner, end-users know not only how accurate the system is, but also how the “trustworthy” it is.

In this paper [2] the authors stated that shift work can be a risk factor for the number of various somatic and psychological health conditions, particularly sleep disorders.

Shift workers would sleep less than day workers, and 20–42% of them affected from difficulties initiating as well as maintaining sleep, that result in reduced capacity to work and social life. A common coping strategy might be alcohol usage that presents the health and safety hazard as it further impairs quality of sleep and exacerbates sleepiness in workplace. This review aimed to assess extent of such possible connection problems. They performed a systematic search of scientific literature on the shift work and the alcohol consumption in PsycInfo, PubMed, and Cochrane Library. Only original studies comparing the shift workers with the non-shift workers are included. The recommendations of Preferred Reporting-Items of Systematic Reviews and Meta-Analyses are followed.

14 articles are included in this review. 6 studies report some kind of connection between shift-or night work, alcohol consumption, especially as the sleep aid. Conflicting and/or negative results were reported by thee studies. Discussed that shift work, especially night working and in shifts rotation, are associated with binge drinking disorder in numerous professions. The reasons for the pathological consumption of alcohol are self-medication of sleep problems and/or coping with the stress and psychosocial problems typical for shift works. Nurses aged over fifty years represent one of the important risk groups. These results are important for preventive programs against sleep disorders which include measures other than drinking alcohol as a sleep aid in the workplace of the shift workers.

They concluded that sleep disorders, fatigue at the work, reduced capacity of social life, and the other psychosocial stress symptoms are the common problems among shift-workers [6–10, 15]. To cope with these problems, the shift workers abuse alcohol in higher rates than normal day workers. Four of the reviewed studies found that heavy drinking or alcohol usage as a sleep aid is correlated to the shift work in various professions like nurses, emergency physicians, and industrial workers. The definition of heavy drinking and the short-term risky levels in the papers vary from up to seven beverages in a row for a man and over five for a woman.

In this paper [3] the authors stated that the personal identification approaches which use iris images receive increasing attention in biometrics fields.

Various methods were being presented in this literature and those based on the encoding phase of texture information were suggested to be the most promising.

Still, there has not been any step to combine those approaches for achieving further improvement in performance terms. This paper presented a comparative study of performance from iris authentication using Haar wavelet, Log-Gabor, DCT and FFT based features.

In this paper [4] the authors stated the primary objective of that paper was to propose the complete methodology for eye live-ness detection based on pupil dynamics. This method may serve as the component of presentation attack detection in iris recognition system, making it more secure. Due to the public databases lack that would support that research, they have built their own iris capture devices for registering pupil size changes under normal visible light stimuli, and then registered 203 observations for 25 subjects (52 different irides), each containing 750 iris images taken every 41 ms.

In this paper [5] the authors stated the temperature distribution on sober eyes and drunk persons was studied and preliminary results were given regarding temperature changes.

It is observed that using simple image processing algorithms as well as histogram modification techniques that temperature difference between the sclera and iris increases if somebody consumes alcohol. Iris will become darker, which means that the temperature decreases when compared to sclera temperature.

Biometrics is the research area with various publications in the recognition or persons identification. Applications were met in financial transactions, medicine, face identification and also mainly in security problems. Research was carried out in various biometric problems like facial expression classification, face/fingerprint recognition and iris identification with high rate of success.

III. METHODOLOGY

In the existing system, normal eye infections are considered then marked. There is no algorithm used for finding whether it is drugged or not. The image processing based existing methodologies are made out of accompanying some state of the art color/texture features which are extracted from test images, color/texture features are combined together and then image CNN classifier is used to disease classification. Drawbacks are:

1) Accuracy is very less here.
2) Time taken for processing the image is high.
3) Drug consumed eyes are not found with high accuracy.
4) Missed options to process high pixel images.

For the drugged eye detection issue, precise image segmentations are required; otherwise the features of non-reddish region dominate over the features of reddish region. In this approach CNN based image processing is require/preferred for detecting the red region which is the only infected part.

After processing input images, features are extracted from processed image of the eyes. Finally, training as well as classification is performed and exact result has been provided.

There are various phases in this methodology. Those are a) Image Acquisition, b) Image Preprocessing, c) Image Segmentation, d) Applying training dataset, e) Experimental results.

A. Flow Diagram

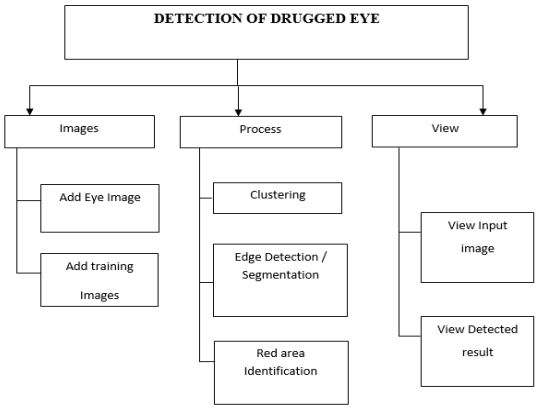


FIG 3.1

B. Image Acquisition

Here in this phase, sample images are collected, which are required to train classifier algorithm and build classifier model. Reddish passion eye variety was selected for taking sample images. Because the yellowish variety is widely not available, for detecting the drug in the country, healthy/affected eye images were taken by using mobile phone camera and used to both training/testing the classifier algorithms. Images are taken in various angles, under different lighting and environmental conditions. The standard JPEG format was used to store the images. In this study here, images are collected from different regions. Eyes infected by the reddish disease that had been included in the collected images.

C. Image Preprocessing

After image acquisition, image processing was done for improving the image quality. All original eye images were stored in single folder. Those images were named as we like the wish can take any value of number. Only horizontal images were rotated by ninety degrees and resized by 200x300 pixels.

The vertical images were resized by 200x300 pixels and when width and height of the image are equal, and then those images were resized to 250x250 pixels. When image size is too large, processing task takes more time. After that, one of the noise reduction techniques was used for removing the noises from images and then increased images sharpness. Then, all preprocessed images are saved in that folder.

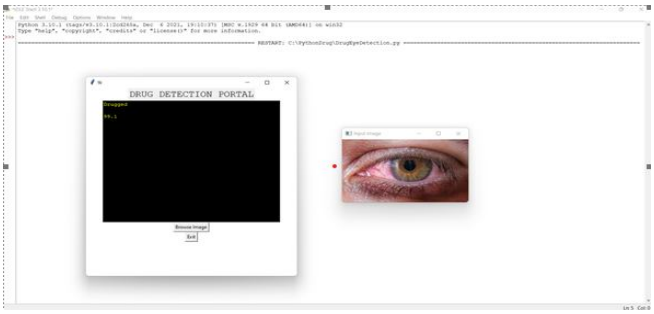


FIG 3.2

D. Image Segmentation

The third phase of the above methodology is the image segmentation. As the first step, all the preprocessed images are converted into L * a * b, HSV, Grey color models and then kept one in original way (RGB). Because identifying suitable color model to preprocess is one of the outcomes of the research. After that, image is converted to binary format (black/white). This format values are then clustered using CNN algorithm. According to the algorithm used image segmentation is done.

E. Applying Training Set

The fifth phase of the above methodology is applying training set images. The segmented output is done, which are created using feature extraction. However, two image sets were created to do the experiments. Preparation of the image sets is discussed. Field expertise support is taken for categorization of images and each image is selected from categorized sets of an image randomly.

IV. EXPERIMENT RESULTS AND FINDINGS

After applying the training set images, two base folders were used for identifying drugged eyes according to its accuracy. These files are called as two classes' dataset. Another way is counting number of reddish places to identify drug consumed eye according to its stage. This method is called as alternative method.

Every training and testing time, rows of training files were shuffled randomly for increasing the accuracy of the model. Each training file was verified and tested in five times and accuracy was taken. Average of these accuracies is taken as accuracy of each model. Using this image dataset, two types of categories were found. Such as drugged eye and not drugged eye.

1) Accuracy is very high here.
2) Enhancing the values of drugged eye detection.
3) It takes only few seconds to provide exact result.
4) Result is provided with the high accuracy rate.
5) Applicable to both low and high pixel images.

EXAMPLE TRAINING SET IMAGES



FIG 4.1 DRUGGED SAMPLE 1



FIG 4.2 DRUGGED SAMPLE 2

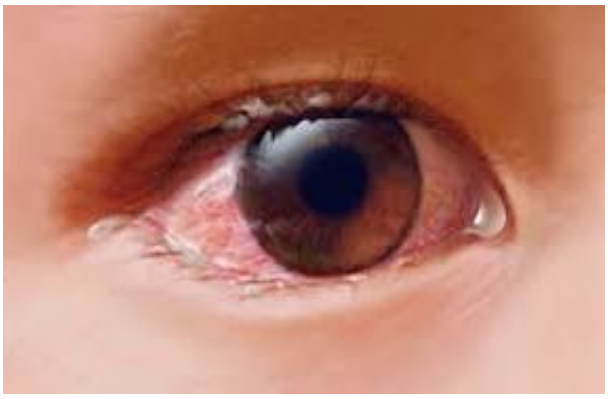


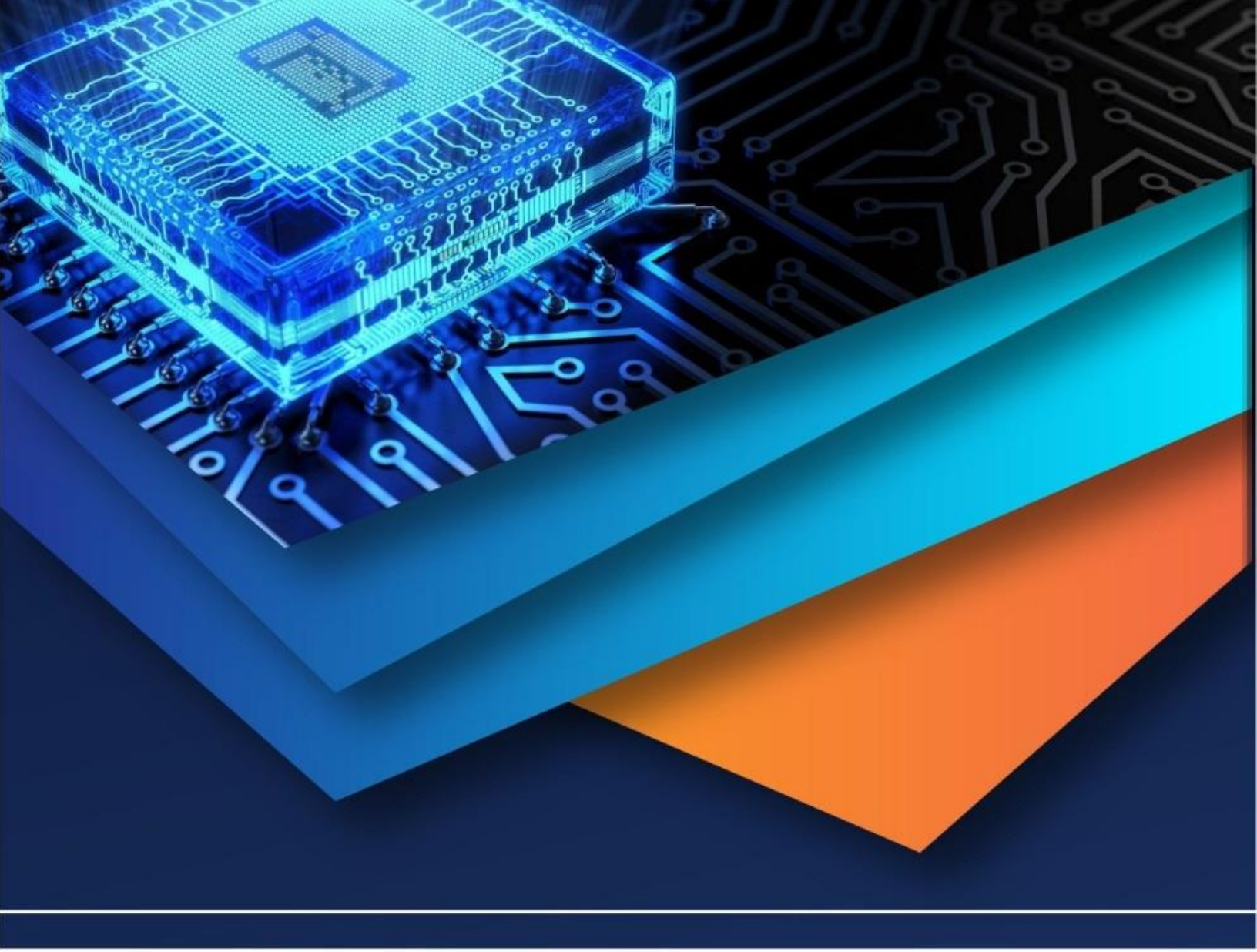
FIG 4.3 DRUGGED SAMPLE 3

V. CONCLUSION

An image processing based solution is being proposed and evaluated in the project to detect drug consumed eye. The proposed approach is composed of 3 steps. I) In the first step image segmentation is performed using convolutional neural network technique. II) In the second step reddish places are found. III) In the third step training and classification are performed. It would also promote to make sure authorized persons were drugged or not and then reduce loss of industrial losses due to drug consumers. The leading objective of the project is to improve the value of drugged eye detection.

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