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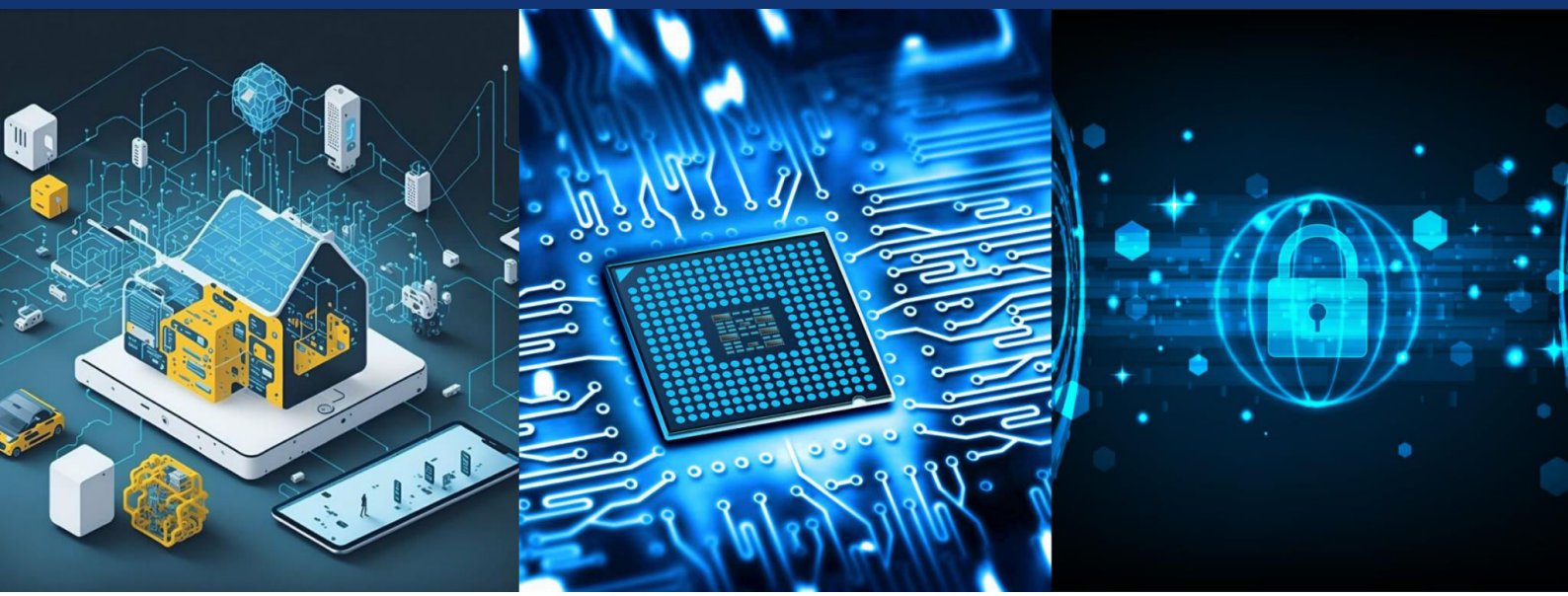
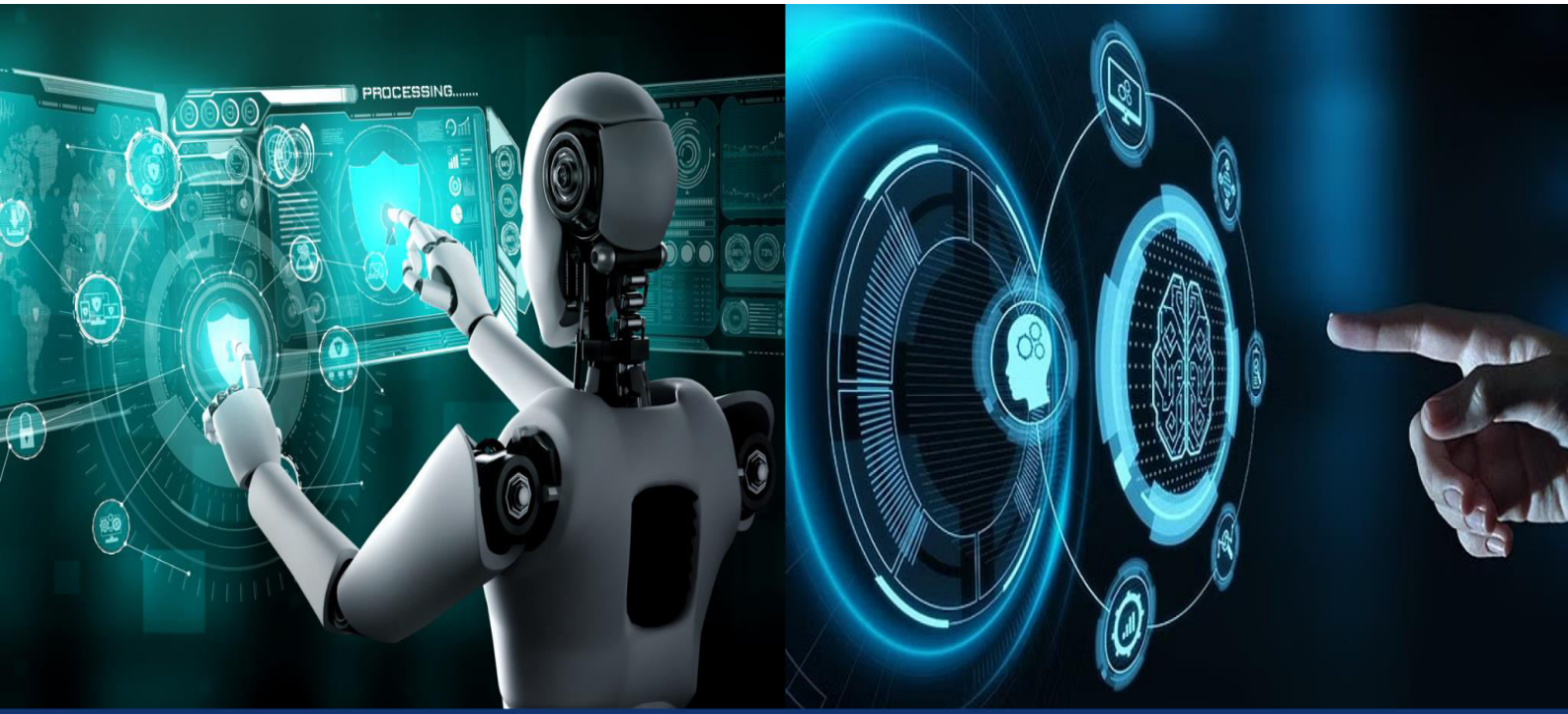


International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



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International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

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A Review on Diabetic Retinopathy Detection in Retinal Images using CNN with Advance Optimization Classifier

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ABSTRACT: The main objective of this method is to detect DR (Diabetic Retinopathy) eye disease using image processing techniques. The tool used in this method is MATLAB (R2010a) and it is widely used in Image processing. This paper proposes a method for extraction of blood vessels from the medical image of human eye retinal fundus image that can be used in ophthalmology for detecting DR (Diabetic Retinopathy). This method utilizes an approach of Adaptive Histogram Equalization using CLAHE (contrast Limited Adaptive Histogram Equalization) algorithm with open CV (Computer vision) framework implementation. The result shows that affected DR is detected in fundus image and the DR is not detected in the healthy fundus image and 98% of Accuracy can be achieved in the detection of DR Diabetic Retinopathy is a chronic eye disorder that impacts the retinas blood vessels, potentially leading to vision loss. It has no cure currently, So early detection plays a critical role in decreasing the risk of blindness and halting it's progression. The use of deep learning algorithm including Kirsch's templates has proven effective in diagnosing and managing Diabetic Retinopathy. This techniques emphasizes the areas of the retina with microaneurysms or hard exudates while also accounting for the histogram and affected pixel points, allowing doctors to determine the diseases stages.

KEYWORDS: CNNs method and deep learning algorithm and ABC algorithm with kirsch's templates to detecting the early stage of diabetic retinopathy.

I. INTRODUCTION

The processing of images by performing some operations in order to get enhanced images is called image processing. Several techniques has been developed for the early detection of DR on the basis of features such as blood vessels, hemorrhages, exudes, etc…, The persistent damage caused to the retina is termed as the retinopathy". Due to high blood glucose it leads to the damage of small blood vessels in the retina and this may result into swelling and hemorrhage of the retina. The classification of DR includes (NPDR) leads to the swelling of the blood vessels in the retina. The proliferative Diabetic Retinopathy (PDR) leads to the formation of blood vessels which are fragile and abnormal. The symptoms of DR includes difficulty in seeing well at night, problem in seeing or blurred vision, empty (or) dark spot of the center of vision.

Regular eye exams and proper blood sugar management are essential for preventing or managing Diabetic Retinopathy, and precise diagnosis and management by clinicians can aid patient in maintaining their overall quality of life and avoid invasive procedures such as laser treatments or surgeries. Moreover, early detection and early management are crucial for preventing severe and permanent vision loss and incorporating Deep Convolutional Neural Network (DCNNs) result in increased accuracy and efficiency for diabetic retinopathy diagnosis and treatment. DCNN algorithms enhance the classification of retinal images. With greater precision and speed, which may result in earlier diseases diagnosis and more successful care. Ultimately, early detection and management of DR are vital for maintaining patients overall quality of life and reducing the risk of permanent vision loss.

II. LITERATURE PREVIEW

The Kazi Ahnaf Alaveee and Mehedi Hasan Enhancing Early detection of diabetic retinopathy through the integration of deep learning models and explainable artificial intelligence and Grad-CAM enriches the presentations by elucidating the CNN model's decision diagnosis the early stage of diabetic retinopathy that can classify the images based on the diseases development and we have used high-resolution color fundus retinal pictures.

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The . C.Sinthanayothin, J.F.Boyce, T.H. Williamson, H.L. Cook, E.Mensah, S.Lal, and D.Usher Automated detection of diabetic Retinopathy on digital fundus image. The aim was to develop an automated screening system to analyses digital color retinal images for important. Features of non-proliferative diabetic Retinopathy (NPDR).

Fully automated computer algorithms were able to detect hard exudates and HMA. This paper presents encouraging results in automatic identification of important features of NPDR.

Ammar Jawad kadhim, Hadi Seyedarabi, Reza Afrouzian, And Fadhil Sahib Hasan Diabetic Retinopathy classification using Hybrid color- Based CLAHE and Blood vessels in Deep Convolutional Neural Network. Diabetic Retinopathy feature extraction pretrained VGG19, pretrained Inception V3 contrast-limited-adaptive histogram-equalization, multiclass classification, data augmentation.

III. HARDWARE REQUIREMENT

REFERENCE-1

COMPONENTS	SPECIFICATIONS
AlexNet (29)	CLAHE Filtering
GoogLeNet(30)	To-Hat Filtering
VGG16 (31)	CLAHE-TH Feature
VGG-19 (32)	Homomorphic Filtering
Inception V3 (34)	RGB channels
Pretrained VGG19	MCET-HHO

REFERENCE-2

COMPONENTS	SPECIFICATIONS
AlexNet (29)	Image analysis
NPDR	Image recognition
Moat Operator	Neural Network
HMA	Optic disk

REFERENCE-3

COMPONENTS	SPECIFICATIONS
DenseNet121	CNN mode
Resnet50	Artificial Intelligence (XAI)
VGG16	Grad_ CAM
VGG19	SVM
Machine learning	RNN

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IV. RESULT

The figure represents the final set up of the proposed system. The software uses CNN network for processing the retinal fundus image.

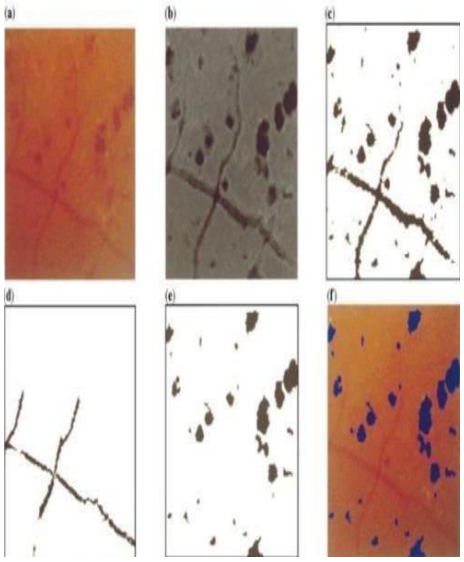

Fig: HMA images

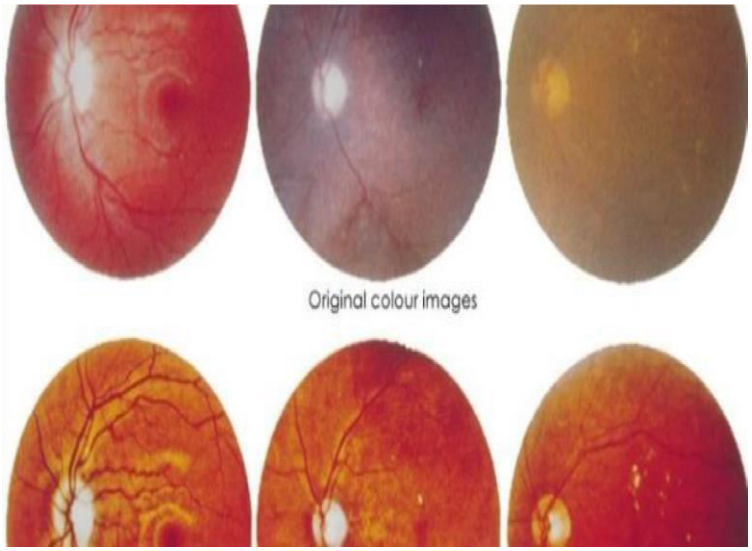

Fig: segmentation after standardized colour images

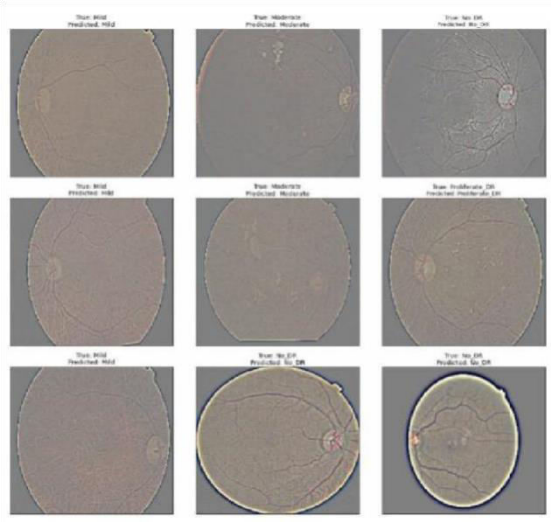

Fig: Working setup of proposed system

Based on the Early detection of DR can significantly reduce the risk of vision impairment by appropriate treatment and necessary precautions. The primary aim of this that study is to leverage cutting- edge models trained on diverse image datasets and propose a CNN model that demonstrates the comparable performance specifically we employ transfer

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learning models such as DenserNet121, Exception Resnet50, and machine learning models such as SVM and neural network models like RNN for binary and multi- class classification.

This outcome is obvious in hindsight since no samples in the training the dataset images was classified the and processing the retinal images. The CNN model outcome is best example for the recognition of image analysis and neural network of Diabetic Retinopathy diagnosis.

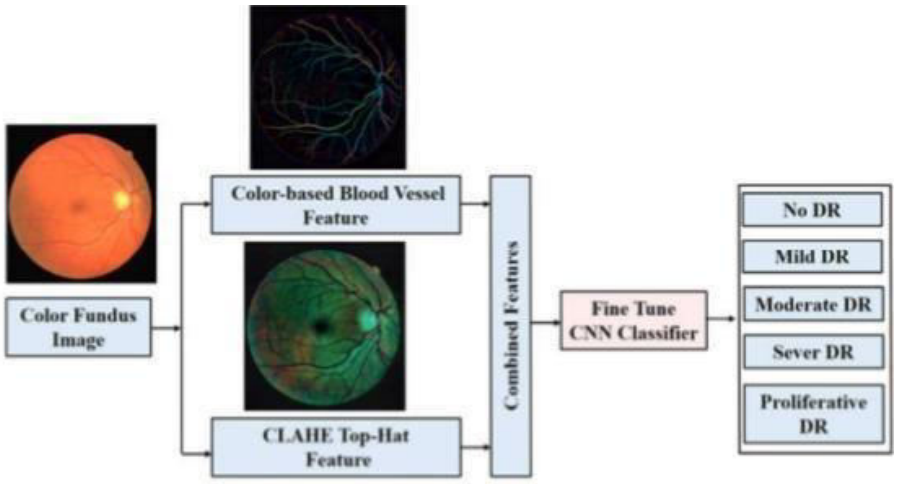

Fig: schematic diagram of the DR detection system.

V FUTURE SCOPES

Future enhancements to this system can include improvements in the accuracy of the DCNN and AOC models through the use of larger and more diverse training sets.

Additionally, integrating the DCNN and AOC with other image processing techniques, such as binarization and segmentation, can enhance the accuracy of DR detection in retinal images.

Thus, future research can focus on exploring alternative machine learning techniques, such as recurrent neural networks and generative adversarial networks, for DR detection in retinal images. By improving the accuracy and efficiency of DR detection in retinal images, we can improve patient outcomes and reduce the burden on healthcare providers and systems.

VI. CONCLUSION

This paper has a review on Diabetic Retinopathy retinal images. It will be lead to report to real time augmentation of retinal images and classified the fundus images. In diabetic Retinopathy. The software synthesis of those systems are compared and clarified with equivalent specifications.

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