Eye Disease Detection using Machine Learning

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Abstract: *Now days a lot of people having eye disease problem and for knowing their disease they do have to wait a lot because of the machine system in the hospital. For resolving that issue, we have developed 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 huge number parameter so that can predict the eye disease quickly.*

Keywords: Eye disease, Keras, Machine learning, Convolution neural network, Supervised Learning

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 better understanding of its feature. The dataset is converted with help of one software that is Irfan view.

For the eye disease detection, we just have created model with help of keras and some of the machine learning concept. 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 used for detection [1].

II. REQUIREMENT

The Eye disease detection using machine project needs some concept of machine learning as well 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

2.1 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 development of frontend as well as backend that is we developed the front end in angular and backend using python language. As you know we can do any kind of programming in Vs code just we have set the environment for every language there are library and tools available for it just we have to download it and set the environment and create different directories so it will not get mixed[2].

2.2 Keras

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 for enabling fast experimentation.

In Our project we used the layers of keras that is sequential layer and dense layer and convolution 2D layer and maxpooling layers of keras.

2.3 CNN (Convolution Neural Network)

A **Convolutional Neural Network (ConvNet/CNN)** is a Deep Learning algorithm which 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 have the ability to learn these filters/characteristics. In our project we used the convolution neural network layers for feature extraction.

III. 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]
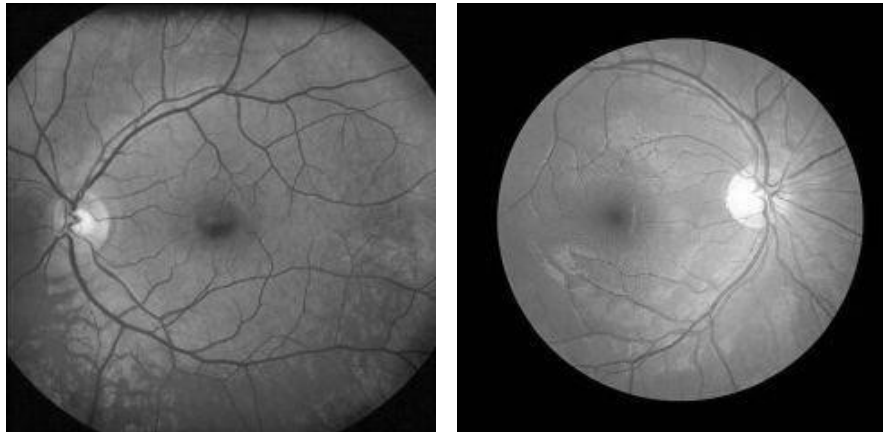

Fig:- Left Normal Fig:- Right Normal

Glaucoma [0,1,0]

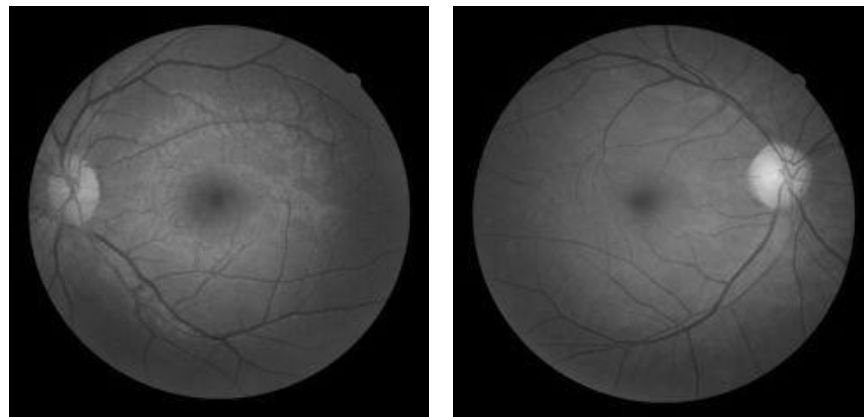

Fig:-Glaucoma left   Fig:-Glaucoma Right

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Retinopathy [0,0,1]

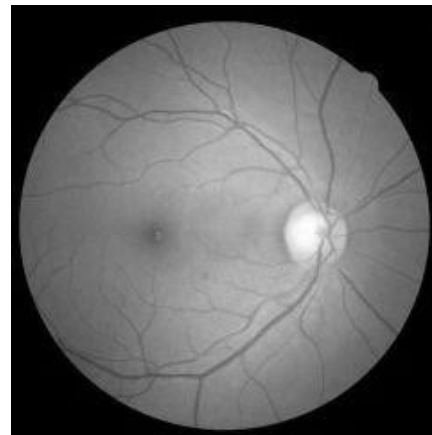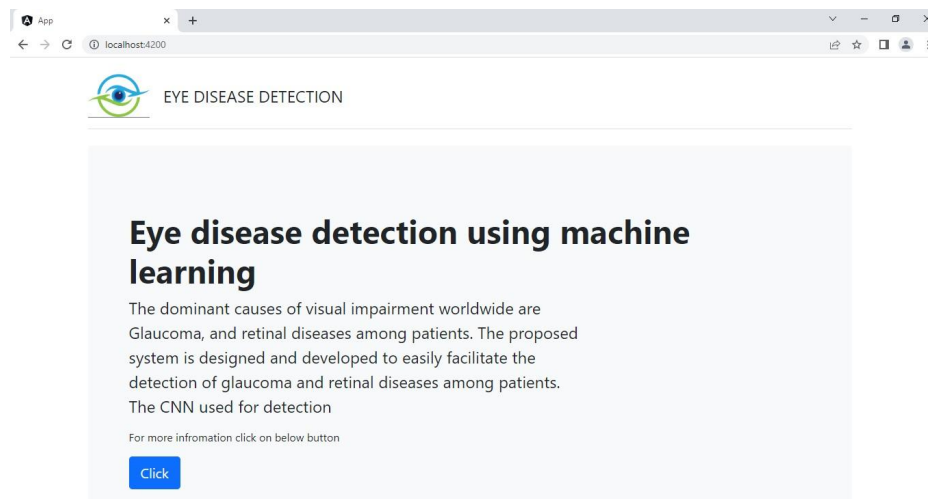Fig:- Retinopathy left   Fig:- Retinopathy Right

IV. WORKI NG

The eye disease detection has two different interface one is for backend and another is for frontend and for front end we have used angular and they both are connected to each other with help of 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 app.py file for accepting the request. There are two ways of running code first is through command promt and second is through VS code. So let's understand the by using VS Code.

1. First we have to open the eye disease detection window which is of machine learning environment and we just have create new terminal and have to run app.py file.
2. Second we have to open the window of frontend that is in angular and just have to create 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 this.
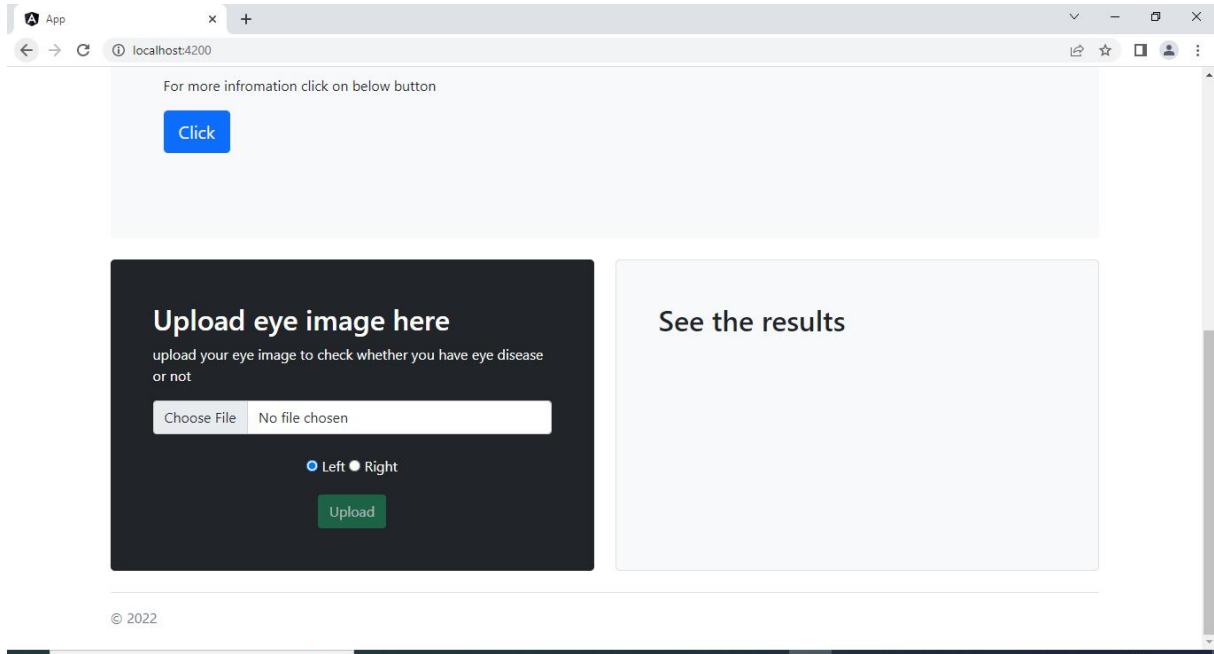
If we are doing this on command promt then we have to open two command promt one is for app.py file and second is for running the front end and just we have to go in directory and have to activate ng serve and have to run app.py
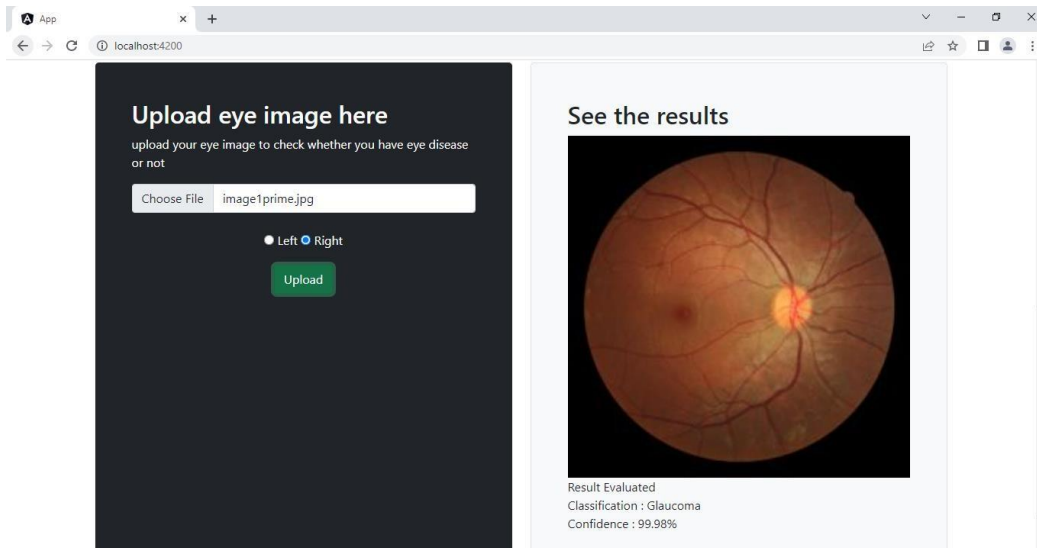
V. OUTPUT

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

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

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

VI. CONCLUSION

The various computer technologies have helped the automation of detecting the OD accurately. A large number of researchers have reported on improved specificity and sensitivity in diagnosing glaucoma. A survey of those technologies [3], [4], [5] has also been reported by various authors in analyzingthe 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, there are several things that are to beconsidered. 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 a 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 modelling.

VII. ACKNOWLEDGMENT

We are pleased to acknowledge Dr. S.B.THIGALE (HOD CSE) sir for his valuable guidance during the course of this project work. We extend our sincere thanks to MR.V.MSALE who continuously helped us throughout the project and without his guidance, this project would have been an uphill task. We are also grateful to other members of the CSE faculty members and technical staff who cooperated with us regarding some issues.

REFERENCES

[1]. Acharya, U. R., Kannathal, N., Ng, E. Y. K., Min, L. C., & Suri, J. S. (2006, August), Computer-based classification of eye diseasesIn Engineering in Medicine and Biology Society, 2006. EMBS'06. 28th Annual International Conference of the IEEE (pp. 6121-6124). IEEE.

[2]. Gardner, G. G., Keating, D., Williamson, T. H., & Elliott, A. T. (1996), Automatic detection of diabetic retinopathy using an artificial neural network: a screening toolBritish journal of Ophthalmology, 80(11), 940-944.

[3]. Winder, R. J., Morrow, P. J., McRitchie, I. N., Bailie, J. R., & Hart, P. M. (2009), Algorithms for digital image processing in diabetic retinopathyComputerized medical imaging and graphics, 33(8), 608-622.

[4]. Ibrahim, F., Ali, J. B., Jaais, A. F., & Taib, M. N. (2001), Expert system for early diagnosis of eye diseases infecting the Malaysian population In TENCON 2001. Proceedings of IEEE Region 10 International Conference on Electrical and Electronic Technology (Vol. 1, pp. 430-432). IEEE.

[5]. Bock, R., Meier, J., Michelson, G., Nyúl, L. G., & Hornegger, J. (2007, September), Classifying glaucoma with image-based features from fundus photographsIn Joint Pattern Recognition Symposium (pp. 355-364). Springer, Berlin, Heidelberg.

[6]. Sajda, P. (2006), Machine learning for detection and diagnosis of disease Annu. Rev. Biomed. Eng., 8, 537-565. [7] Jelinek, H. F., Rocha, A., Carvalho, T., Goldenstein, S., & Wainer, J. (2011, August)Machine learning and pattern classification in identification of indigenous retinal pathologyIn Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE (pp. 5951-5954). IEEE.

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