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Eye Disease Detection System

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Abstract: ***Nowadays a lot of people have eye disease problems and to know their disease they do have to wait a lot because of the machine system in the hospital. To resolve that issue, we have developed an eye disease detection model using machine learning technology which will help the patient to know their disease as early as they can. The eye disease detection model is trained on a huge number of parameters so that can predict eye disease quickly.***
Keywords: Eye disease, Keras, Machine learning, Convolution neural network, Supervised Leraning.

I. INTRODUCTION

The Eye disease detection machine learning project is developed for disease detection using machine learning. In our project, we categorized the disease in 3 phase that is normal images which has no disease and second is glaucoma and third is retinopathy. So we have taken left and right side images of each class and trained our data with the help of 372 images so that our model can learn from it and converted the input dataset in grayscale format for a better understanding of its features. The dataset is converted with the help of one software, Irfan View. For eye disease detection, we have created a model with the help of Keras and some of the machine learning concepts. The dominant causes of visual impairment worldwide are Glaucoma, and retinal diseases among patients. The proposed system is designed and developed to easily facilitate the detection of glaucoma and retinal diseases among patients. The CNN is used for detection

TABLE I

Classification	accuracy	confidence	Array
Normal	99.01	100	[1,0,0]
Glaucoma	99.99	100	[0,1,0]
Retinopathy	98.99	99	[0,0,1]

II. REQUIREMENT

The Eye disease detection using machine project needs some concept of machine learning as well as some concept of Keras and the most important is environment and language, so let's see each need of our project. Visual Studio Keras CNN concept Anaconda.
Visual Studio Visual Studio known as VS code is a free open-source editor by Microsoft. VS Code is available for Windows, Linux, and macOS. However, the editor is relatively lightweight, it includes some powerful features that have made VS Code one of the most popular development environment tools in recent times. The Vs code we use for the development of the front end as well as a backend that is developed the front end in angular and the backend using Python language. As you know we can do any kind of programming in Vs code just we have to set the environment for every language there are libraries and tools available for it just have to download it set the environment and create different directories so it will not get mixed[2].
Keras is a deep learning framework for Python that provides a convenient way to define and train almost any kind of deep learning model. keras is a high-level neural networks API, written in Python which is capable of running on top of TensorFlow, Theano, and CNTK. It was developed to enable fast experimentation. In Our project, we used the layers of keras that is sequential layer and dense layer and convolution 2D layer and max pooling layers of Keras.
CNN (Convolution Neural Network) A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm that can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and be able to differentiate one from the other. The pre-processing required in a Convnet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, Convnets can learn these filters/characteristics. In our project, we used the convolution neural network layers for feature extraction.

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INPUT DATASET TABLE I Classification accuracy confidence Array Normal 99.01 100 [1,0,0] Glaucoma 99.99 100 [0,1,0] Retinopathy 98.99 99 [0,0,1]

Let's see the Images of each disease. Normal [1,0,0]

Fig:- Left Normal

Fig:- Right Normal

Figure 1

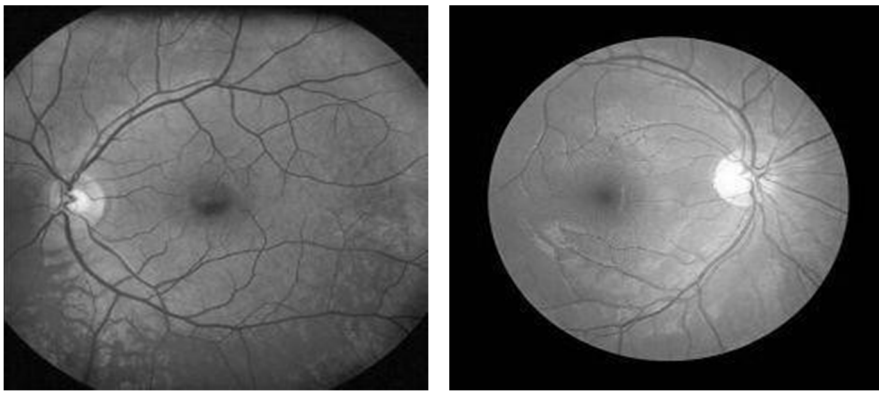


Figure 2

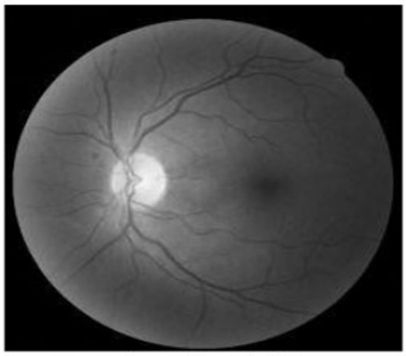


Fig:- Retinopathy left

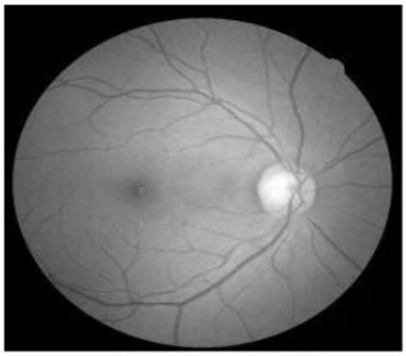
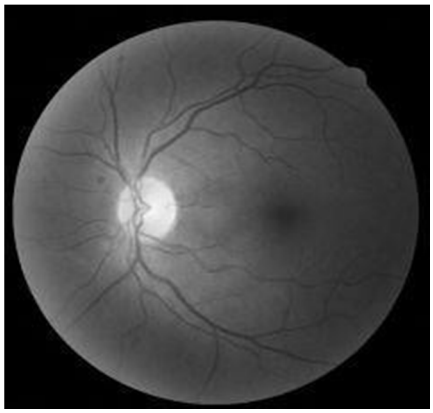
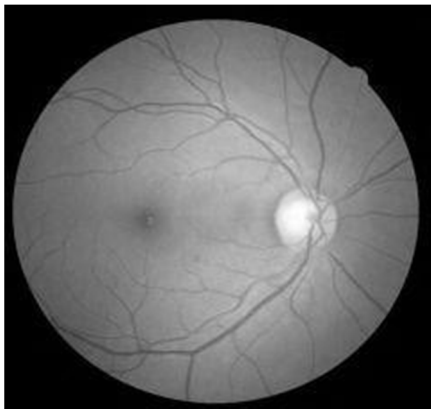


Fig:- Retinopathy Right

Figure 3





III. WORKING

Eye disease detection has two different interfaces one is for the backend and another is for the frontend and front end we have used angular and they both are connected with the help of an app.py file. If we are running the project without running the app.py file then it won't show the result so before running our project we have to run the app.py file to accept the request. There are two ways of running code first is through command prompt and second is through VS code. So let's understand the by using VS Code. First, we have to open the eye disease detection window which is a machine-learning environment and we just have to create a new terminal and run the app.py file. Second, we have to open the window of the frontend that is in angular and just create a terminal and click on the run without debugging then it will automatically start the execution and activate ng. serve and after execution it will open the browser automatically and we can able to see the front that website of.

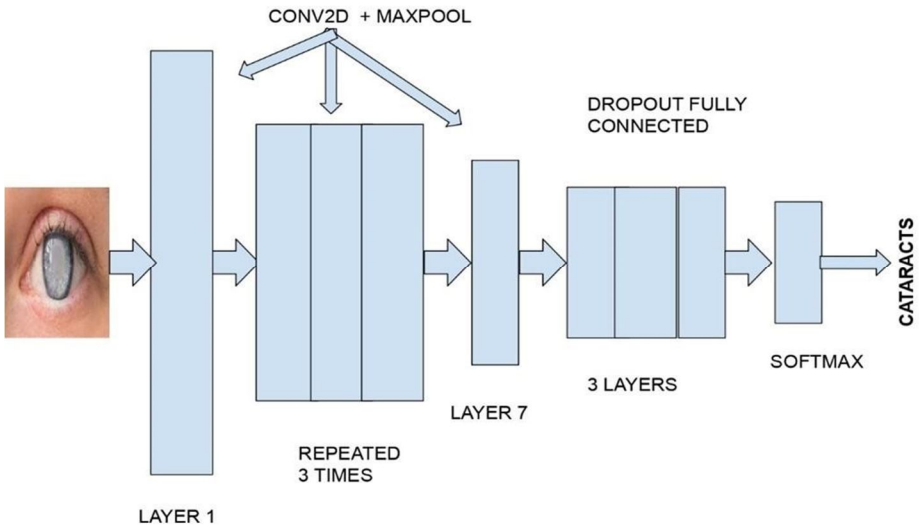
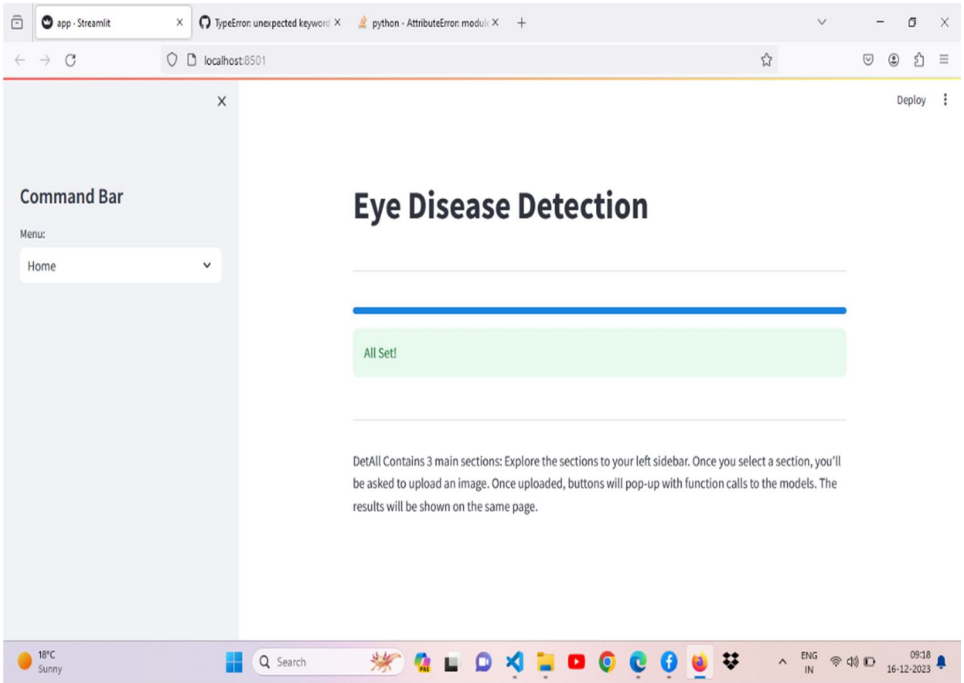


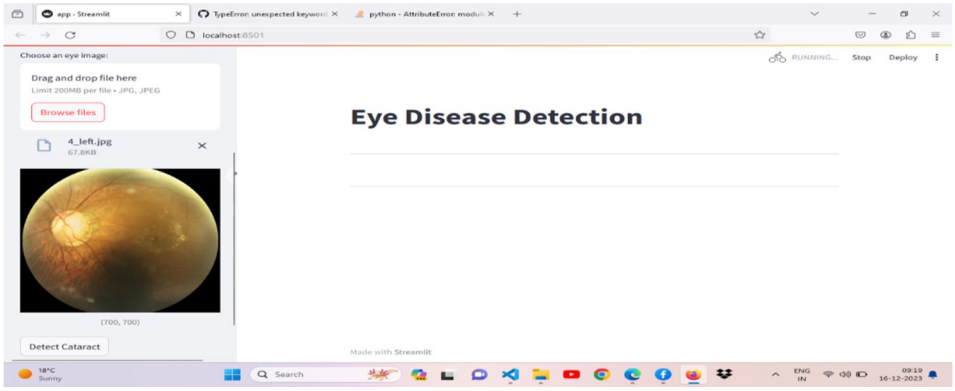
Fig: Disease detection CNN architecture

IV. OUTPUT

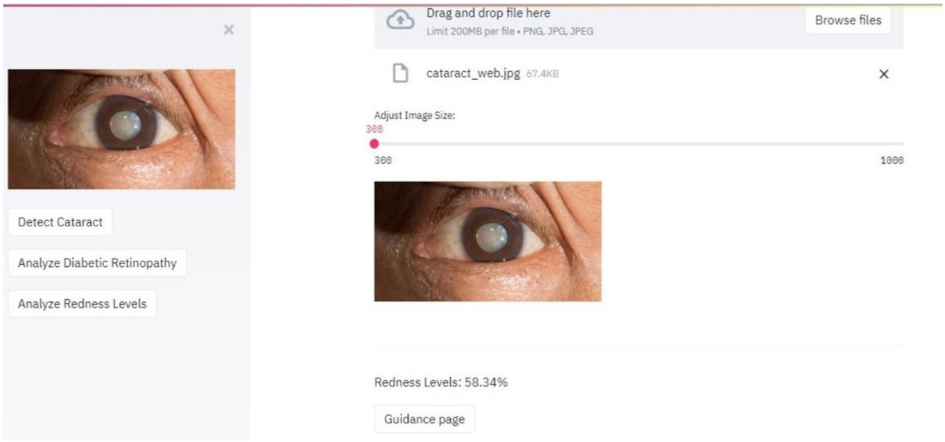


Step 1: After the successful execution of the code this window will open as you can see here.

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Step 2: Here will be the actual input section where we have to choose the image and upload it.



Step 3:After uploading Image you will able to see the actual output. That means the image have which kind of disease or there is no disease

V. CONCLUSION

The various computer technologies have helped the automation of detecting the OD accurately. A large number of researchers have reported improved specificity and sensitivity in diagnosing glaucoma. A survey of those technologies [3], [4], [5] has also been reported by various authors in analyzing the retinal image features. Machine intelligence technologies such as ANNs have helped the physicians in management and analysis of clinical data. When a neural network model is employed for medical image processing, compared with conventional image processing methods, several things are to be considered. Firstly, the time for applying a trained neural network to solve a medical image processing problem is negligibly small, though the training of a neural network is time-consuming work. Secondly, medical image processing tasks often require complex computations. Hence the performance of ANNs can be significantly improved when image-based information is added, which shows the need for (semi-)automatic segmentation and Modeling.

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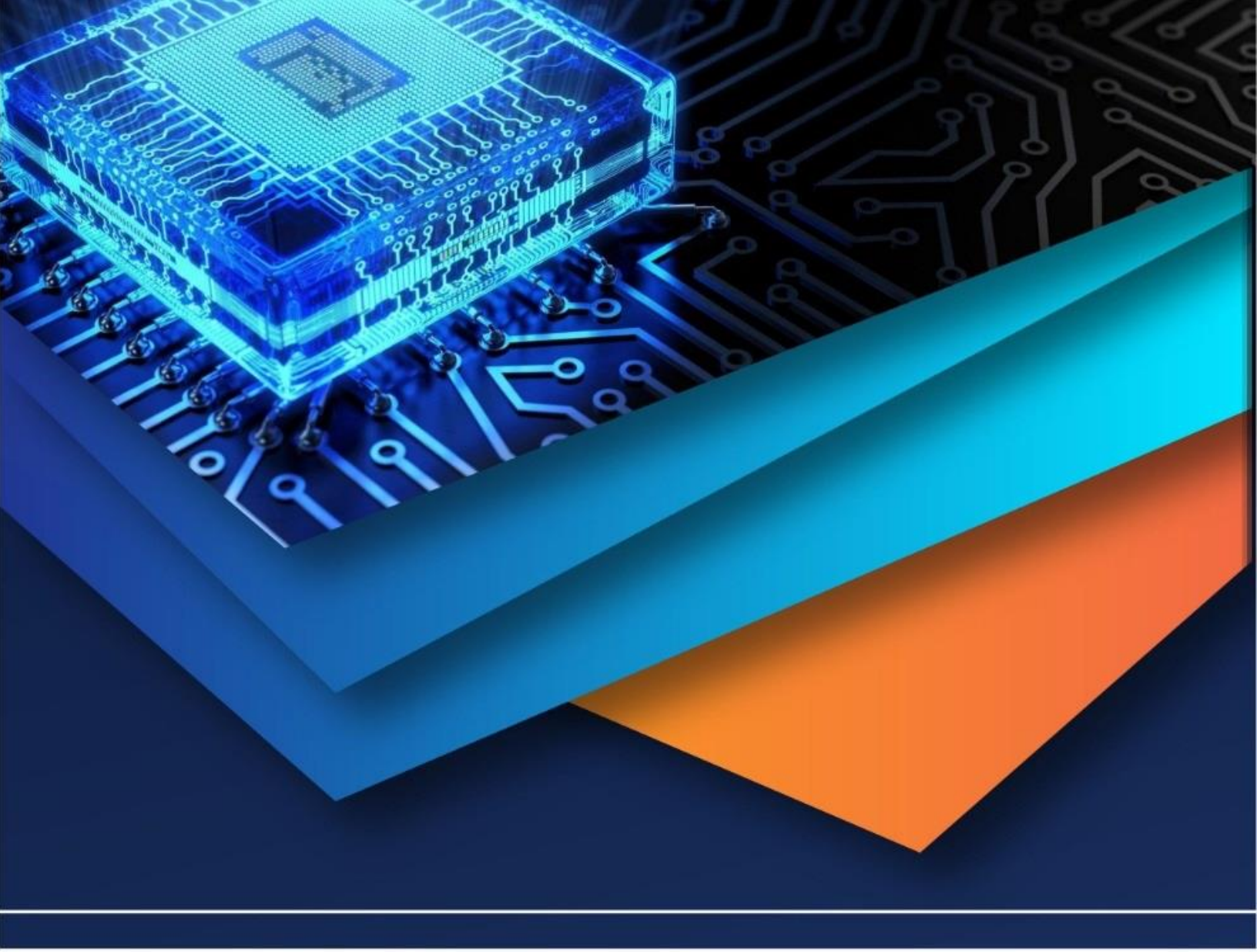
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