IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 2, July 2023

Diabetic Retinopathy Detection

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Abstract: *Diabetic retinopathy is a common complication of diabetes that can lead to vision loss if not detected and treated early. Detecting diabetic retinopathy through retinal images is an important task in healthcare. In recent years, deep learning-based approaches have shown promising results for diabetic retinopathy detection. These approaches typically involve training a convolutional neural network on large datasets of retinal images labeled with diabetic retinopathy severity levels. The trained model can then be used to predict the severity level of new retinal images. Various techniques such as data augmentation, transfer learning, and assembling can be used to improve the performance of these models. Diabetic retinopathy detection has the potential to improve patient outcomes and reduce healthcare costs by enabling early intervention and treatment. Diabetic retinopathy is a common complication of diabetes that affects the blood vessels in the retina, the light-sensitive tissue at the back of the eye. It is a leading cause of vision loss among adults with diabetes and can progress without any noticeable symptoms until vision is severely affected. Early detection and treatment are critical to prevent vision loss and blindness. Traditionally, diabetic retinopathy has been detected through manual examination of retinal images by trained ophthalmologists or optometrists. However, this process can be time-consuming, and costly, and may not be widely available, particularly in low-resource settings. With the advancement of computer vision and deep learning techniques, automated diabetic retinopathy detection through retinal images has become an active research area in recent years. Deep learning models have shown promising results for detecting diabetic retinopathy with high accuracy and speed, making it possible to screen large no. of patients.*

Keywords: Diabetic Retinopathy

I. INTRODUCTION

Diabetes is a malady that influences veins all through the body, especially in the kidneys and eyes. At the point when veins in the eye are influenced, the condition is alluded to as diabetic retinopathy (DR) a significant general medical issue and the main source of visual deficiency around the planet. It is a small-scale vascular complexity that may happen in patients with diabetes. DR will bring about the unsettling influence of visual ability and can, in the end, prompt visual deficiency. There are more possibilities for the progression of DR if the diabetic individual isn't treated for a significant time. DR gets symptomatic in a while later stages. In the main stage, diabetic patients may not know about having been tainted by the malady. In this way, Carly's discovery of DR is critical to stay away from further complications. The fundus retinal pictures of patients are used by an ophthalmologist for recognition of DR, and from these retinal pictures manifestations will be distinguished physically by an ophthalmologist [6,7] The increasing number of diabetic retinopathy cases worldwide requires intensifying efforts in developing tools to assist in the diagnosis of DR. Automatic detection of DR will lead to a large amount of savings of time and effort.

1.1 Motivation

Today's students are tomorrow's alumni and future university supporters. In recent years a lot of importance is given by hospitals in building diabetic retinopathy techniques worldwide, understanding the significance of its benefits. One of the major challenges faced by doctors associations is detecting diabetes. Diabetic Retinopathy Detection serves as a platform for communication and connection between current students, alumni from outside the institution, and the institution itself while also providing information on internship and employment opportunities. This will largely assist students to find job opportunities: To create a great career. It will also help colleges to track the laurels of alumni: students can draw inspiration from it.

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II. LITERATURE SURVEY

2.1 Study

Digital Retinal Imaging

Digital retinal imaging, including fundus photography, optical coherence tomography (OCT),And ultra-wide field imaging, has become a widely used tool for the detection of Diabetic Retinopathy. Fundus photography provides a comprehensive view of the retina, allowing for the Identification of retinal abnormalities, while OCT provides high-resolution images of the retina, enabling the detection of early signs of diabetic retinopathy. Ultra-wide field imaging canvisualize up to 80% of the peripheral retina in a single image, making it a useful tool for
detecting diabetic retinopathy in its early stages.

Machine Learning Algorithms

Machine learning algorithms, including deep learning and convolutional neural networks, have shown promise in the detection of diabetic retinopathy from digital retinal images. These algorithms can be trained on large datasets of retinal images to identify specific features and patterns associated with diabetic retinopathy, such as microaneurysms, hemorrhages, and exudates. One example of the application of machine learning in diabetic retinopathy detection is
the IDx-DR system, which received FDA approval in 2018 as the first AI-powered diagnostic system for the detection of diabetic retinopathy. This system uses deep learning algorithms to analyze retinal images and make a diagnosis of diabetic retinopathy. Another example is the use of a deep learning algorithm in a study by Wang et al. (2018), which achieved high accuracy inthe detection of diabetic retinopathy from retinal images.

Telemedicine and Screening

Telemedicine has the potential to increase access to diabetic retinopathy screening, particularly in rural and underserved areas. The use of telemedicine can facilitate remote screening and diagnosis of diabetic retinopathy, allowing patients to receive prompt and appropriate treatment. A study by Koo et al. (2017) found that telemedicine was effective in the detection of diabeticretinopathy and could increase access to screening for individuals with diabetes

2.2 Technology Methodology

The programming language favored for this calculation was python. Various libraries along with pre-trained ResNet-50, ResNet-152, and Dense Netarchitecture were utilized. The library pandasare utilized for information control and examination, Fastal a profound learning library is utilizedfor streamlining and preparing quick and precise neural systems utilizing currently accepted procedures. Matplotlib is a Python library utilized for plotting purposes. Pytorch is a Python-based library used to give adaptability as a profound learning stage.

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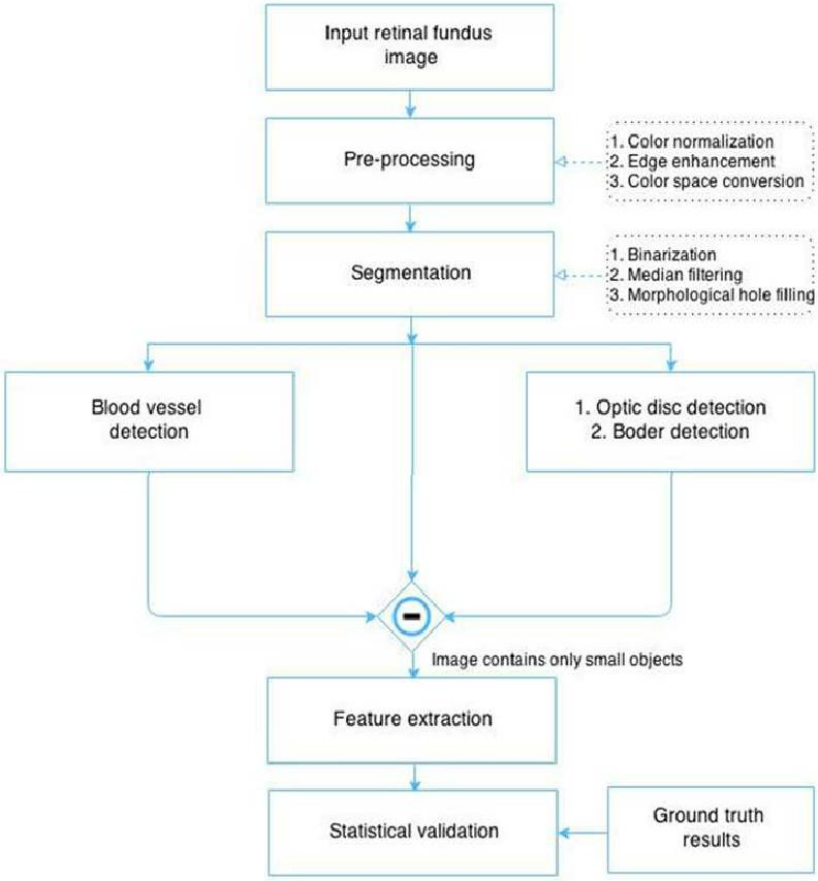
2.3 Entity Relationship Diagram



III. CONCLUSION

In conclusion, machine learning has emerged as a promising approach for the early detection of diabetic retinopathy. By leveraging large datasets of retinal images, machine learning algorithms can accurately classify images and identify signs of diabetic retinopathy. This can help to streamline the screening process, reduce the workload of eye care professionals, and improve patient outcomes by enabling earlier detection and treatment. While there are still some challenges to overcome, such as ensuring the accuracy and reproducibility of machine learning models, the potential benefits of this approach are significant and warrant further exploration.

IV. ACKNOWLEDGEMENT

We thank the almighty Lord for giving me the strength and courage to sail out through the tough and reach shore safely. We owe a debt of sincere gratitude, a deep sense of reverence, and respect to our guide Prof. Simarjeet Singh Bhatia, Assistant Professor at CSIT Department, and mentor Prof. Nisha Rathi, Assistant Professor, AITR, Indore for their motivation, sagacious guidance, constant encouragement, vigilant supervision and valuable critical appreciation throughout this project work, which helped us to successfully complete the project on time.

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