



IDENTIFICATION AND LEVEL PREDICTION OF RETINAL DISEASE AND REVIEW BASED DOCTOR RECOMMENDATION

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INTRODUCTION

Blood vessel in retina is an important component in finding the cardiovascular disease, ophthalmological disease and segmentation of vessel tree in retina is used for computerbased identification systems. It has been identified that in some cases the symptoms of some diseases such as Diabetic Retinopathy, Hemorrhages cannot be differentiated from that of the blood vessels while training the fundus images. The Image segmentation process is examined to increase the accuracy using debauched vessel segmentation method which will help us to remove the blood vessels from the fundus images and provides easy processing. The precise retinal vessel segmentation has been established and executed. The blood vessel extraction is an edge enhancement and detection algorithm are analyzed. Then here we using algorithm is Convolution neural network(CNN). Through this algorithm we get the result easily.

And here identifies the stages of retinal disease based on symptoms by using KNN Algorithm. through this we can identify the stage of retinal disease. here using the symptom dataset, that dataset contains different symptoms and its corresponding stages. and using this, we create the dataset and using knn trained the dataset. There is a CHATBOT for patient and hospital interaction, in chatbot here using the concept of sentence similarity. and here using algorithm is term frequency-inverse document frequency (TF-IDF Algorithm). And here also have a Recommendation system, A recommendation system is a subclass of Information filtering Systems that seeks to predict the rating or the preference a user might give to an item. In simple words, it is an algorithm that suggests relevant items to users. Here we can develop doctor recommendation system based on user reviews, by using content based recommendation.

METHODOLOGY

The Image segmentation process is examined to increase the accuracy using debauched vessel segmentation method which will help us to remove the blood vessels from the fundus images and provides easy processing. The precise retinal vessel segmentation has been established and executed. The blood vessel extraction is an edge enhancement and detection algorithm are analyzed. The Edge Enhancement and Edge detection method (EEED method) separates the surplus edges and does not consider the blood vessels. The method is faster and finds the good results, the significance of the method to these method is to improve the blood vessels contrast and diffuse the anomalous topographies in the retina image. The process involved in the EEED method is, First we input a retinal image. Then the retina image is convert into grayscale form, are often used for extracting descriptors instead operating on color images. and it reduces computational requirements. Then it is convolved with gaussian large blurring kernel to extract the blood vessels. The blurred image contains only the illumination pattern and other patterns get lost. the Gaussian blurred image is obtained from the retinal fundus image. this blurred image is given as an input to the log filter of a certain kernel size. then it will remove the noise and move blood vessel on images more clearly. The significance of log filter gives the uniform background intensity image. for detecting disease it will go two CNN and compare the images with the patterns and find the matching one and ouput the corresponding result.

KNN-ALGORITHM

- K Nearest Neighbors is a simple algorithm but works incredibly in practice that stores all the available cases and classifies the new data or case based on a similarity measure. It suggests that if the new point added to the sample is similar to the neighbor points, that point will belong to the particular class of the neighbor points. In general, KNN algorithm uses in search applications where people looking for similar items. K in the KNN algorithm denotes the number of nearest neighbors of the new point which needed to be predicted.

Algorithm

- The k-nearest neighbor algorithm is imported from the scikit-learn package.
- Create feature and target variables.
- Split data into training and test data.
- Generate a k-NN model using neighbors value.
- Train or fit the data into the model.
- Predict the future

TF-IDF ALGORITHM

A high weight in TF-IDF is reached by a high frequency(in the given document) and a low document frequency of the term in the whole collection of documents

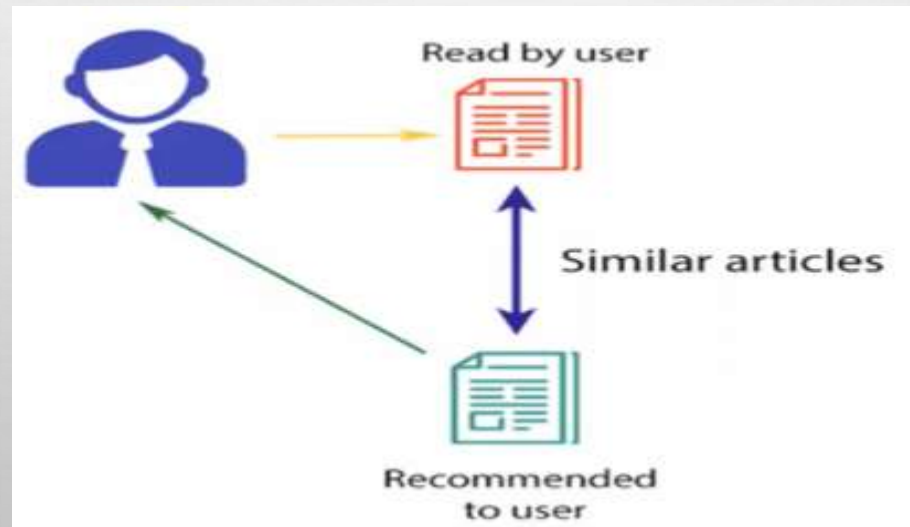
- TF-IDF algorithm is made of 2 algorithms multiplied together.
- **Term Frequency**
- Term frequency (TF) is how often a word appears in a document, divided by how many words there are.
- **$TF(t) = (\text{Number of times term } t \text{ appears in a document}) / (\text{Total number of terms in the document})$**
- **Inverse document frequency**
- Term frequency is how common a word is, inverse document frequency (IDF) is how unique or rare a word is.
- **$IDF(t) = \log_e(\text{Total number of documents} / \text{Number of documents with term } t \text{ in it})$**

The 9 steps implementation

1. Tokenize the sentences
2. Create the Frequency matrix of the words in each sentence.
3. Calculate TermFrequency and generate a matrix
4. Creating a table for documents per words
5. Calculate IDF and generate a matrix
6. Calculate TF-IDF and generate a matrix
7. Score the sentences
8. Find the threshold
9. Generate the summary

RECOMMENDATION SYSTEM

- Here are a lot of applications where websites collect data from their users and use that data to predict the likes and dislikes of their users. This allows them to recommend the content that they like. Recommender systems are a way of suggesting or similar items and ideas to a user's specific way of thinking.
- **Content-Based Recommendation:** It is supervised machine learning used to induce a classifier to discriminate between interesting and uninteresting items for the user. Here Content-Based systems recommends Doctor to the user similar to previously high-rated doctor by the user. It uses the features and properties of the doctor. From these properties, it can calculate the similarity between the doctors. In a content-based recommendation system, first, we need to create a profile for each doctor, which represents the properties of those doctor. From the user profiles are inferred for a particular user. We use these user profiles to recommend the doctors to the users from the catalog.



MODULES

1.EXPERT

- LOGIN
- ADD AND MANAGE DATASET
- VIEW FEEDBACK
- ADD AND MANAGE TREATMENT
- ADD AND MANAGE SYMPTOMS DATASET

2.ADMIN

- LOGIN
- ADD AND MANAGE EXPERT
- ACCEPT OR REJECT DOCTOR
- VIEW USERS
- VIEW COMPLAINTS AND SEND REPLY
- VIEW FEEDBACK

3.USER

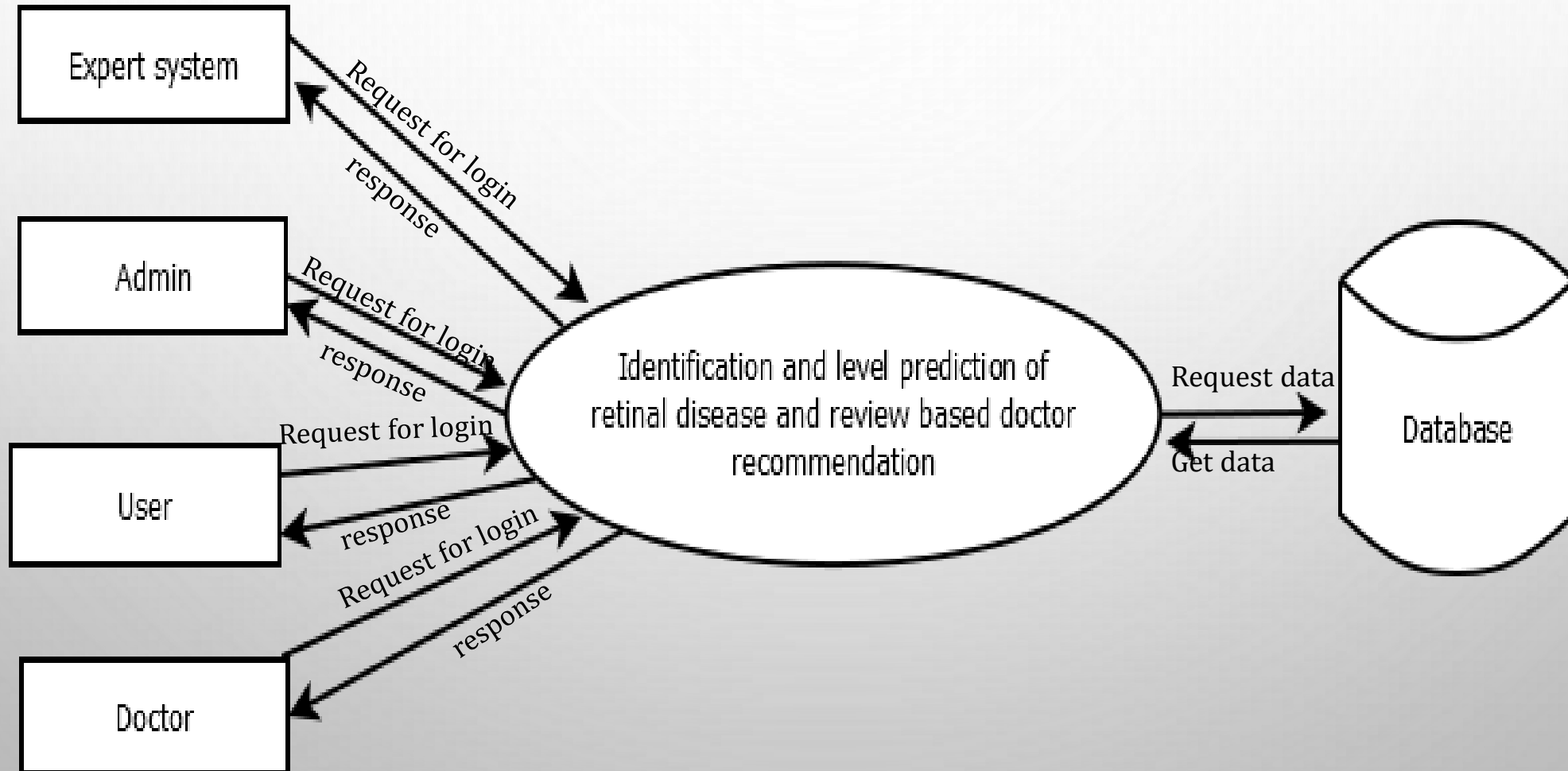
- REGISTRATION
- LOGIN
- VIEW TIPS
- VIEW TREATMENTS
- UPLOAD IMAGE VIEW RESULT
- SEND FEEDBACK
- VIEW DOCTOR
- CHATBOT
- IMAGE PREDICTION AND RECOMMENDATION
- COMPLAINT AND REPLY
- LOGOUT

4.DOCTOR

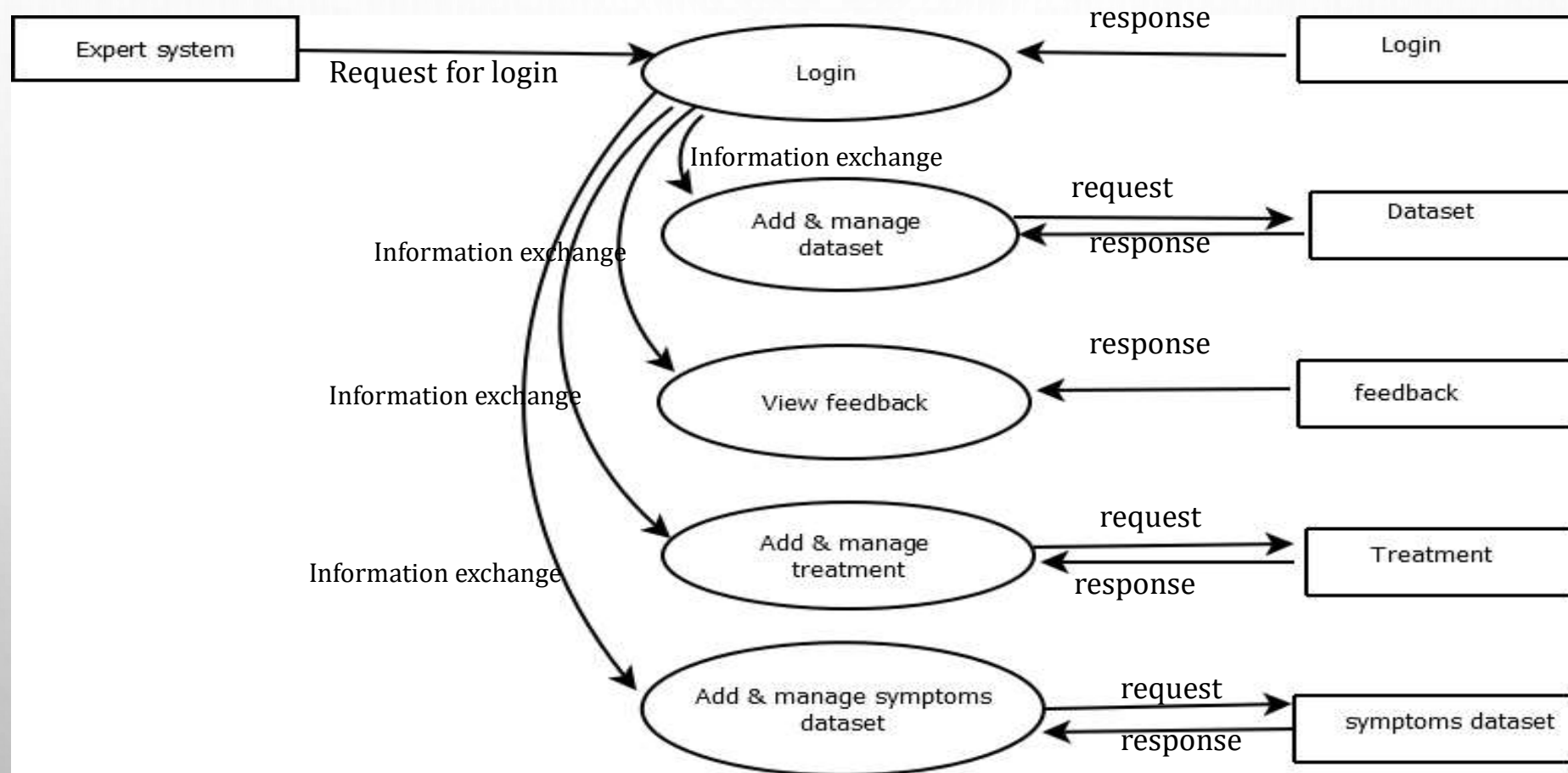
- REGISTRATION
- LOGIN
- ADD TIME SCHEDULE
- ADD AND MANAGE TREATMENT INFORMATION
- ADD AND MANAGE SPECIALIZATION INFORMATION

DATA FLOW DIAGRAM

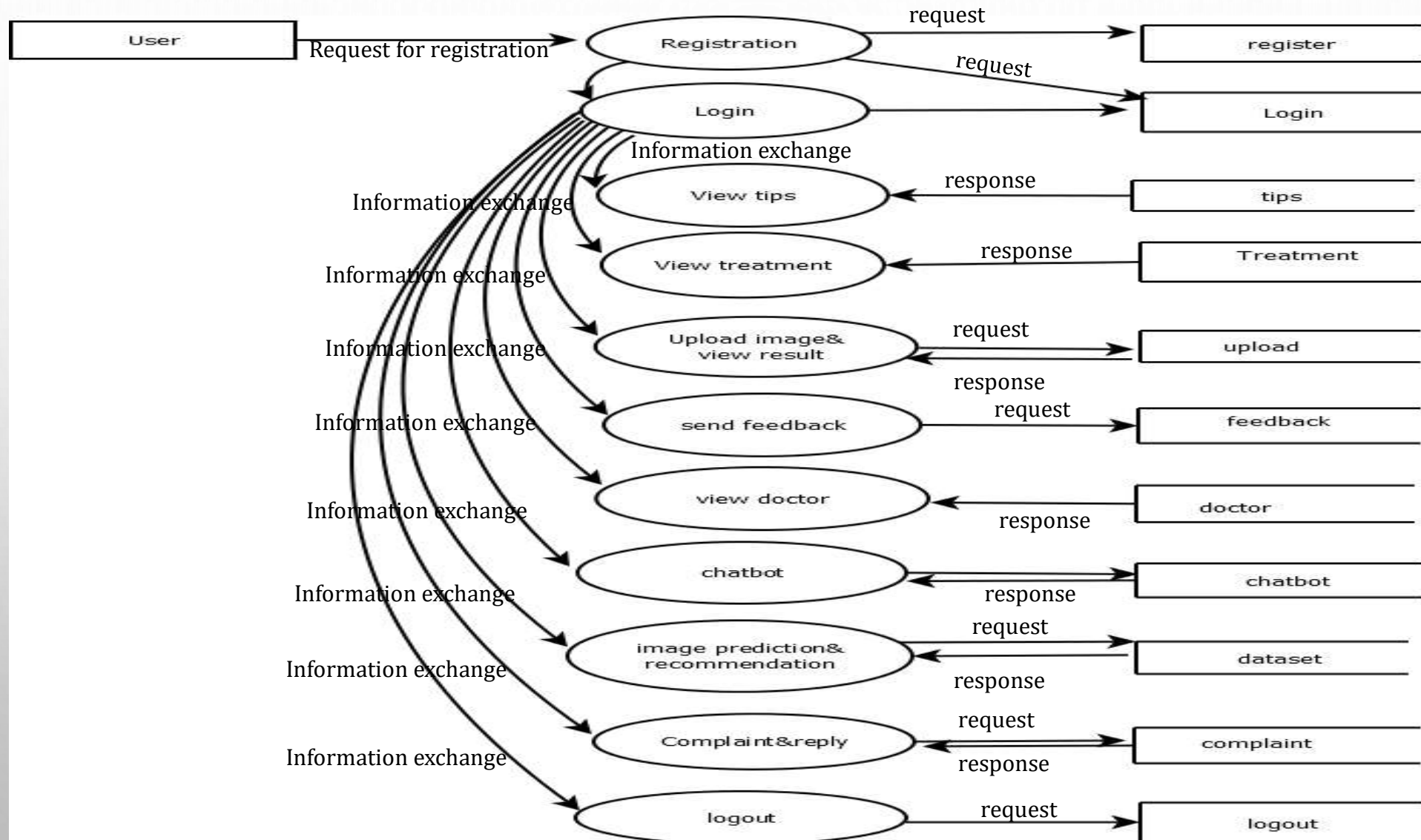
❖ Level 0:



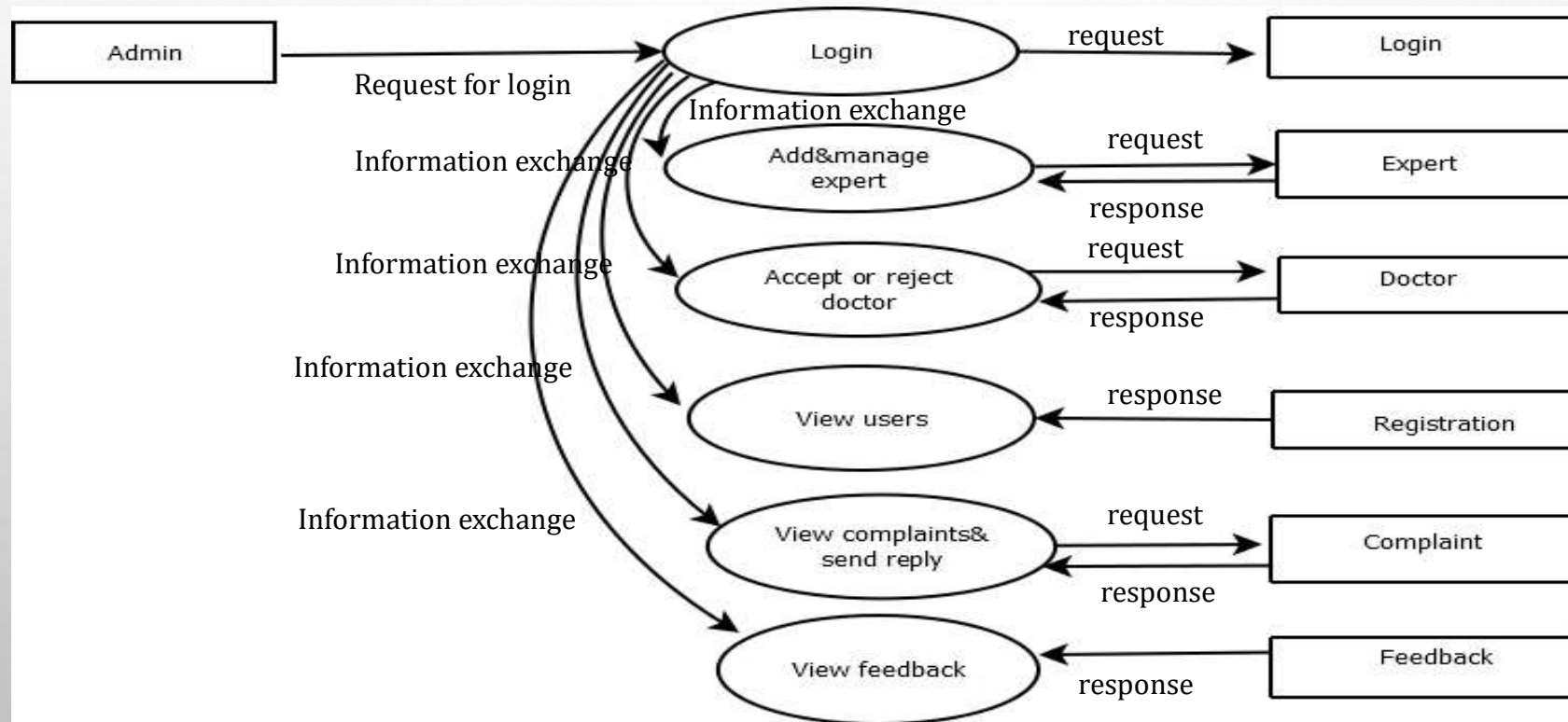
❖ Level 1:



❖ Level 2:



❖ Level 3:



❖ Level 4:

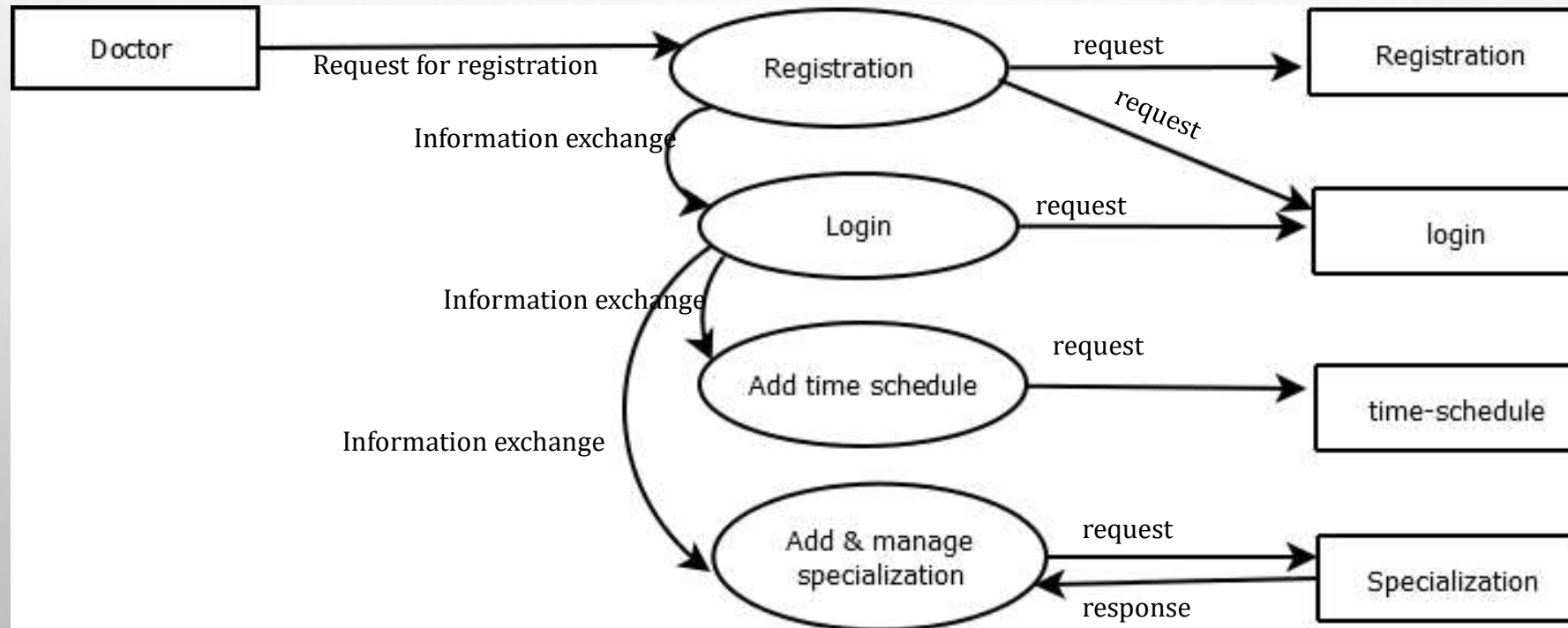
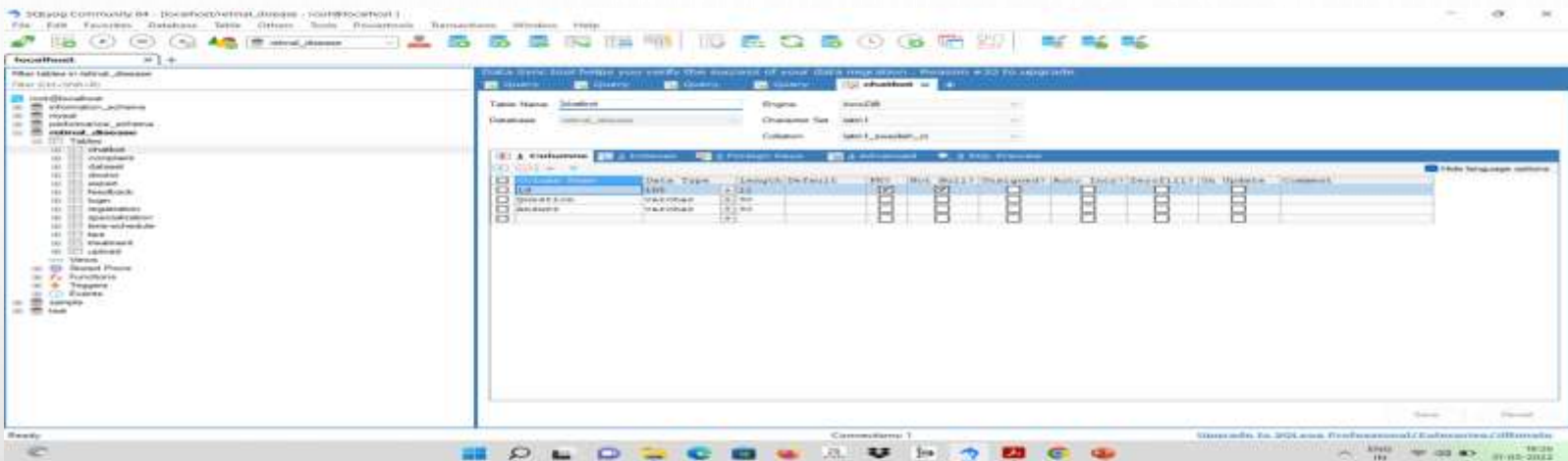
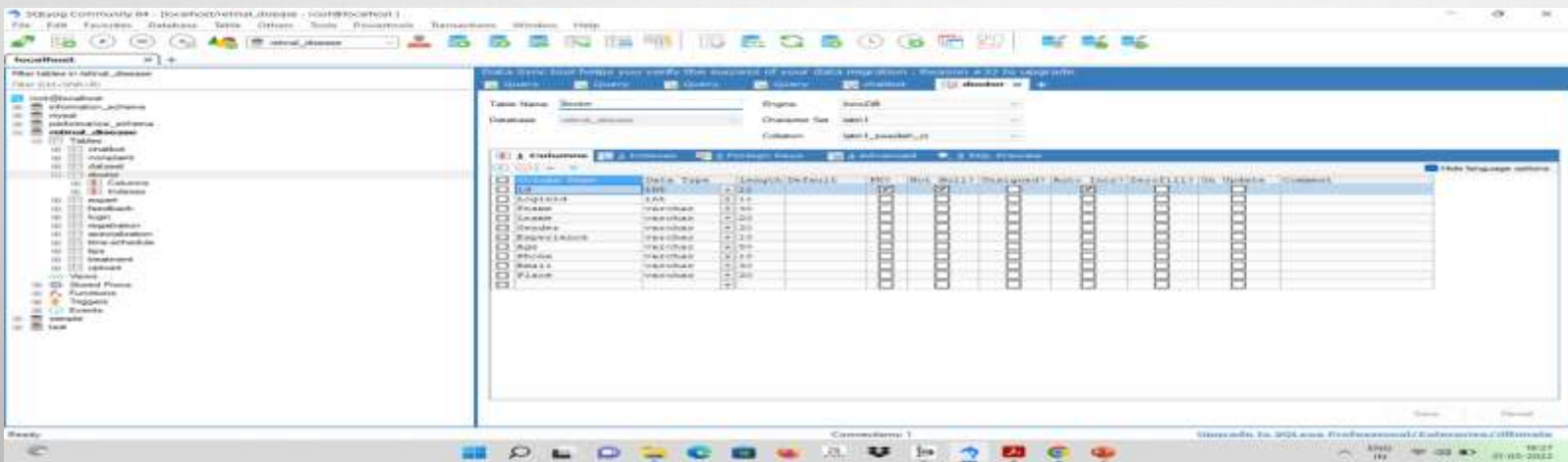


TABLE DESIGN

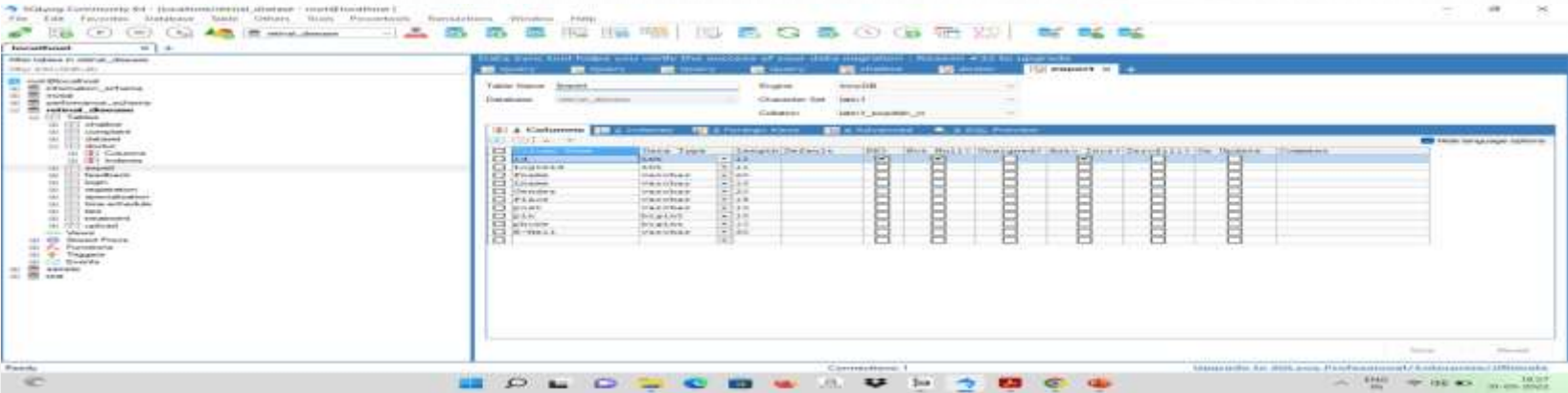
Chatbot



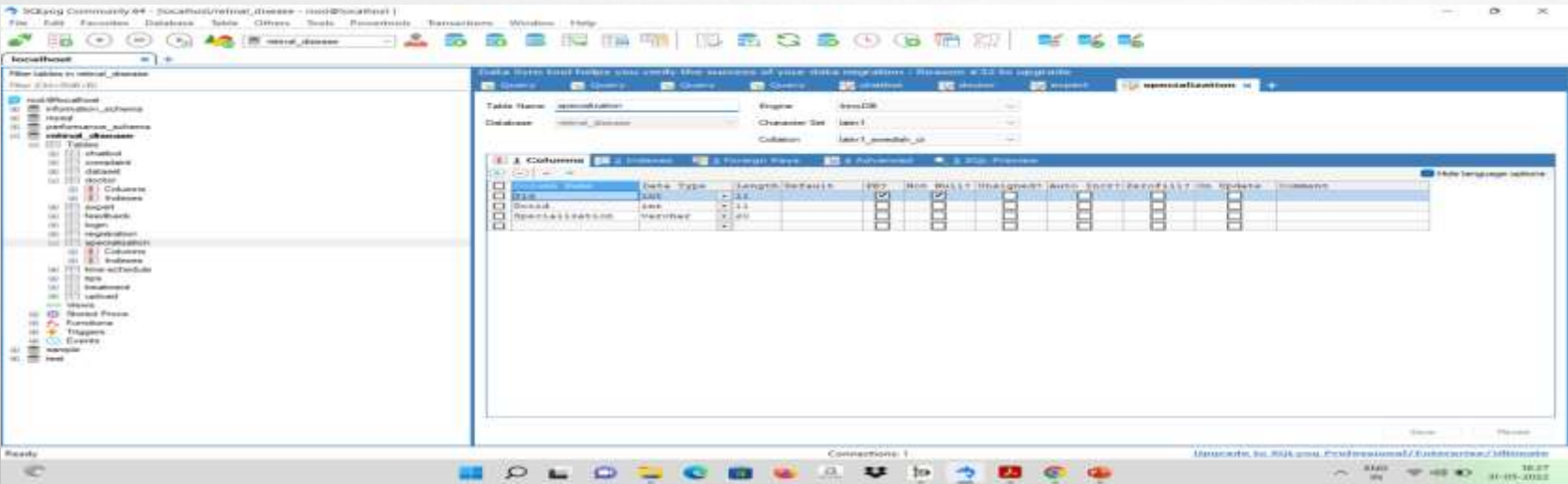
Doctor



Expert



Specialization



DEVELOPING ENVIRONMENT

- OPERATING SYSTEM: WINDOWS 10
- FRONT END: HTML ,CSS,JAVASCRIPT
- BACK END: MYSQL
- SOFTWARE USED:JETBRAINS PYCHARM,ANDROID
- TECHNOLOGY USED: PYTHON,JAVA
- FRAME WORK USED:FLASK

USER STORY

UserStoryID	As a <type of user>	I want to <perform some task>	So that I can <Achieve some goal>
1	Expert	login	login successful with correct username and password
2	Expert	Add and manage dataset	Add disease effected fundus image.
3	Expert	Add and manage tips	Add tips for users and view the added tips.
4	Expert	View feedback	View user feedback
5	Expert	Add and Manage treatments	Add treatments for different eye disease.
6	Expert	Add and manage dataset	Add symptoms and its corresponding disease stage
7	User	Register	User can register with this app
8	User	Login	login successful with correct username and password
9	User	Upload image and view result	Upload image and View result
10	User	View tips	View added tips
11	User	Send feedback	Send feedback
12	User	View treatments	View added treatments
13	User	View doctor	View doctors list
14	User	Chatbot	Chatbot for patient & hospital interaction
15	User	Image prediction and recommendation	Through the prediction of disease ,recommend doctor
16	User	Complaint and reply	Users send complaints and admin gives reply

17	Admin	Login	login successful with correct username and password
18	Admin	Add and manage expert	Add expert for controlling expert system
19	Admin	Accept or reject doctor	Admin can accept and reject doctor
20	Admin	View users	View registered users
21	Admin	View complaint and send reply	Admin can view the complaints and can send reply .
22	Admin	View feedback	Admin can also view the feedback
23	Doctor	Registration	Doctor registration
24	Doctor	Login	login successful with correct username and password
25	Doctor	Add time schedule	Add doctors time schedules
26	Doctor	Add and manage specialization	Add doctors specialization

PRODUCT BACKLOG

User Story ID	Priority <High/Medium/Low>	Size (Hours)	Sprint <#>	Status <Planned/In progress/Completed>	Release Date	Release Goal
1	Medium	8	1	Completed	1/05/22	Table design
2	High	10		Completed	15/05/22	Form design of Admin, Basic coding
3	High	6	2	Completed	28/05/22	Form design of doctor
4	Medium	5		Completed	1/06/22	Basic coding
5	High	5	3	Completed	2/06/22	Symptoms dataset creation preprocessing
6	Medium	5		Completed	5/06/22	User home functions
7	Medium		4	Planned		Chatbot dataset creation
8	High			Planned		preprocessing
9	High			Planned		Similarity matching&output answer
10	Medium		5	Planned		User functions
11	High			Planned		Recommendation

PROJECT PLAN

User Story ID	Task Name	Start Date	End Date	Hours	Status
1	Sprint 1	20/04/2022	1/05/2022	18	Completed
2		4/05/2022	15/05/2022		Completed
3	Sprint 2	17/05/2022	28/05/2022	11	Planned
4		29/05/2022	1/06/2022		Planned
5	Sprint 3	1/06/2022	2/06/2022	10	Planned
6		2/06/2022	5/06/2022		Planned
7	Sprint 4				Planned
8					Planned
9					Planned
10	Sprint 5				Planned
11					Planned

SPRINT BACKLOG PLAN

[illegible]

SPRINT ACTUAL

[illegible]

THANK YOU