

Diabetic Retinopathy Detection

Lekshmi Surya S. L^{1*}

¹ Assistant Professor on Contract, Department of Computer Science, Fatima Mata National College, Kollam.

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Abstract

Diabetic Retinopathy is one of the eye diseases which is caused due to retinal blood vessels. Manual inspection of fundus images to check morphological changes in blood vessels and macula is a very time consuming and tedious work. It can be made easily with the help of computer aided system and inter variability for the observer. This is the system where extract the retinal blood vessels for detecting eye disease. Extracting the retinal blood vessels manually is a long task. Many automated methods are available to overcome the difficulties in doing it manually. This system is used for classification of diabetic retinopathy leveraging with the help of deep learning. The approach classifies images grounded on characteristic features uprooted by lesion discovery and anatomical part recognition algorithms. User will apply retina image into system. System will apply filtering techniques. Image pre-processing ways are applied to get accurate result. Eventually system will descry diabetic retinopathy. A web application is also maintained to manage patient and hospital details.

Keywords: MySQL, Machine Learning, PHP, Deep Neural Network.

1. Introduction

The work entitled DIABETIC RETINOPATHY DETECTION with deep learning is powerful software for detecting eye disease. The main functions are assigned to Administrator, Doctor, Normal user, Office Staff and Patient. This work is unique and advanced because the system is used for classification of diabetic retinopathy leveraging with the help of deep learning. A web application is also maintained to manage patient and hospital details. The objective of the work is to implement an automated detection of diabetic retinopathy (DR) using digital fundus images and can identify the diabetic retinopathy using the retinal images in efficient manner. As a whole the system is apt for a typical administration. The core modules are:

- Administrator
- Patient
- Doctor
- Normal user
- Office Staff

* Lekshmi Assistant Professor on Contract, Department of Computer Science, Fatima Mata National College, Kollam.
Email: lekshmisnc2020@gmail.com

2. Proposed System

At present Diabetic retinopathy is one of the diseases which can be fatal, not being able to detect the symptoms soon enough would prove deadly to the person suffering from it. Manual detection of disease would be time consuming and may not bring out accurate results which may affect the health of the patient.

Proposed systems bridge all issues related with the existing system. The problem of delay in detecting the disease is erased by using machine learning technology. Patients have options to manually check their retinal image to get more clear idea about the disease. The software is developed in open-source technologies. As the development is done in PHP and Python there are no hidden costs in the process. In the backend the systems use MySQL database server.

Machine Learning module is implemented using Python. There are lots of IDEs for Python. But go for Google lab. This tool has got amazing facilities. Retinal image of the patient can be processed faster using algorithms like Deep Neural Network.

Figure

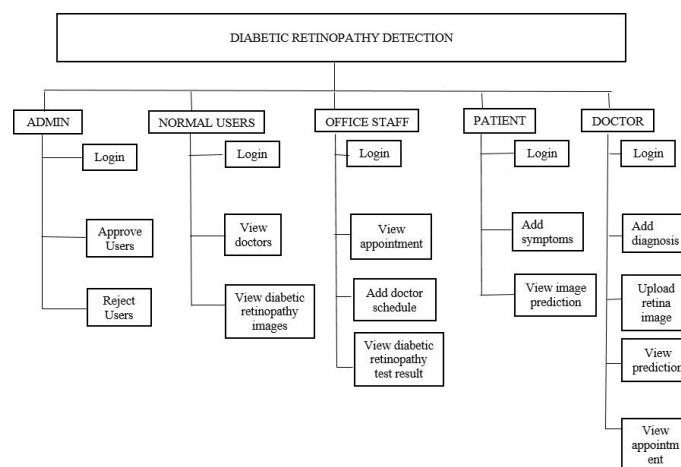


Figure 1. Structure Chart

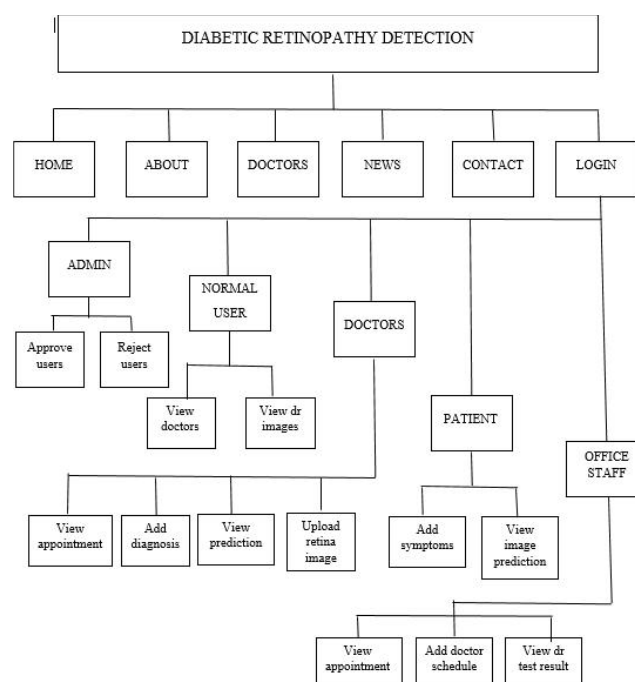


Figure 2. Menu Tree

3. System Implementation

Implementation is the process of bringing developed system into operational use and turning it over to the user. Implementation is the stage of the project where the theoretical design is turned into working system. Implementation includes all those activities that takes place to convert from old system to new one. Implementation is the phase, in which one has to be cautious, because the efforts undertaken during the work will be fruitful only if the software is properly implemented according to the plan made. The system implementation was carried out using five main aspects:

- Transition planning
- Training
- Security
- Protection
- Quality control.

Implementation Planning

Implementation of a system involves people from different departments and system analyst are confronted with the practical problems of controlling the activities of people outside their own data processing departments prior to this point in the project system, system analyst has interviewed department staffs with the permission of their respective managers. The implementation coordination committee should be responsible for a successful implementation. There should be at least one representative of each department affected by the changes and other members should be opted for discussion of specific topics.

Training

Training section must aim to give user staff the specific skills required in their new jobs. The training will be more successful if conducted by the supervisor with the system analyst is attendance to sort out any queries, new methods gain acceptable more quickly in this way.

4. Results and Reports

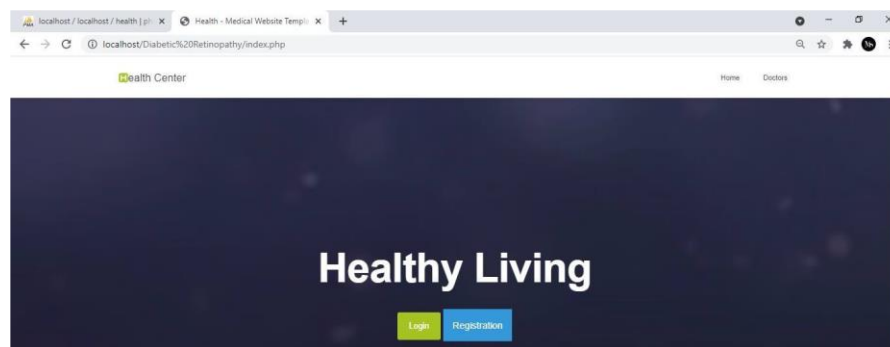


Figure 3. Index page

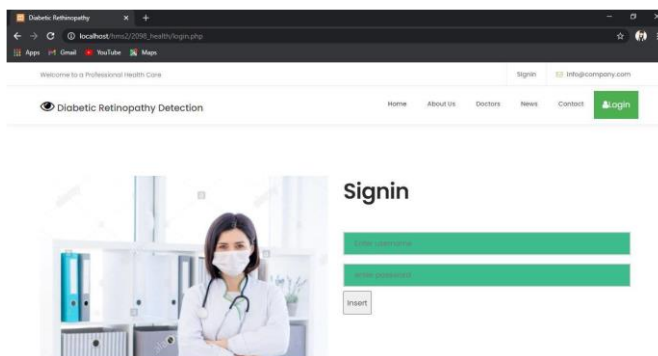


Figure 4. Login Page



Figure 5. Patient registration

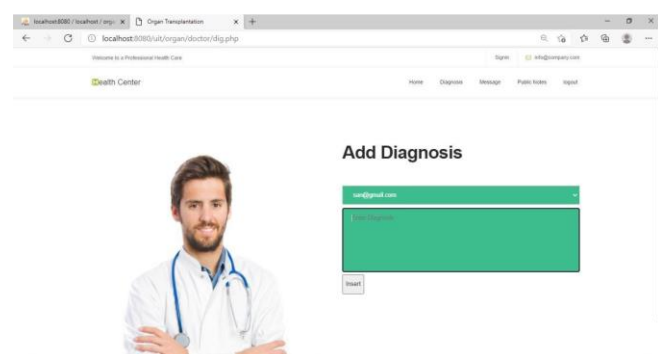


Figure 6. Adding Diagnosis of Patient

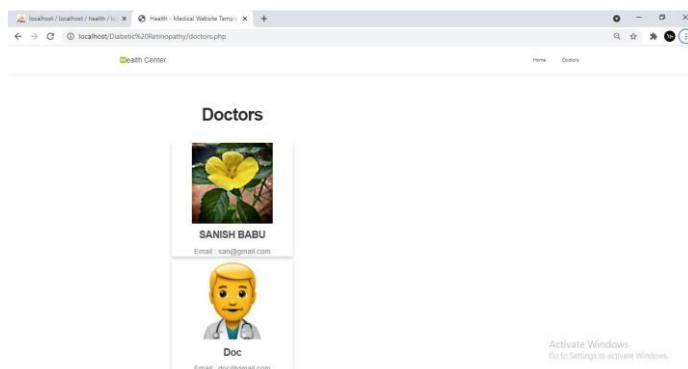


Figure 7. List of Doctors

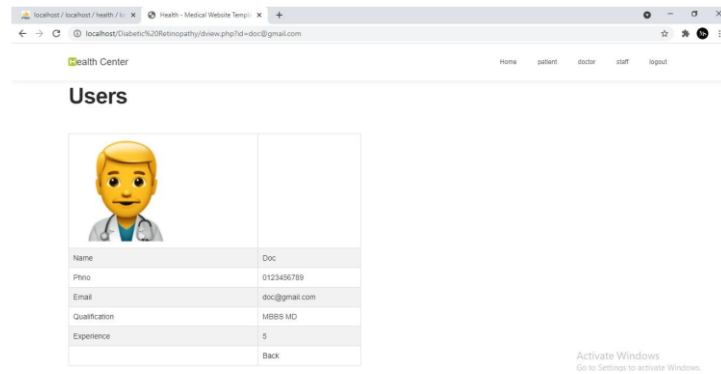


Figure 8. User's Profile

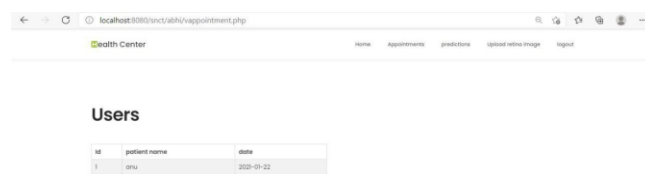


Figure 9. Appointment

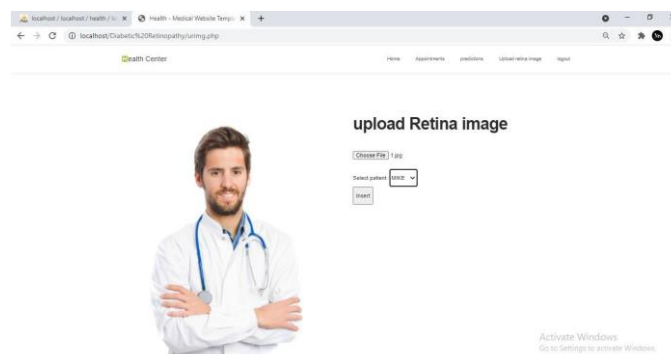


Figure 10. Retina Image Upload

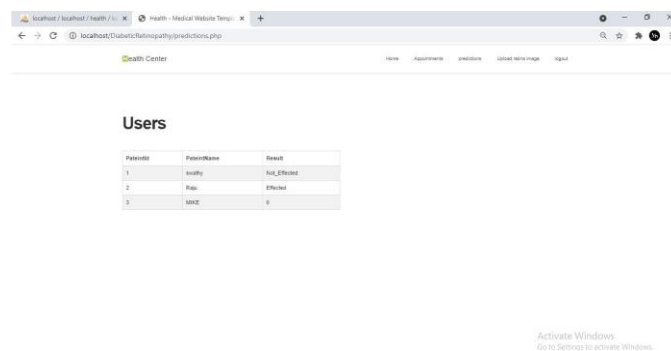


Figure 11. Test Result

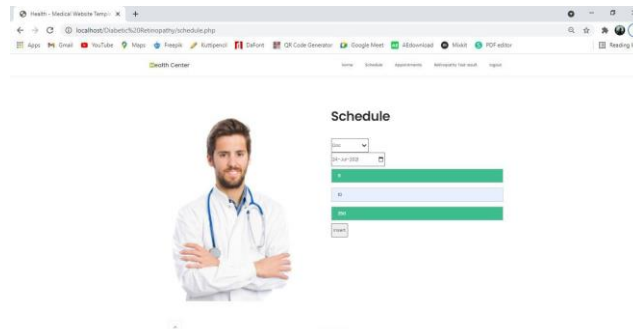


Figure 12. Staff Scheduling

5. Conclusion

The purpose of this work was to develop a web application for detecting the diabetic retinopathy disease easier. This work helped in gaining valuable information and practical knowledge on diabetic retinopathy with designing web pages using html and CSS, usage of responsive templates and management of database using My SQL. The entire system is secured. Also, the work is helpful for large hospitals as well as small clinics. A number of features can be added to this system like implementing deep learning to identify the disease at the earliest, even before its onset.

6. Future Enhancement

This work involves immediate features needed for disease detection. The system is designed in such a way that the future expansion or modification can be easily implemented. The future implementation will be providing a full-fledged chatting system along with video conferencing option so that patient can communicate further with the doctor of their doubts even without direct consultation at the comfort of their home.

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