

# BLOOD PRESSURE TRACKER USING AI

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# BACKGROUND



Chronic diseases, encompassing conditions like diabetes and heart disease, demand continuous management due to their potential for disability and mortality.



**"Blood Pressure Tracker"** performs regular home health check-ups and empowers patients to detect issues early, enabling timely intervention and enhancing overall disease management.

# PROBLEM

- The lack of systems that allow patients to monitor their health and blood pressure without going to the doctor.
- assessing the health status of an individual using traditional methods are inaccurate, time consuming.
- the medical examinations and procedures may be expensive.

# THE SOLUTION

- use data analysis techniques and machine learning algorithms to detect patterns and provide an accurate diagnosis of health status for individuals.
- The system will provide a more accurate an individual's health status, enabling them to avoid future health problems

# ADVANTAGES



Completely for free



Saves time and easy  
to use



Provide an accurate  
diagnosis of blood  
pressure status.



Helping patients  
monitor their health

# Related Works



**Blood Pressure  
Calculator**

**Beat Diabetes Calculator**

**Beat Diabetes  
Calculator**

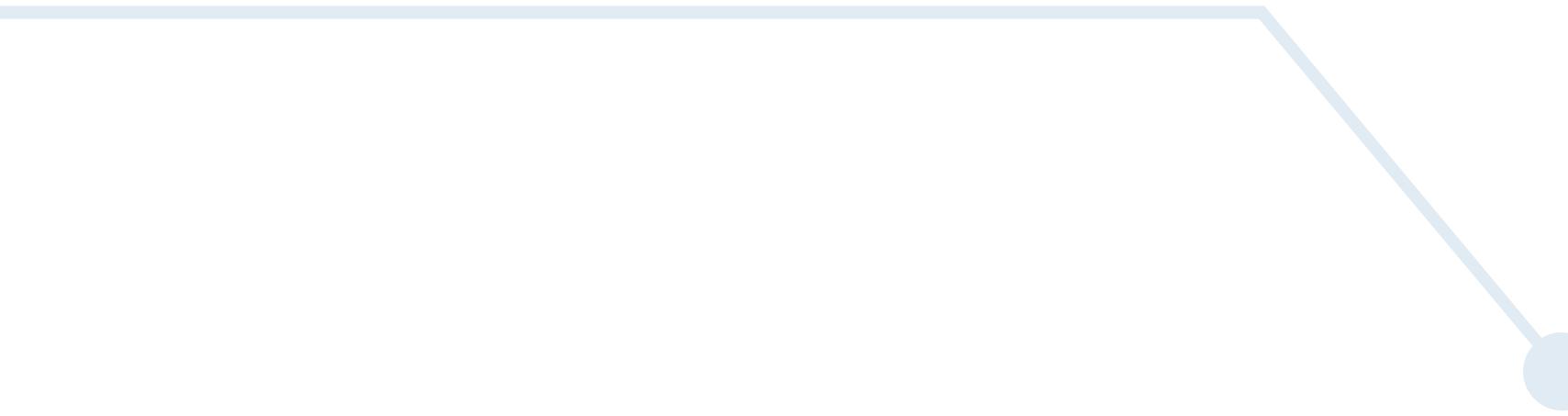


**Blood pressure  
test**



**Symptomate**

**symptomate**

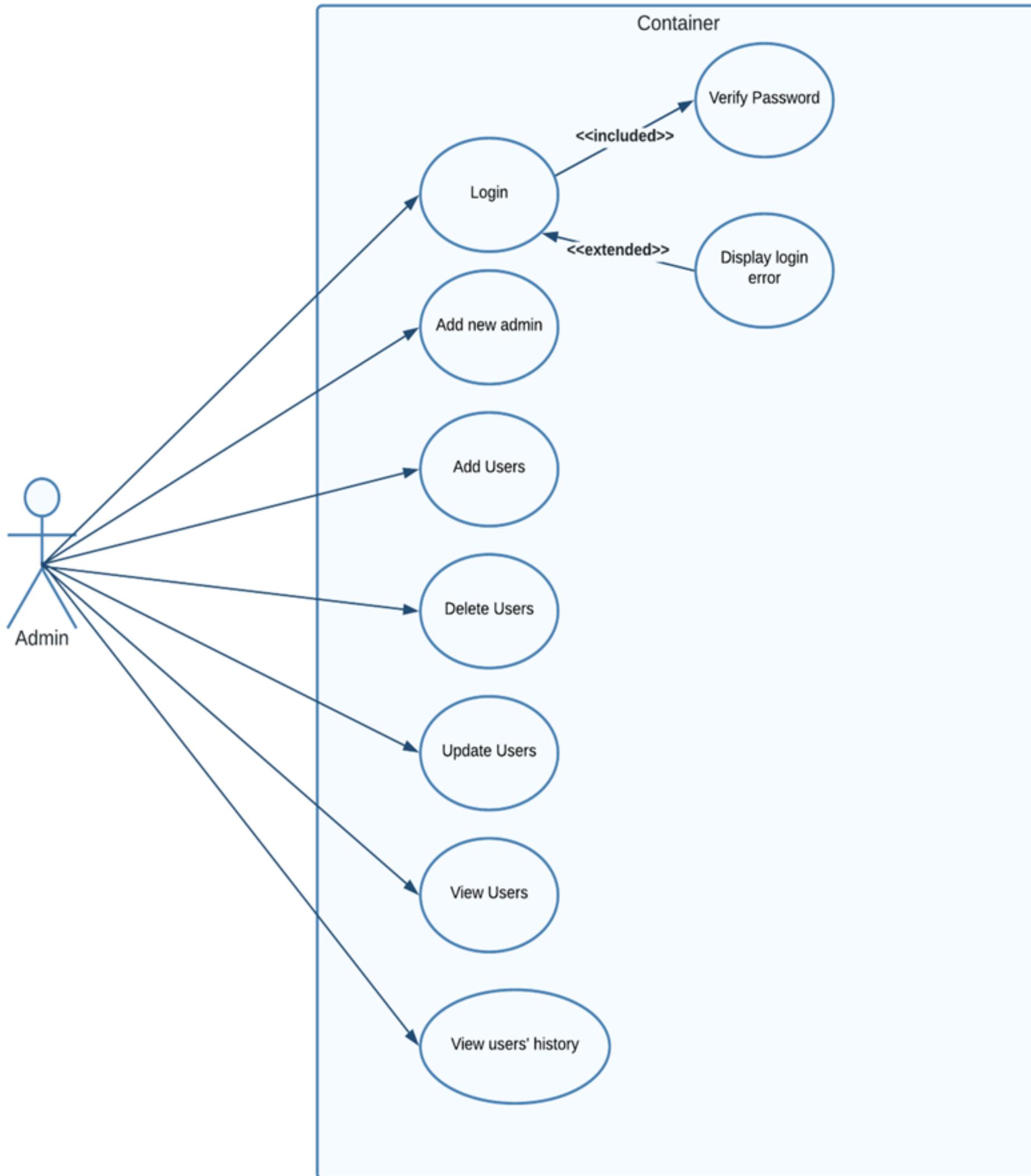


# **SOFTWARE ANALYSIS & DESIGN**

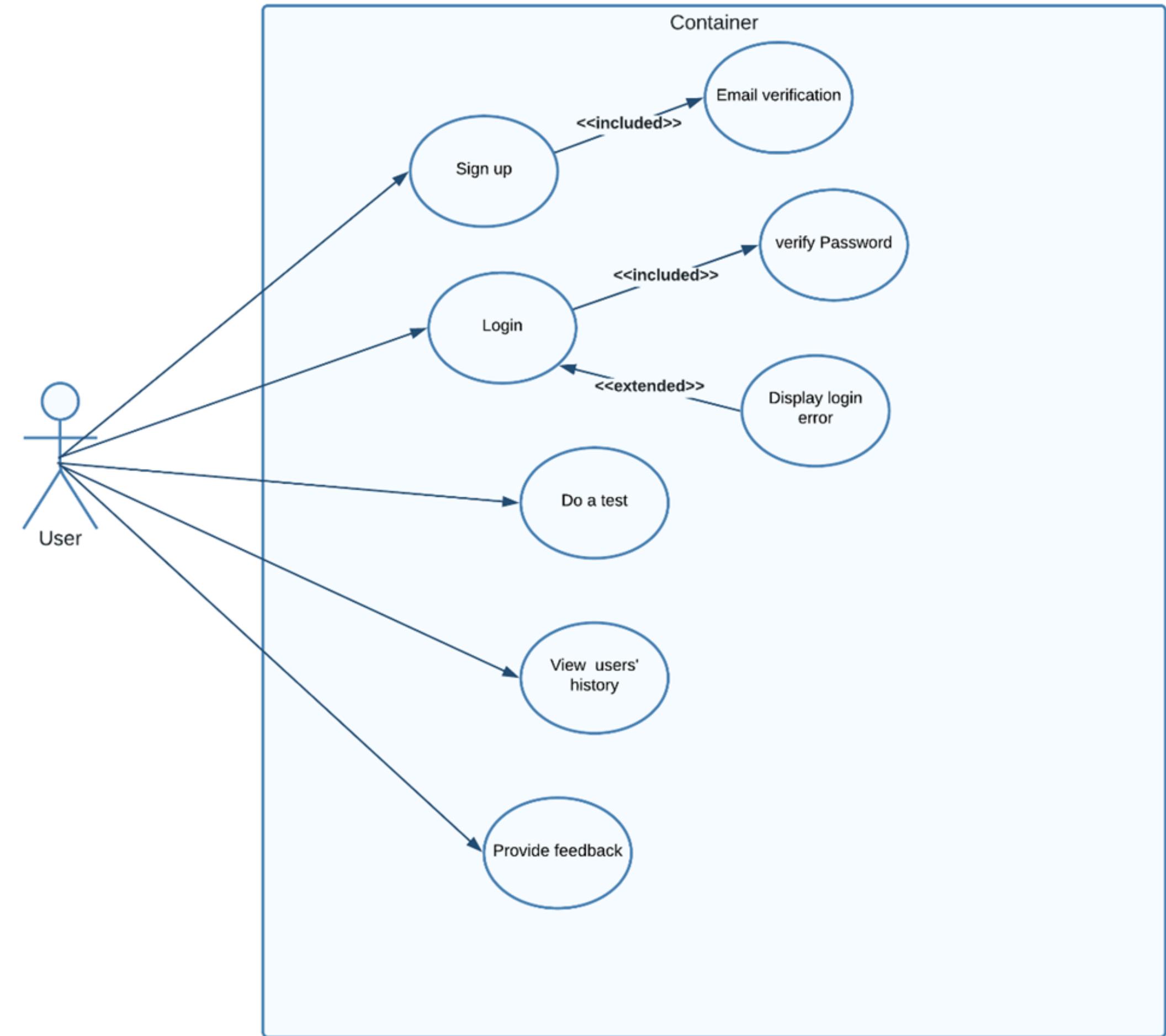


# USE CASE

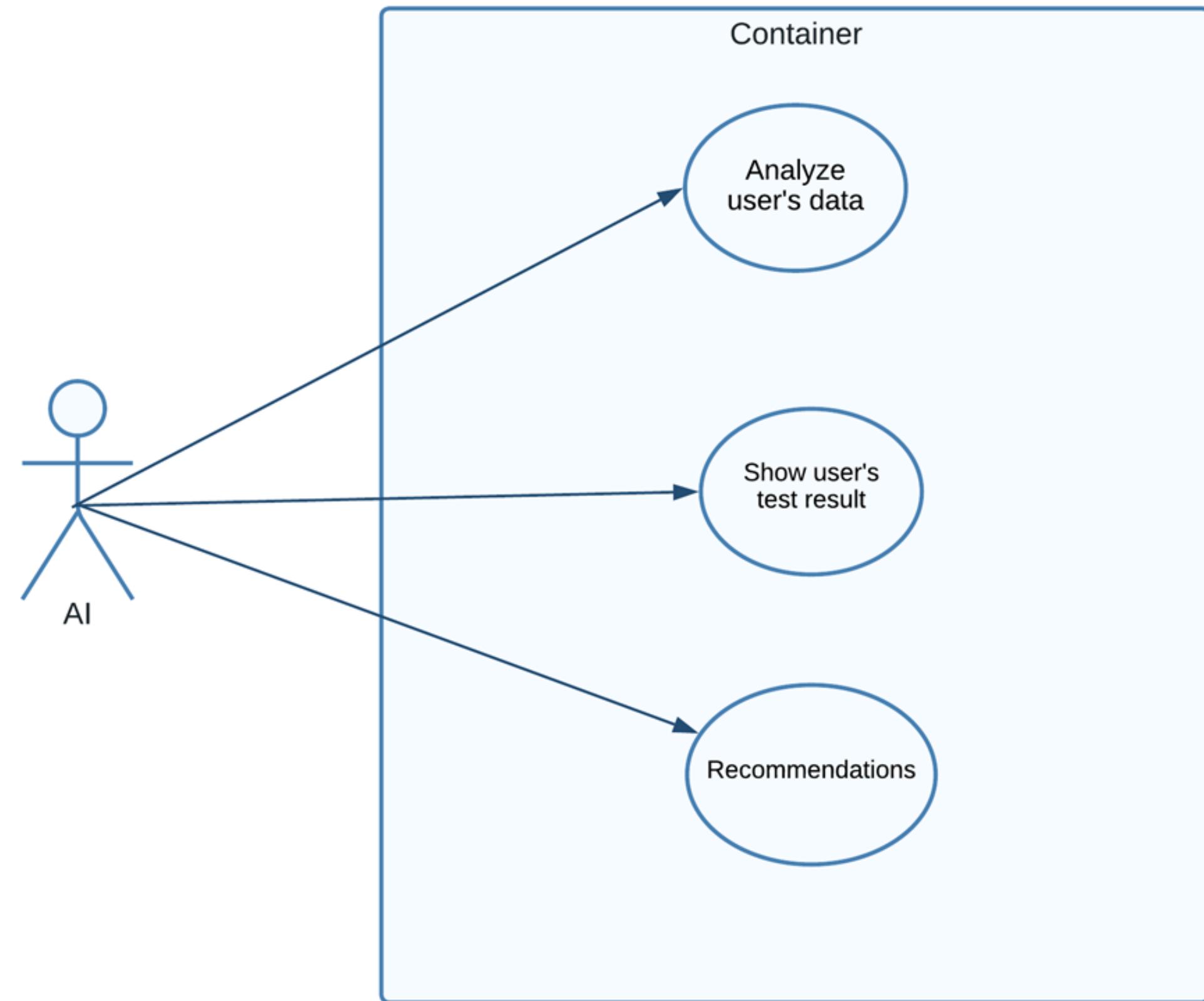
## Admin use case diagram



## User use case diagram



## AI use case diagram



# **CLASS DIAGRAM**

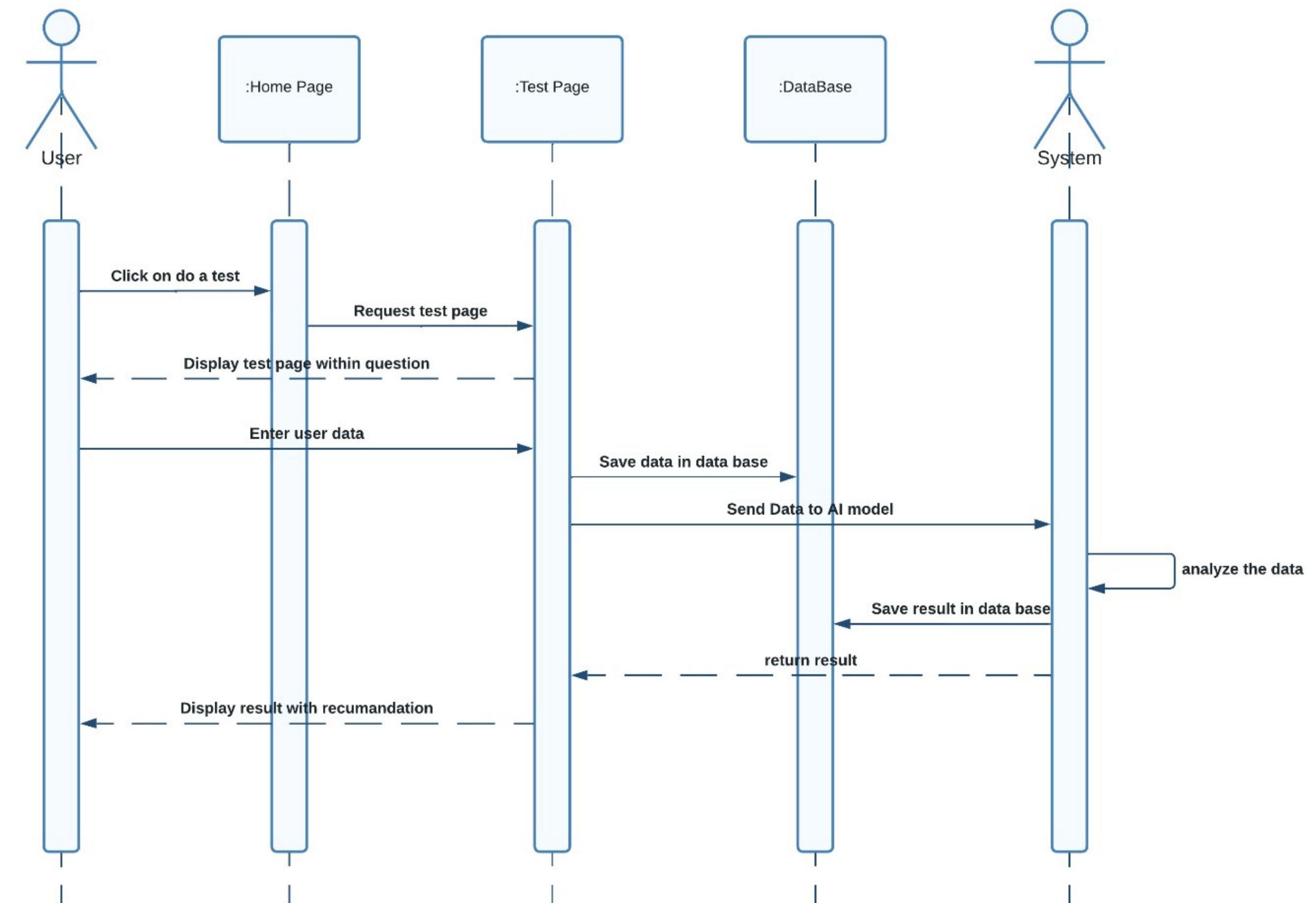
## MongoDB Schema

---

Medical Information	Users
<ul style="list-style-type: none"><li>- _id: objectId</li><li>- Age: int</li><li>- Gender: int</li><li>- Height: int</li><li>- Weight: int</li><li>- BMI: float</li><li>- HighBP: int</li><li>- LowBP: float</li><li>- BP: float</li><li>- Cholesterol: int</li><li>- Glucose: int</li><li>- Smoking: int</li><li>- Alcohol: int</li><li>- Activity: int</li><li>- Result: str</li><li>- user_id: objectId</li><li>- Test_Date:date</li></ul>	<ul style="list-style-type: none"><li>- _id: objectId</li><li>- name: Str</li><li>- email: Str</li><li>- gender: str</li><li>- age: int</li><li>- confirmEmail: true</li><li>- Password: Str</li><li>- isAdmin: boolean</li><li>- tokens: str[]</li><li>- createdAt: date</li><li>- updatedAt: date</li></ul>

# **SEQUENCE DIAGRAM**

## Analyzes user data Sequence Diagram



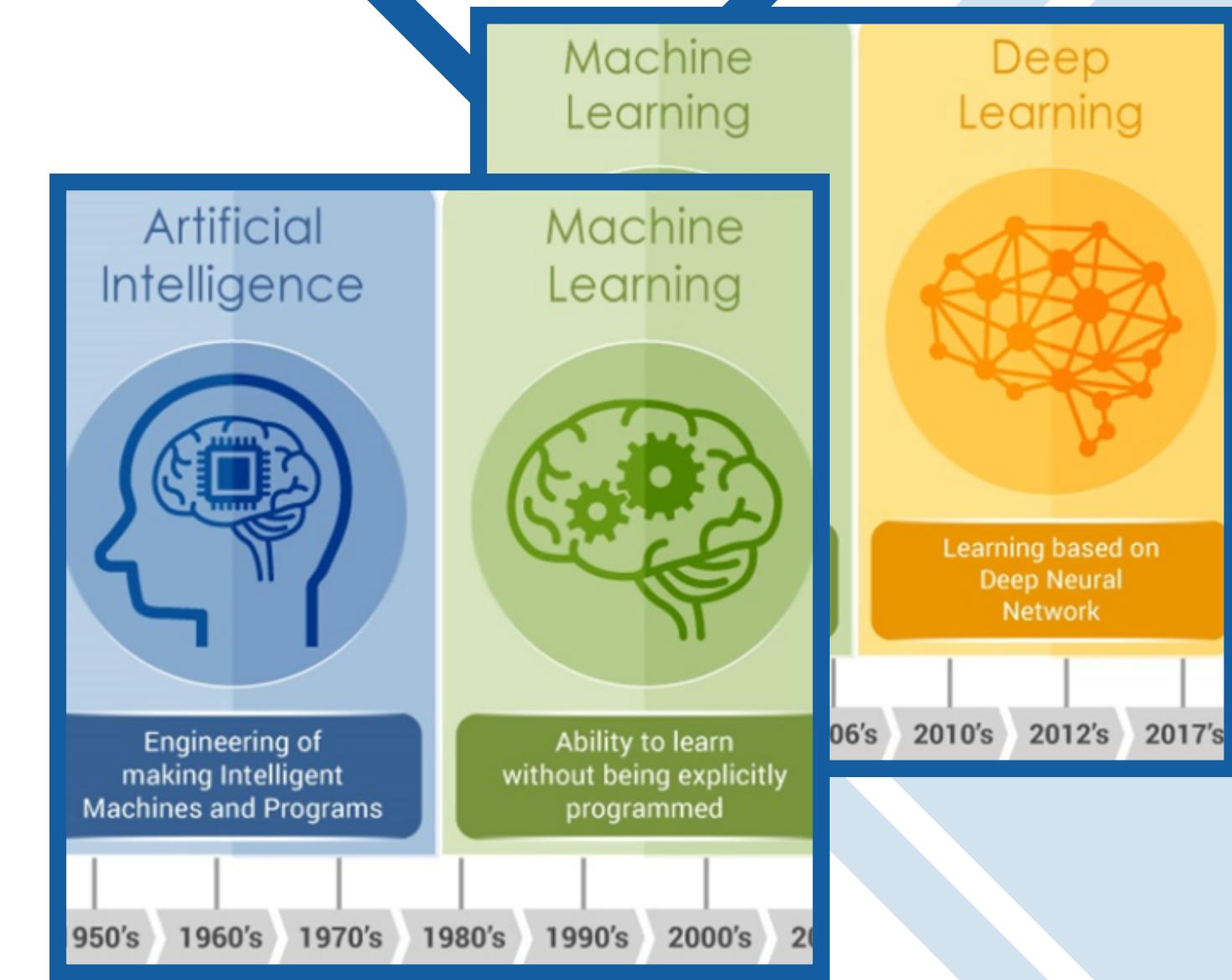
# USE CASE DESCRIPTION DIAGRAMS

## Do a Test use case Description diagram

Use case name:	Do a Test.					
scenario:	Do a health assessment.					
Triggering Event:	User wants to do a health assessment.					
Brief Description:	This use case describes the process of a user performing a health test using the system, which involves entering test parameters and receiving test results and recommendations.					
Actors:	User					
Related Use Case:	Analyze Test Results Use Case.					
Stakeholders:	Patients and Doctors					
Preconditions:	1.The user has successfully logged into the system. 2.The user has completed their profile information. 3.The system has the necessary resources and algorithms to perform the health test.					
Postconditions:	1.The test results are saved in the system. 2.The user receives the test result and recommendations. 3.The user's history are updated in the system. 4.The system may provide options for the user to view history over time. 5.The user may have the ability to provide feedback on the test experience if desired.					
Flow of Activities:	<table border="1"> <thead> <tr> <th>Actor</th> <th>System</th> </tr> </thead> <tbody> <tr> <td>           1.User attends to perform a health assessment test.            2.User enters the test information.            3.User submits the test.            4.User reviews the test result and recommendations.         </td> <td>           1.System may have the ability to view user test data and results for analysis and administration purposes.            2.System presents the test form to the user, prompting them to enter the required information such as low and high pressure, gender, weight, age, and height.            3.System can access the user's test results and recommendations to assist in providing guidance or support if necessary.            4.System analyzes the entered data and calculates the test result.            5.System validates the entered data for correctness and completeness.            6.System provides recommendations to the user based on their assessment results.         </td> </tr> </tbody> </table>	Actor	System	1.User attends to perform a health assessment test. 2.User enters the test information. 3.User submits the test. 4.User reviews the test result and recommendations.	1.System may have the ability to view user test data and results for analysis and administration purposes. 2.System presents the test form to the user, prompting them to enter the required information such as low and high pressure, gender, weight, age, and height. 3.System can access the user's test results and recommendations to assist in providing guidance or support if necessary. 4.System analyzes the entered data and calculates the test result. 5.System validates the entered data for correctness and completeness. 6.System provides recommendations to the user based on their assessment results.	
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Exception Conditions:	1.User not logged in. 2.Test entered data are invalid or incomplete.					

# THE ALGORITHMS USED AND THEIR ACCURACY

- We utilized artificial intelligence on a substantial dataset to predict patients' blood pressure stages.
- Employing machine learning.
- **Support Vector Machine (SVM)** achieved an accuracy of **85%**.
- **Decision Tree** reached **95%**.
- employing **deep learning** with a **neural network (using Keras)** resulted in an impressive accuracy of **98.8%**.
- The most accurate model, the neural network, was implemented to develop a web-based platform for predicting blood pressure stages.



# ML MODEL

- DEEP LEARNING (NEURAL NETWORK USING KERAS)

## INPUT (FACTORS )

*“Age, Gender, Height, Weight, BMI, Systolic blood pressure, Diastolic blood pressure, Blood Pressure, Cholesterol, Glucose, Smoking, Alcohol intake, physical activities”*

## OUTPUT (BLOOD PRESSURE STAGES)

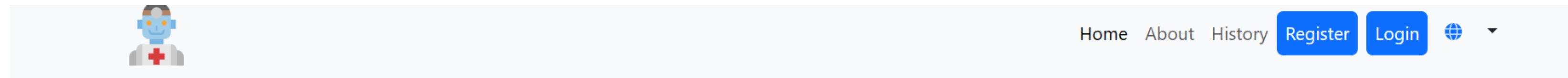
Blood Pressure Category mm Hg (upper #)	Systolic mm Hg (upper #)	Diastolic mm Hg (lower #)
Normal	less than 120	and less than 80
Elevated	120-129	and less than 80
High Blood Pressure (Hypertension) Stage 1	130-139	or 80-89
High Blood Pressure (Hypertension) Stage 2	140 or higher	or 90 or higher
Hypertensive Crisis (Seek Emergency Care)	higher than 180	and/or higher than 120

# **SYSTEM REQUIREMENTS & METHODOLOGY**



# Functional Requirements

## SIGN UP



SIGNUP

# LOGIN



Home About History [Register](#) [Login](#)  ▾

Sign In

Email

Password 

**LOGIN**

# CONFIRM EMAIL

The screenshot shows a Gmail inbox interface. On the left, there's a sidebar with icons forCompose, Delete, and Labels. The main area displays an email from "Blood Pressure" with the subject "Confirm Your Email". The email content includes a greeting "Hello Razan," a message explaining the purpose of the email, a "CONFIRM YOUR EMAIL" button, and a note about self-destructing links. The inbox has 422 messages, and the "البريد الوارد" (Inbox) label is selected.

R ⚙️ 🌐 ?

البحث في البريد 🔎

Gmail M ☰

إنشاء 🖊

422 البريد الوارد 📤

المميزة بنجمة ★

المؤجلة ⏳

البريد المرسل 📧

المسوّفات 📁

المزيد ⏮

التصنيفات +

**Confirm Your Email**

Hello Razan,

You've received this message because your email address has been registered with our site. Please click the button below to verify your email address and confirm that you are the owner of this account.

If you did not register with us, please disregard this email.

**CONFIRM YOUR EMAIL**

Once confirmed, this email will be uniquely associated with your account.

Blood Pressure © 2023 Blood Pressure, Inc. All Rights Reserved.  
This link will self-destruct in 1 hours.

# VIEW PROFILE



Home Dashboard About History Profile

Logout



RAZAN

## Information

Email: harashe115@gmail.com

Age: 22

Gender:  
Female

# VIEW HISTORY



Your Result X

Age	Gender
22	Male
Height	Weight
160	65
High Blood Pressure	Low Blood Pressure
120	90
Cholesterol	Glucose
Normal	Normal
Smoking	Alcohol
No	No
Activity	Your Result
Yes	Stage2

Details

Details

[Close](#)

#	Date
1	2024-02-01

# DO TEST

Home Dashboard About History Profile Logout

Health Care

## Your Health is our priority

Check on your health by answering some questions honestly to get an accurate result

Get Started Learn More



# PROVIDE FEEDBACK

Rate us



---

close

Done

# ADMIN

# VIEW USERS

Admin Panel - Users

[Dashboard](#) [Home](#)

Add User

#	Name	Email	Gender	Age	Role	Tests	Update	Delete
1	Adham Hantash	adham.ashraf@hotmail.com	Male	23	User	History	Update	Delete
2	Razan	rharashe4@gmail.com	Female	22	Admin	History	Update	Delete
3	Adham Abu Hantassh	adhamabuhantash20@gmail.com	Male	23	Admin	History	Update	Delete
4	Razan Harashe	rharashe5@gmail.com	Female	22	Admin	History	Update	Delete
5	Batool	bat108087@gmail.com	Female	15	Admin	History	Update	Delete
6	Razan	harashe115@gmail.com	Female	22	Admin	History	Update	Delete
7	razan	razan@gmail.com	Female	22	Admin	History	Update	Delete
8	Saeed Sabra	sabrasaeed890@gmail.com	Male	23	User	History	Update	Delete
9	Saeed Sabra	saeedsabra565@gmail.com	Male	23	Admin	History	Update	Delete



# ADD USERS & NEW ADMIN

Admin Panel - Users

Dashboard Home

## Add User

Name

Email

Gender

Role

Admin

User

Password

Confirm Password

ADD

# DELETE USER

Admin Panel - Users

Dashboard Home

Add User

#	Name	Email	Gender	Age	Role	Tests	Update	Delete
1	Adham Hantash	adhamhantash@gmail.com	Female	22	Admin	History	Update	Delete
2	Razan	razan@gmail.com	Female	22	Admin	History	Update	Delete
3	Adham Abu Hantassh	adhamabuhantash@gmail.com	Female	22	Admin	History	Update	Delete
4	Razan Harashe	razanharashe@gmail.com	Female	22	Admin	History	Update	Delete
5	Batool	batool@gmail.com	Female	22	Admin	History	Update	Delete
6	Razan	razan2@gmail.com	Female	22	Admin	History	Update	Delete
7	razan	razan@gmail.com	Female	22	Admin	History	Update	Delete
8	Saeed Sabra	sabrasaeed890@gmail.com	Male	23	User	History	Update	Delete
9	Saeed Sabra	saeedsabra565@gmail.com	Male	23	Admin	History	Update	Delete

Are you sure?  
You won't be able to revert this!

Delete Cancel



# UPDATE USER INFORMATION

Admin Panel - Users

Dashboard Home

## Update User Info

Name

Email

Gender

Role

Age

UPDATE

# VIEW USER HISTORY

Admin Panel - Users

Result X

Age	Gender
23	Male
Height	Weight
170	70
High Blood Pressure	Low Blood Pressure
90	60
Cholesterol	Glucose
Normal	DontKnow
Smoking	Alcohol
No	No
Activity	Result
Yes	Normal

[Details](#)

[Close](#)

Adham Abu Hanta

#	Date
1	2024-01-29

# SHOW USER TEST RESULT & RECOMMENDATION

Your Result !

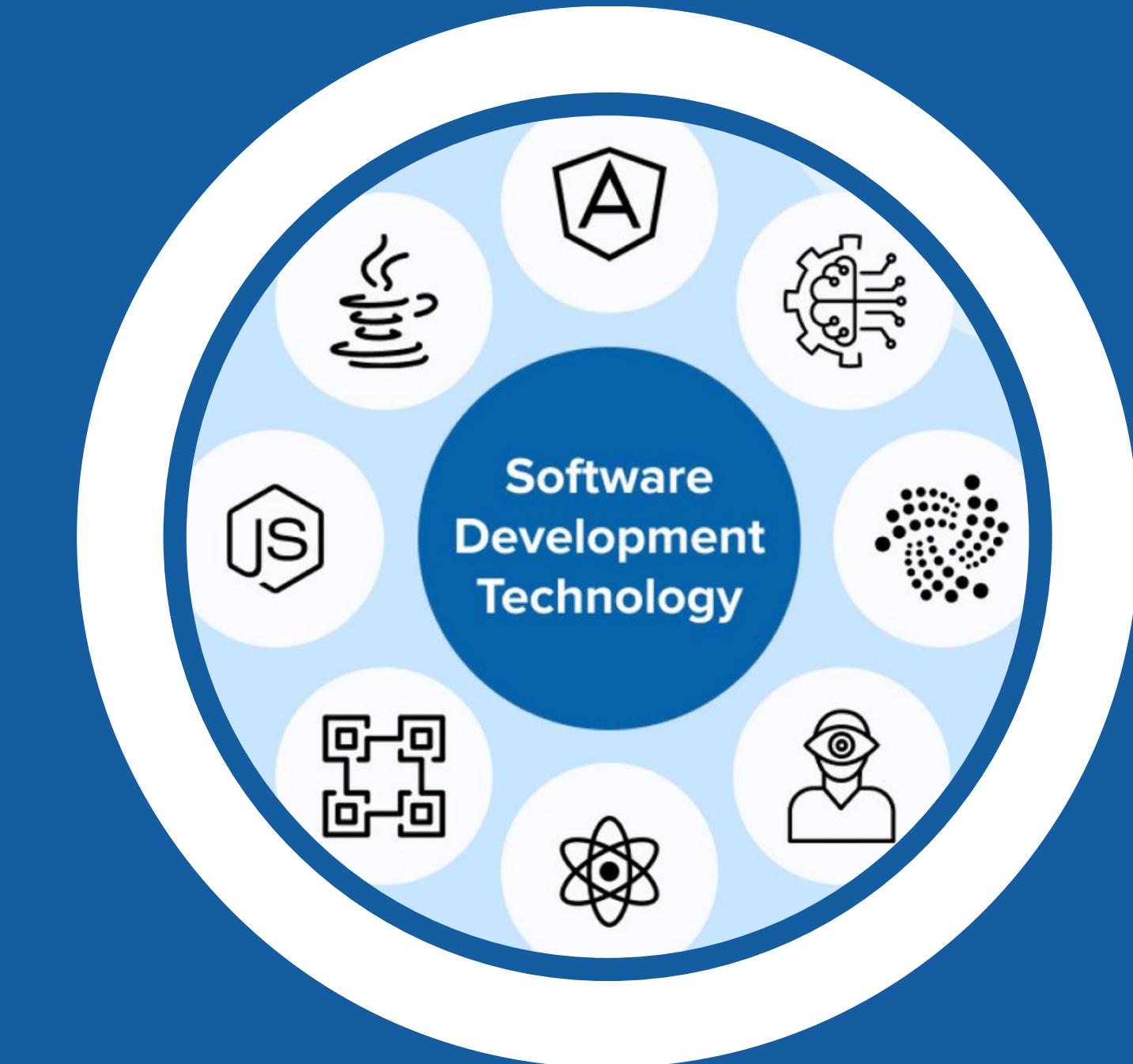
X Dashboard About History Profile Logout

Your Blood Pressure reading is too high and this can be dangerous for your health and you should seek an immediate appointment with your doctor. Repeat the measurement a couple of times so that similar values are consistently obtained. Also check the measuring instrument/apparatus for the correct calibration. The reading should not be taken after a meal or exercise or after any stressful event. When measuring the blood pressure, the cuff should be properly placed and fixed on the arm. If on repeated testing the value is similar to the one that was indicated previously we recommend that you confirm this diagnosis with your doctor. Some people with high blood pressure (Hypertension) may experience chest pain, shortness of breath, nausea and blurred vision. However in the majority, hypertension doesn't show any symptoms until complications like heart attack, heart failure, kidney failure and stroke develop. If diagnosed with hypertension you may require a few blood tests and ECG.

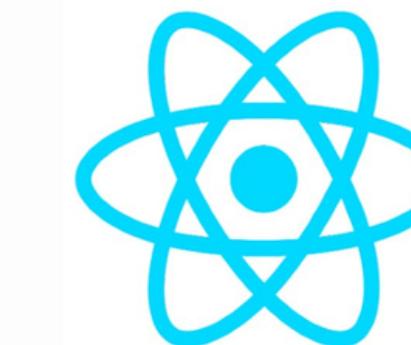
Rate us

close Done

# THE TECHNOLOGIES



# Front End Technologies



React



MATERIAL-UI

# Back End Technologies



mongoDB®

# Machine Learning Technologies



**Integrated  
Development  
Environment**



Visual Studio Code

# CHALLENGES

- 1 **Learning New Technologies With a Short Time Frame.**
- 2 **Multiple Resources of Learning.**
- 3 **Time Management.**

# FUTURE VISIONS

1

**Integrating doctors into the site, allowing users to consult with them directly, thereby enhancing accessibility to medical advice.**

2

**Developing the site to comprehensively assess individuals' health status not just their blood pressure status.**



# THANK YOU