

BayMax

Your healthcare companion!

Independent Study Project By:

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INTRODUCTION

- In the BayMax Django web application, two pivotal models, the Disease Prediction Model, and the Drug Name Recommendation Model, seamlessly integrate to enhance healthcare interactions.
- The Patient Dashboard employs the Disease Prediction Model, offering users proactive health insights for anticipating potential ailments.
- Simultaneously, the Doctor Dashboard utilizes the Drug Name Recommendation Model, employing machine learning to suggest optimal drug names for personalized treatment plans.
- To address misunderstandings, patients can effortlessly request appointments with healthcare providers, ensuring a human touch in the era of AI-driven healthcare solutions.



MOTIVATION

- **Facilitates Easy Home Diagnoses:** BayMax empowers individuals to conduct preliminary health assessments from the comfort of their homes, streamlining the diagnostic process and reducing the need for hospital visits.
- **Optimizes Drug Prescriptions:** Through advanced machine learning, BayMax's Drug Name Recommendation Model ensures personalized and optimized drug prescriptions, enhancing the efficacy of treatment plans.
- **Seamless Communication Channels:** BayMax establishes direct communication channels between patients and healthcare providers, fostering a bridge for clarifications and appointments and promoting a patient-centric approach to healthcare.



OUTLINE

01.

User Registration and Authentication:

- Patient and doctor registration with HTML forms
- Django-based authentication for secure access
- Profile creation for personalized user experiences

02.

Patient Dashboard:

- User-friendly UI displaying relevant health information
- MySQL integration for seamless data storage
- Symptom input form for preliminary diagnosis

03.

Disease Prediction Model (ML Algorithms):

- Logistic Regression, Naive Bayes, Random Forest, Decision Trees, MLP for disease prediction
- Predicted results displayed on the patient dashboard

04.

Appointment Handling:

- Patient initiates an appointment request through the UI
- Request details stored in MySQL database
- Confirmation sent to the patient

05.

Doctor Dashboard:

- Doctor authentication to access the dashboard
- User-friendly UI for drug recommendation and appointment management
- MySQL integration for data retrieval

06.

Drug Name Recommendation Model:

- Naive Bayes and Random Forest used for drug prediction
- Patient data retrieved for personalized drug recommendations

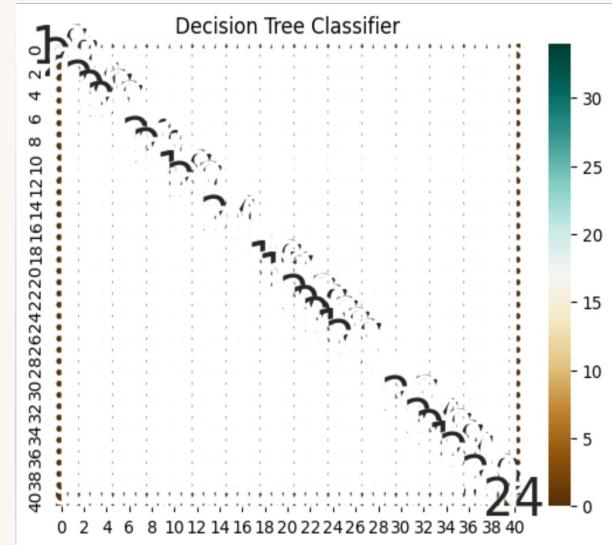
MODELS

Disease Prediction Model Selection:

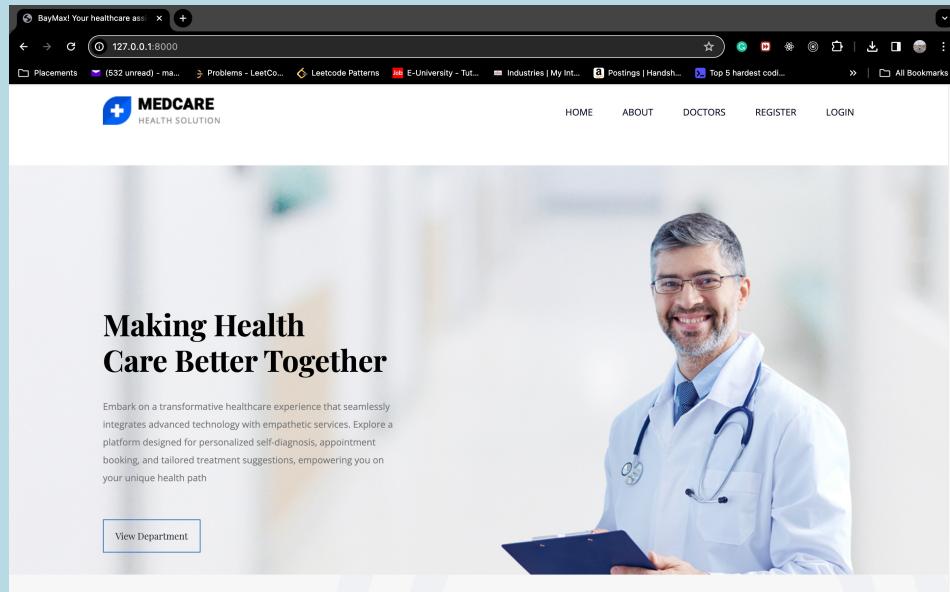
- Employing the Decision Tree model for disease prediction within BayMax, achieving a robust mean accuracy of 90%.
- The serialized Decision Tree model is exported as a pickle file, enabling seamless integration and retrieval for real-time predictions.

Drug Recommendation Model Choice:

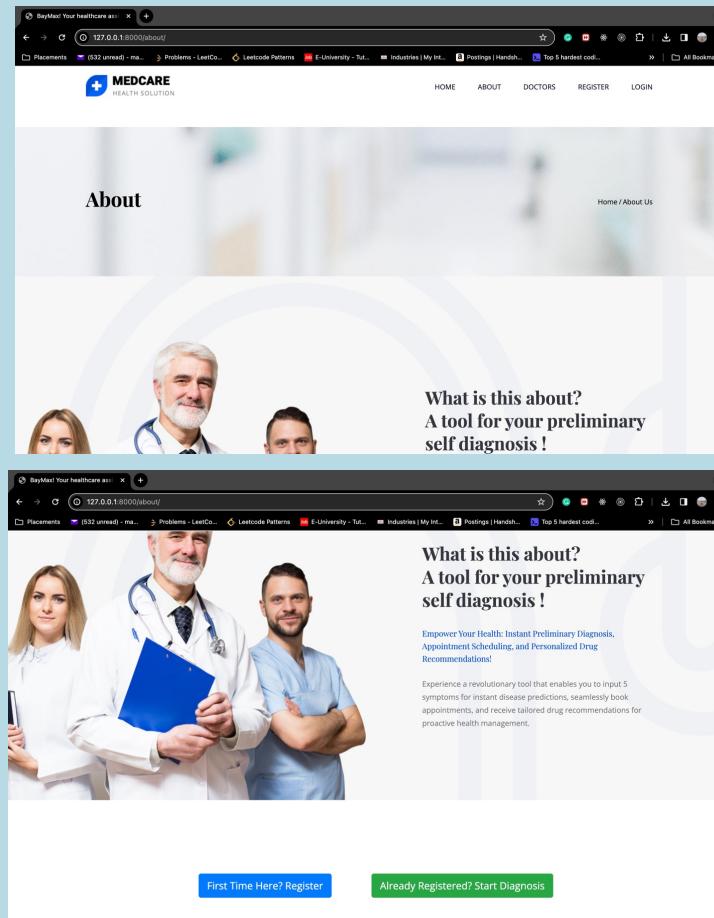
- Opting for the Random Forest model for drug recommendation, showcasing a mean accuracy of 75%.
- The Random Forest model is serialized into a pickle file, facilitating efficient usage and integration into the doctor dashboard for personalized drug recommendations.



PATIENT OUTPUT PT. 1



Home page of the website



About page of the website

PATIENT OUTPUT PT. 2

The screenshot shows a web browser window with the URL `127.0.0.1:8000/register/`. The page has a light blue header bar with the text "Registration Form". Below it is a form with three input fields: "Username" (placeholder "Enter Username"), "Email" (placeholder "Enter Email"), and "Password" (placeholder "Enter Password"). At the bottom of the form is a blue "Register" button.

Registration page

The screenshot shows a web browser window with the URL `127.0.0.1:8000/login/`. The page has a light blue header bar with the text "Login Form". Below it is a form with two input fields: "Username" (placeholder "Enter Username") and "Password" (placeholder "Enter Password"). To the right of the password field is a blue "Login" button.

Login Page

PATIENT OUTPUT PT. 3

The screenshot shows the phpMyAdmin interface for the 'healthcare_db' database. The left sidebar lists various tables under the 'healthcare_db' schema. The main area displays a table of 14 tables, each with columns for Action, Table, Rows, Type, Collation, Size, and Overhead. The table structure is as follows:

Action	Table	Rows	Type	Collation	Size	Overhead
Browse Structure Search Insert Empty Drop	auth_group	0	InnoDB	utf8mb4_general_ci	32.0 Kib	-
Browse Structure Search Insert Empty Drop	auth_group_permissions	0	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	auth_permission	40	InnoDB	utf8mb4_general_ci	32.0 Kib	-
Browse Structure Search Insert Empty Drop	core_feedback	0	InnoDB	utf8mb4_general_ci	16.0 Kib	-
Browse Structure Search Insert Empty Drop	core_medical	0	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	core_ment	0	InnoDB	utf8mb4_general_ci	64.0 Kib	-
Browse Structure Search Insert Empty Drop	core_profile	0	InnoDB	utf8mb4_general_ci	32.0 Kib	-
Browse Structure Search Insert Empty Drop	core_user	1	InnoDB	utf8mb4_general_ci	32.0 Kib	-
Browse Structure Search Insert Empty Drop	core_user_groups	0	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	core_user_user_permissions	0	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	django_admin_log	11	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	django_content_type	10	InnoDB	utf8mb4_general_ci	48.0 Kib	-
Browse Structure Search Insert Empty Drop	django_migrations	24	InnoDB	utf8mb4_general_ci	16.0 Kib	-
Browse Structure Search Insert Empty Drop	django_session	1	InnoDB	utf8mb4_general_ci	32.0 Kib	-
14 tables		Sum		87 InnoDB	utf8mb4_general_ci	544.0 Kib

The bottom section of the interface shows a console window with the message "Press Ctrl+Enter to execute query".

Database structure

PATIENT OUTPUT PT. 4

BayMax! Your healthcare assis... x +

127.0.0.1:8000/register/

Placements (532 unread) - ma... Problems - LeetCo... Leetcode Patterns E-University - Tut... Industries | My Int... Postings | Handsh... Top 5 hardest codi... All Bookmarks

MEDCARE
HEALTH SOLUTION

Home About Doctors Register Login

Registration Form

Username

Email

Password

Register

BayMax! Your healthcare assis... x +

127.0.0.1:8000/register/

Placements (532 unread) - ma... Problems - LeetCo... Leetcode Patterns E-University - Tut... Industries | My Int... Postings | Handsh... Top 5 hardest codi... All Bookmarks

MEDCARE
HEALTH SOLUTION

Home About Doctors Register Login

Registration Form

Username

Email

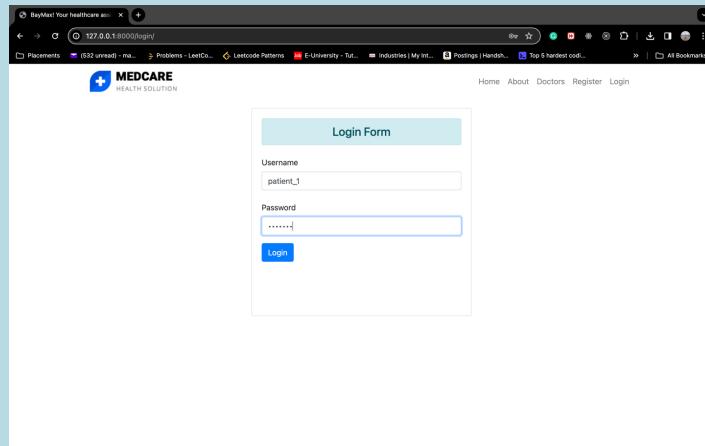
Password

Register

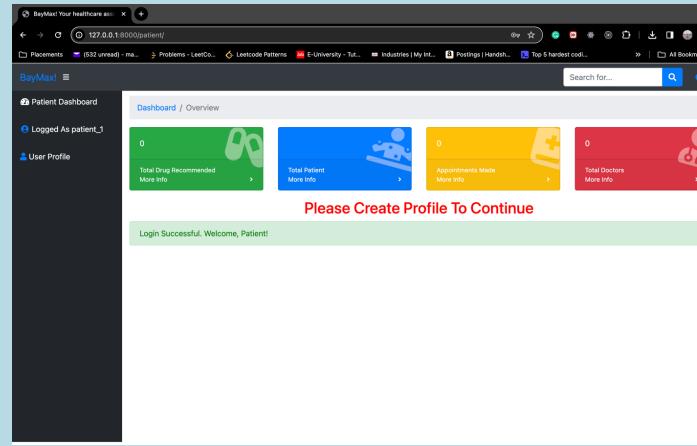
Account was created successfully.

Registering a user

PATIENT OUTPUT PT. 5

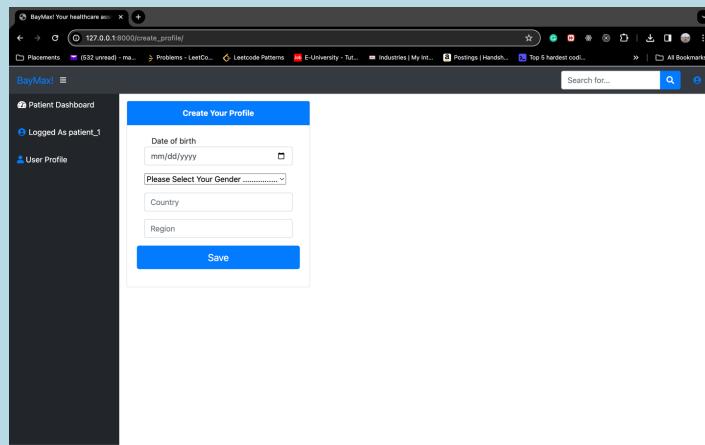


A screenshot of a web browser showing the MEDCARE login page. The URL is 127.0.0.1:8000/login. The page has a header with the MEDCARE logo and navigation links for Home, About, Doctors, Register, and Login. Below the header is a "Login Form" section containing fields for Username (patient_1) and Password (*****), and a blue "Login" button.

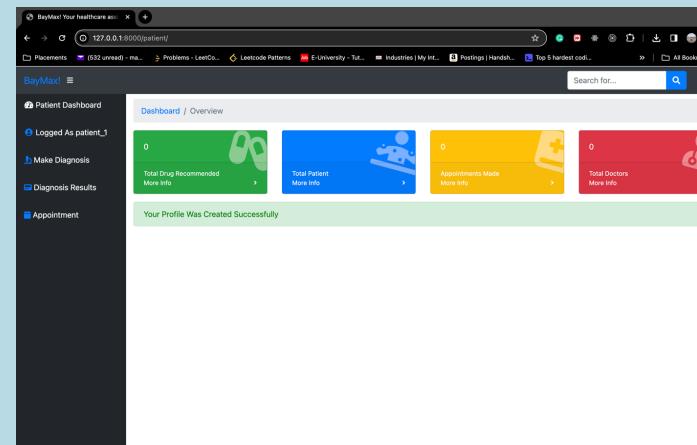


A screenshot of the Patient Dashboard. The URL is 127.0.0.1:8000/patient/. The dashboard features a "Please Create Profile To Continue" message in red at the top. It includes four cards: "Total Drug Recommended" (0), "Total Patient" (0), "Appointments Made" (0), and "Total Doctors" (0). A green banner at the bottom says "Login Successful. Welcome, Patient!".

Logging In and Creating a profile



A screenshot of the "Create Your Profile" form. The URL is 127.0.0.1:8000/create_profile. The form includes fields for Date of birth (mm/dd/yyyy), Please Select Your Gender (dropdown menu), Country, and Region. A blue "Save" button is at the bottom.



A screenshot of the Patient Dashboard after creating a profile. The URL is 127.0.0.1:8000/patient/. The dashboard shows the same four cards as before, but now they have values: "Total Drug Recommended" (0), "Total Patient" (0), "Appointments Made" (0), and "Total Doctors" (0). A green banner at the bottom says "Your Profile Was Created Successfully".

PATIENT OUTPUT PT. 6

A screenshot of a web browser window titled "BayMax! Your healthcare ass...". The URL is 127.0.0.1:8000/diagnosis/. The page has a dark sidebar on the left with icons for Patient Dashboard, Make Diagnosis, Diagnosis Results, and Appointment. The main content area is titled "Disease Prediction Panel". It contains five input fields labeled "1st Symptom", "2nd Symptom", "3rd Symptom", "4th Symptom", and "5th Symptom", each with the placeholder text "Please Choose Symptom". Below these fields is a green "Predict" button.

A screenshot of a web browser window titled "BayMax! Your healthcare ass...". The URL is 127.0.0.1:8000/diagnosis/. The sidebar and main content area are identical to the first screenshot, but the input fields now contain specific values: "muscle_wasting" for 1st Symptom, "patches_in_throat" for 2nd Symptom, "high_fever" for 3rd Symptom, "extra_marital_contacts" for 4th Symptom, and "fatigue" for 5th Symptom. Below the 5th Symptom field is another green "Predict" button. To the right of the 5th Symptom field, the text "There Are Chances You Have AIDS" is displayed.

Disease Prediction

PATIENT OUTPUT PT. 7

The screenshot shows a web browser window titled "BayMax! Your healthcare ass...". The URL is "127.0.0.1:8000/result". The page has a dark sidebar on the left with icons for "Patient Dashboard", "Logged As patient_1", "Make Diagnosis", "Diagnosis Results", and "Appointment". The main content area is titled "Medical Check Up Panel" and contains a table titled "List Of Disease Diagnosed". The table has columns: Id, Name, Disease, Medicine, and Appointment. There are two rows:

Id	Name	Disease	Medicine	Appointment
33	patient_1	Jaundice	Yet Recommended	<button>Request</button>
34	patient_1	AIDS	Yet Recommended	<button>Request</button>

This screenshot is from the same BayMax! application. The URL is "127.0.0.1:8000/result". The sidebar and table structure are identical to the first screenshot. However, the "Appointment" column for both rows now contains a blue button labeled "Requested". Below the table, a message reads "Appointment Was Successfully Requested".

Requesting Appointment

DOCTOR OUTPUT PT. 1

The image displays two screenshots of a web-based healthcare application interface.

Left Screenshot (Registration Form):

- The title bar shows the URL `127.0.0.1:8000/register/`.
- The header includes a logo for "MEDCARE HEALTH SOLUTION".
- The main content is a "Registration Form" with fields:
 - Username: doctor
 - Email: doctor@gmail.com
 - Password: (redacted)
- A "Register" button is at the bottom.

Right Screenshot (Doctor Dashboard):

- The title bar shows the URL `127.0.0.1:8000/doctor/`.
- The header includes a search bar and a message to "Press (Fn) F to exit full screen".
- The sidebar menu includes:
 - Doctor Dashboard (selected)
 - Logged As doctor
 - Drug Recommendation
 - Appointment
- The main dashboard area shows four cards:
 - Total Drug Recommended: 8 (More Info)
 - Total Patient: 0 (More Info)
 - Appointments Made: 0 (More Info)
 - Total Doctors: 1 (More Info)

Registering and log in as a doctor

DOCTOR OUTPUT PT. 2

BayMax! Your healthcare ass... 127.0.0.1:8000/commend/

Doctor Dashboard

Logged As doctor

Drug Recommendation

Appointment

Drug Recommendation Panel

List Of Disease Diagnosed

ID	Name	Disease	Medicine	Action
33	patient_1	Jaundice	Yet Recommended	<button>Recommend</button>
34	patient_1	AIDS	Yet Recommended	<button>Recommend</button>
35	patient_1	Osteoarthritis	Yet Recommended	<button>Recommend</button>
36	patient_1	Paralysis (brain hemorrhage)	Yet Recommended	<button>Recommend</button>
37	patient_1	Diabetes	Yet Recommended	<button>Recommend</button>
38	patient_1	Migraine	Yet Recommended	<button>Recommend</button>
39	patient_1	Allergy	Yet Recommended	<button>Recommend</button>
40	patient_1	Urinary tract infection	Yet Recommended	<button>Recommend</button>

BayMax! Your healthcare ass... 127.0.0.1:8000/commend/

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BayMax! Logged As doctor Drug Recommendation Appointment

List Of Disease Diagnosed

ID	Name	Disease	Medicine	Action
33	patient_1	Jaundice	See Doctor	<button>Recommend</button>
34	patient_1	AIDS	Cytogranir TM 450mg Tablet 2'S	<button>Recommend</button>
35	patient_1	Osteoarthritis	See Doctor	<button>Recommend</button>
36	patient_1	Paralysis (brain hemorrhage)	See Doctor	<button>Recommend</button>
37	patient_1	Diabetes	See Doctor	<button>Recommend</button>
38	patient_1	Migraine	Cephagraine Drops 15ml/Cephagraine Tablet 40'S	<button>Recommend</button>
39	patient_1	Allergy	Cetirizet 10mg Tablet 10'S/Cetirizet 5mg Tablet 10'S	<button>Recommend</button>
40	patient_1	Urinary tract infection	Alcephin 125mg Tablet 10'S/Alcephin 250mg Capsule 10'S	<button>Recommend</button>

Doctor recommending drugs to patients

DOCTOR OUTPUT PT. 3

The screenshot shows a web browser window titled "BayMax! Your healthcare assistant" with the URL "127.0.0.1:8000/meet/". The page is titled "Appointment Panel" and displays a table titled "List of Patient Appointment". The table has columns for "Id", "Patient", "Status", and "Arrange Appointment". There are 10 rows of data, each representing a patient appointment. The "Status" column shows values like "Approved", "Pending", and "Confirmed". The "Arrange Appointment" column contains blue "Click here" buttons.

List of Patient Appointment			
ID	Patient	Status	Arrange Appointment
23	patient_1	Approved	Click here
24	patient_1	Pending	Click here
25	patient_1	Pending	Click here
26	patient_1	Pending	Click here
27	patient_1	Pending	Click here
28	patient_1	Pending	Click here
29	patient_1	Pending	Click here
30	patient_1	Pending	Click here

The screenshot shows a modal dialog box titled "127.0.0.1:8000 says" with the message "Appointment is confirmed". The background page is the same as the first screenshot, showing the "List of Patient Appointment" table. A green "OK" button is visible in the top right corner of the modal.

ID	Patient	Status	Arrange Appointment
23	patient_1	Approved	
24	patient_1	Pending	
25	patient_1	Pending	
26	patient_1	Pending	
27	patient_1	Pending	
28	patient_1	Pending	
29	patient_1	Pending	
30	patient_1	Pending	

Doctor setting appointments

PATIENT OUTPUT PT. 8

BayMax! ■

Patient Dashboard

Logged As patient_1

Make Diagnosis

Diagnosis Results

Appointment

Medical Check Up Panel

List Of Disease Diagnosed

ID	Name	Disease	Medicine	Appointment
33	patient_1	Jaundice	See Doctor	Appointment Exists
34	patient_1	AIDS	Cytogair TM 450mg Tablet 2'S	Appointment Exists
35	patient_1	Osteoarthritis	See Doctor	Appointment Exists
36	patient_1	Paralysis (brain hemorrhage)	See Doctor	Appointment Exists
37	patient_1	Diabetes	See Doctor	Appointment Exists
38	patient_1	Migraine	Cephagraine Drops 15ml/Cephagraine Tablet 40'S	Appointment Exists
39	patient_1	Allergy	Cetirizine 10mg Tablet 10'S/Cetirizine 5mg Tablet 10'S	Appointment Exists
40	patient_1	Urinary tract infection	Alcephin 125mg Tablet 10'S/Alcephin 250mg Capsule 10'S	Appointment Exists

BayMax! ■

Patient Dashboard

Logged As patient_1

Make Diagnosis

Diagnosis Results

Appointment

Appointment Panel

List Of Disease Diagnosed

ID	Patient	Status	Day	Time	Doctor	Doctor Contact
23	patient_1		Dec 14, 2023	09:00	doctor	6096197061
24	patient_1	Pending	Not Set	Not Set	None	None
25	patient_1	Pending	Not Set	Not Set	None	None
26	patient_1	Pending	Not Set	Not Set	None	None
27	patient_1	Pending	Not Set	Not Set	None	None
28	patient_1	Pending	Not Set	Not Set	None	None
29	patient_1	Pending	Not Set	Not Set	None	None
30	patient_1	Pending	Not Set	Not Set	None	None

Patient being able to view recommended drugs and appointments set by Doctor

FUTURE WORK

Advanced Disease Treatments

Integration:

- Investigate integrating advanced and specific disease treatments, focusing on conditions like cancer, tumors, and other specialized medical scenarios.
- Incorporate cutting-edge treatment protocols and personalized care plans and insurance plans into the BayMax platform.

Dynamic Drug Recommendation System:

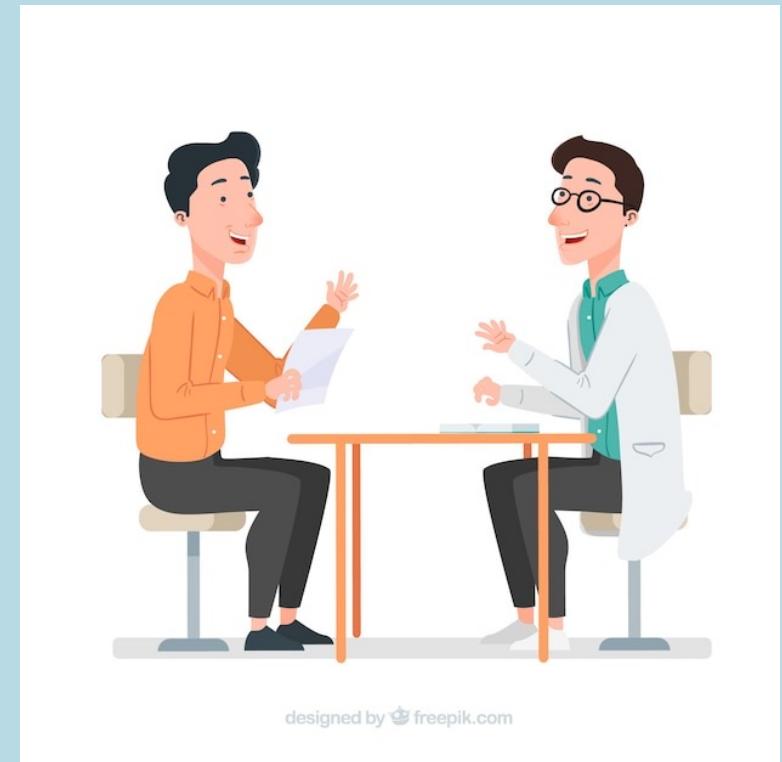
- Develop a more dynamic drug recommendation system by incorporating patient history, genetic information, and potential drug interactions for more accurate and personalized suggestions.

X-ray Reading and Report Processing:

- Implement a feature allowing patients to upload medical reports, specifically focusing on X-ray images.
- Integrate machine learning algorithms for automated X-ray analysis to assist healthcare providers in diagnostics.

CONCLUSION

- BayMax represents a shift in healthcare, seamlessly merging advanced technology with medical insights to provide accessible and personalized healthcare solutions.
- The project's success lies in integrating robust disease prediction models and dynamic drug recommendation systems, offering users a proactive approach to health management.
- Future work, including integrating specialized disease treatments and diagnostic image processing, positions BayMax as an evolving healthcare ecosystem ready to meet diverse medical needs.
- BayMax envisions a future where technology empowers individuals, fosters collaboration with healthcare professionals, and contributes to positive changes in healthcare delivery worldwide.



designed by  freepik.com

REFERENCES

- [1] Shahadat Uddin^{1*} , Arif Khan^{1,2}, Md Ekramul Hossain¹ and Mohammad Ali Moni³, “Comparing different supervised machine learning algorithms for disease prediction”, 2019
- [2] Kedar Pingale¹, Sushant Surwase², Vaibhav Kulkarni³, Saurabh Sarage⁴, Prof. Abhijeet Karve⁵, “Disease Prediction using Machine Learning”, December 2019
- [3] K.Sowmya, Saragadam Sridhar, “Drug Recommendation System Using Machine Learning Based On Tf-idf feature Extraction Process”, July 2023

Thank you very much!

