



# DEPRESSION DETECTION APP

PROF. HENRY WONG

CS 692

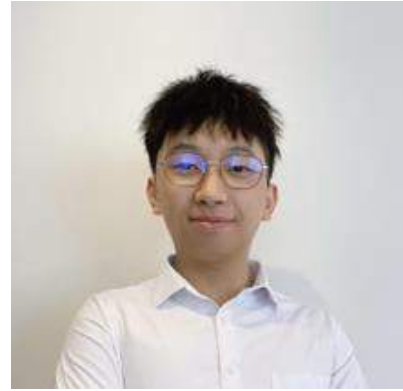
# AGENDA

1	Project Description and problem statement
2	Description of minimal viable product and all attributes, including product backlog
3	Acceptance Criteria & user stories
4	Sprint 6 backlog and test cases
5	Team metrics for every sprint
6	Application screenshot & ML model description
7	API and Retrospective & plans for sprint 7

# OUR TEAM



**Omkar Shitole**  
Developer & DBA



**Yuxiang Liu**  
Lead Software  
Engineer



**Shivani Chavan**  
Developer



**Wangbo Gu**  
Developer



**Artem Kolmogorov**  
Developer & Project Manager



**Siddharth Ravirala**  
Developer



# IMPROVEMENTS MADE FROM PROFESSOR'S FEEDBACK

## **IMPROVEMENTS RELATED TO SPRINT RECAP**

We have implemented improvement suggested by Professor Wong with sprint recap. Now it is clear and easy to understand.

## **IMPROVEMENTS OF ACCEPTANCE CRITERIA**

We have rewritten scenarios of acceptance criteria as well as added id to test cases. This has improved clarity on what user stories were completed and tested.

## **IMPROVEMENT OF TEAM VELOCITY AND SPRINT BURNDOWN CHARTS**

We have clearly marked all charts and histograms depicted in our team velocity and burndown charts.

## **ADDED DETAILS FOR PLANS ON FUTURE SPRINTS**

We have added more detailed description of plans for future sprints.

# PROJECT DESCRIPTION

Project Name	StressOut
Team	Bug Terminator
Project Description	<p>Detecting early signs of depression based on users' pictures and quizzes</p> <p><b>For</b> customers</p> <p><b>Who</b> want to manage their mental health</p> <p><b>The</b> StressOut app</p> <p><b>Is a</b> mobile app</p> <p><b>That</b> analyzes user's images and quiz results and provides accurate assessment</p> <p><b>Unlike</b> traditional way of visiting specialists.</p> <p><b>Our application</b> provides accessible, accurate and daily measurement of person's mental state</p>
Benefit Outcomes	<p>Users can check their mental state anywhere and anytime</p> <p>Users can track their mental state over long period of time</p> <p>Users can receive useful tips for managing depression</p>
Github Link	<a href="https://github.com/htmw/2023S-Team2">https://github.com/htmw/2023S-Team2</a>



## PROJECT DESCRIPTION

We are developing depression detection system that uses artificial intelligence model to analyze person's face with images or current mood with text, to help find depression sings. Our detection system is trained with a unique dataset depression faces from messages and images. We believe that certain linguistic traits can be examined and linked to possible depressive symptoms as well as used to forecast self-destructive behavior. The training result we want to achieve is the system capable of analyzing the input (messages and images) from users, and detect the type of depression such as anxiety, bipolar or paranoia.



# PROBLEM STATEMENT

Depression is a prevalent mental health disorder that affects millions of people worldwide. The condition is characterized by a persistent feeling of sadness, hopelessness, and loss of interest in daily activities. It significantly impairs a person's ability to function and can lead to a range of physical and emotional problems. Early detection of depression is crucial for effective treatment, as it can reduce the severity and duration of symptoms and improve a person's quality of life.

However, traditional methods of detecting depression, such as self-report questionnaires or clinical interviews, have several limitations. Self-report questionnaires rely on a person's ability to accurately report their symptoms, which can be influenced by various factors, such as social desirability bias, memory recall bias, and language barriers. Clinical interviews can also be subjective and may vary depending on the clinician's experience and training.

As a result, there is a need for an objective and reliable method of detecting depression. One potential solution is the use of machine learning algorithms to analyze various data sources, such as speech patterns, facial expressions, and physiological signals, to identify indicators of depression. These systems have shown promising results in early studies and have the potential to revolutionize the field of mental health.

Detecting depression early is essential, as the condition can lead to a range of negative outcomes, including increased risk of premature death, suicidal thoughts, and impaired daily functioning. By developing accurate and reliable detection systems, we can improve the lives of millions of people who suffer from depression worldwide.

# TEAMWORK AGREEMENT

CS-691

## Team Agreement

### Communication

- The team will communicate with each other through a variety of channels. For weekly meetings for meaningful team discussions, zoom meetings will be used. All the team members are highly encouraged to keep their cameras on, which will be able to build trust between the team members and reflect transparency.
- To discussion regarding minute details and doubts or anything urgent, a Whatsapp messenger group will be used.
- To share the final deliverables, Google docs will be used where all the team members can edit the document.
- A common platform called Trello has been set up for all team members, where designated groups have been created, such as Developers, Business Analyst, Product Owner.
- Database management, bugs, attendance, weekly plan, and meeting minutes. This manages all the bits and pieces of the project and makes the project management efficient.

### Work division and Participation

TEAM AGREEMENT

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- The entire project work should be divided into equal parts, and equal responsibilities should be given to all the team members.
- Each team member should complete their division of work before the deadline. If they are unable to complete the work on time, that hinders the performance of the entire team. If in case a team member is facing trouble and issues at some point, they can share it with others so that they can help each other and complete the work before the deadline.
- All the team members are expected to attend the meetings promptly.
- Absence during multiple meetings will affect the team's performance and efficiency. The team member can discuss beforehand with the team leader if he/she is going to miss the meeting or make it up for it before the next meeting is scheduled.
- Work is separated between members of the group separated voluntarily, however if members lacks participation product owner is entitled to assign necessary tasks to absentee members.
- In case member is absent during meetings, member pledges to support whichever decision is approved during that meeting.

### Meetings

- All the team members will meet on zoom virtually every Tuesday and Friday. All the team members have to be present, as attendance is mandatory unless there is an exceptional case.
- The team leader would be responsible for sending meeting details and conducting the meeting.
- A meeting track or meeting minutes report would be listed after every meeting to keep track of the project and its progress.
- Every team member is expected to come up with ideas, participate in the discussion, and give an update on their progress for their part of the work.

### Respect

- Making sure all team members always have chance to share their opinion

TEAM AGREEMENT

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- All members agree to respect each others personal time and try not bother members during night time unless it is urgently required by the project.

Team Member	Email
Chiranjeev Chavan	<a href="mailto:chiranjeev.chavan@pace.edu">chiranjeev.chavan@pace.edu</a>
Yunus Ali	<a href="mailto:y426417@pace.edu">y426417@pace.edu</a>
Omkar Chaudhary	<a href="mailto:oc31654@pace.edu">oc31654@pace.edu</a>
Wangbo Gu	<a href="mailto:wg1015@pace.edu">wg1015@pace.edu</a>
Siddharth Ravindra	<a href="mailto:sr64119@pace.edu">sr64119@pace.edu</a>
Arun Kolmogorov	<a href="mailto:ak7177@pace.edu">ak7177@pace.edu</a>

TEAM AGREEMENT

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# PERSONAS

## JACK

### Profile

Jack, a 35-year-old software engineer who has a history of depression and anxiety. He often finds himself feeling overwhelmed at work and is struggling to balance his job and personal life. He wants to find a way to manage his symptoms so that he can be more productive and happier.

**Name:** Jack

**Age:** 35

**Location:** Chicago, MI

**Job:** Software Engineer

**Salary:** 92 000 – 110 000\$/annually

**Family:** Single

### Interests

- Riding Bike
- Goes Kayaking
- Attending live concerts

### Frustration

- Managing depression
- Wants to change job, but unable

### Goals

- Moving to south
- Finding friends
- Buying a bigger house



# PERSONAS

## SARAH

### Profile

Sarah, a 25-year-old graphic designer who has been feeling down for the past few months. Despite her successful career and supportive friends and family, she feels unfulfilled and struggles to find joy in her everyday life. She wants to find a way to manage her depression and is open to using technology to help her do so.

**Name:** Sarah

**Age:** 25

**Location:** Los Angeles, CA

**Job:** Graphic Designer

**Salary:** 66 000 – 70 000\$/annually **Family:** Single

### Interests

- Writing own comic books
- Everyday swimmer
- Loves animals
- Watching series

### Frustration

- Traffic in Los Angeles area
- Living alone for a long time

### Goals

- Buying her own house
- Building lifelong relationships
- Finding friends



# PERSONAS

## LISA

### Profile

Lisa, a 40-year-old stay-at-home mom who is feeling overwhelmed and exhausted. She is struggling to keep up with the demands of taking care of her children and household, and she often feels like she is failing as a mother. She wants to find a way to manage her stress and feelings of inadequacy.

**Name:** Lisa

**Age:** 40

**Location** New-York, NY

**Job:** Unemployed

**Salary:** N/A

**Family:** Married, two kids

### Interests

- Reading romantic novels
- Going for beach holidays
- Loves animals
- Watching series

### Frustration

- Her husband going for a long business trip
- Having troubles with her kids

### Goals

- Taking dog from shelter
- Helping kids with college



# PERSONAS

## TOM

### Profile

Tom, a 50-year-old small business owner who is feeling stressed and burnt out. Despite the success of his business, he is feeling overwhelmed by the responsibilities and pressure of running it. He wants to find a way to manage his stress and anxiety so that he can enjoy his success and have a better work-life balance.

**Name:** Tom

**Age:** 50

**Location:** Austin, TA

**Job:** Self-Employed

**Salary:** 150 000 \$/annually

**Family:** Divorced

### Interests

- Going hunting & fishing
- Taking rides in his chopper

### Frustration

- Declining business profits
- Having health problems

### Goals

- Building strong portfolio for his 401-k
- Finding new friends



# MVP, TECHNOLOGIES & ALGORITHMS

# MINIMAL VIABLE PRODUCT



## Home Page

- A welcome message that briefly introduces the app and its purpose
- A button or link to create an account or log in if you already have one
- A list of features and resources available within the app, such as self-assessment questionnaires, mood trackers, and mental health resources
- A prominent call-to-action encouraging users to take a self-assessment or start tracking their mood



## Profile/History of Consultation

- A section where you can edit your personal information, such as your name, email address, and password

# MINIMAL VIABLE PRODUCT



## Image upload/Take Picture

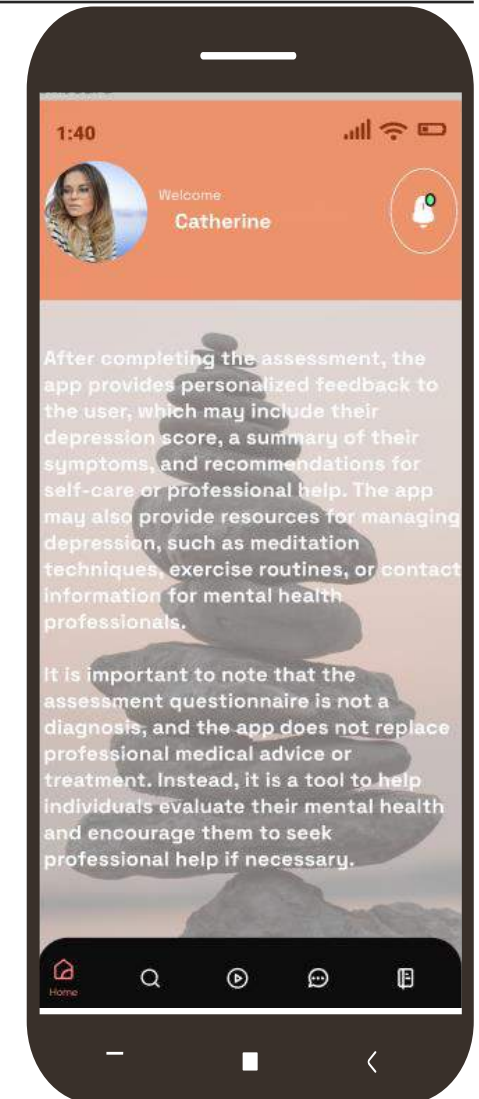
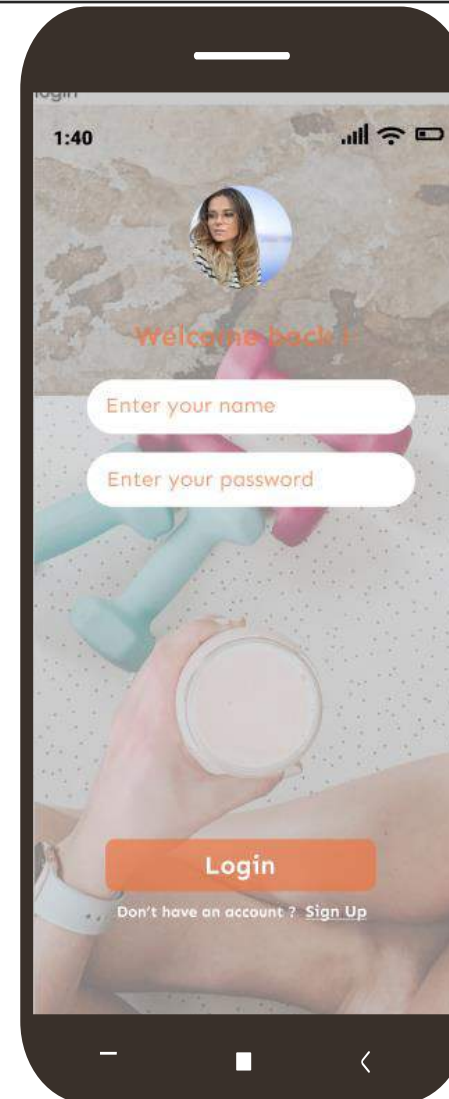
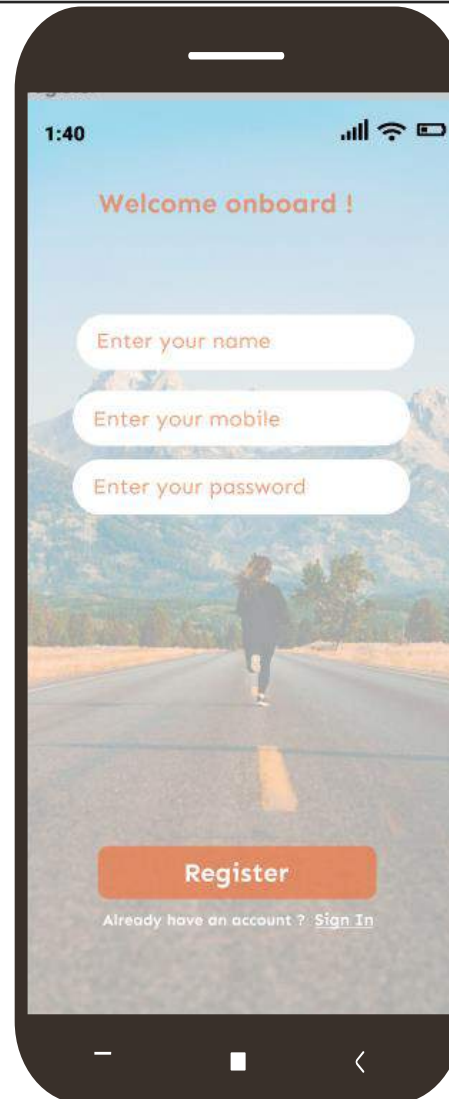
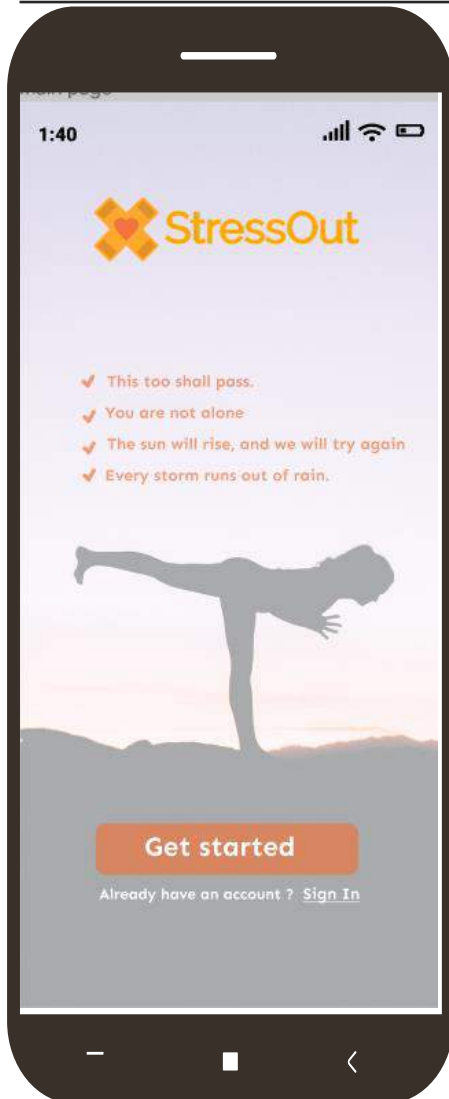
- A camera button that allows you to take a picture directly within the app
- A gallery button that allows you to upload pictures from your camera roll
- An option to add captions or notes to each image, to help you remember important details or context



## Recommendation

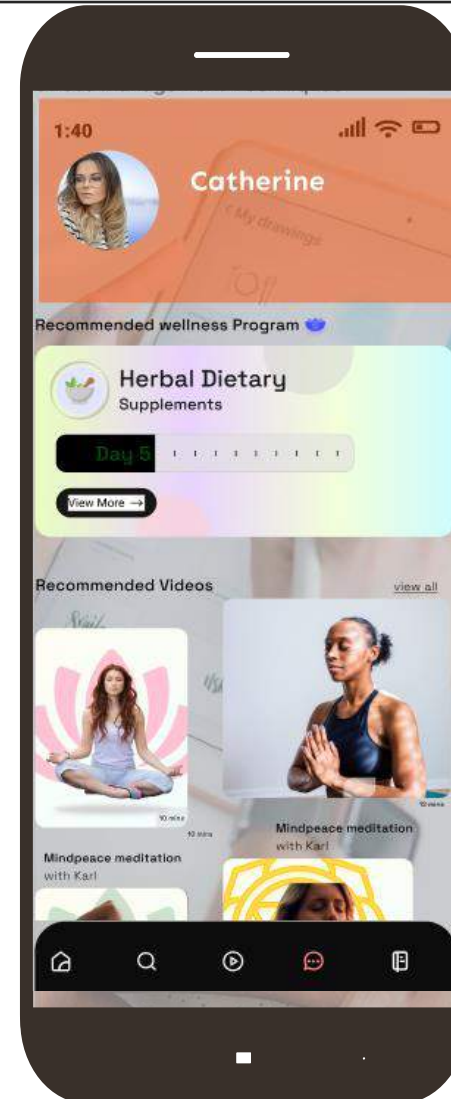
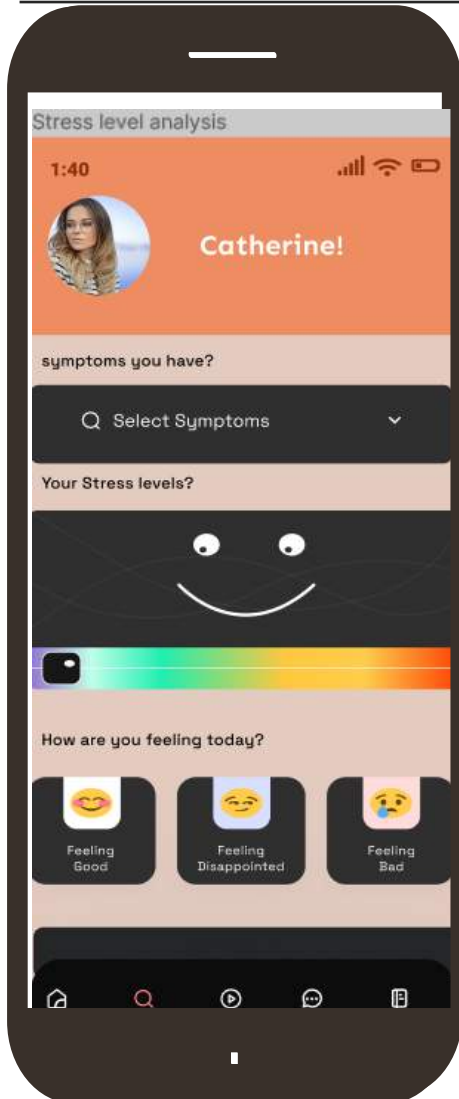
- A dashboard that displays any recommendations or next steps based on your self-assessment results, including suggestions for lifestyle changes, self-care practices, or professional treatment options

# PROTOTYPE





# PROTOTYPE



# ALGORITHMS & TECHNOLOGIES



TensorFlow



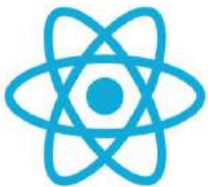
Keras



render



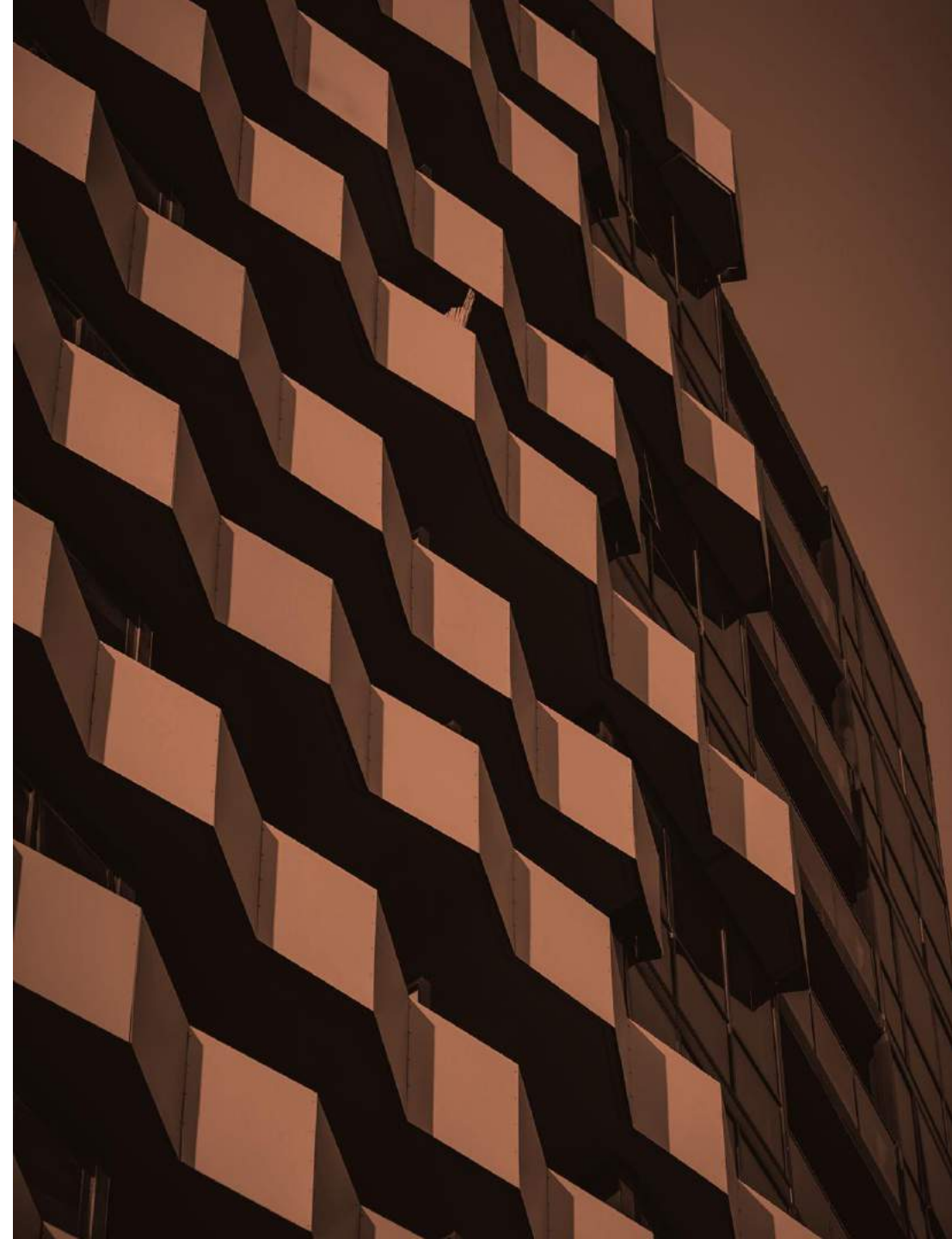
FastAPI



React Native

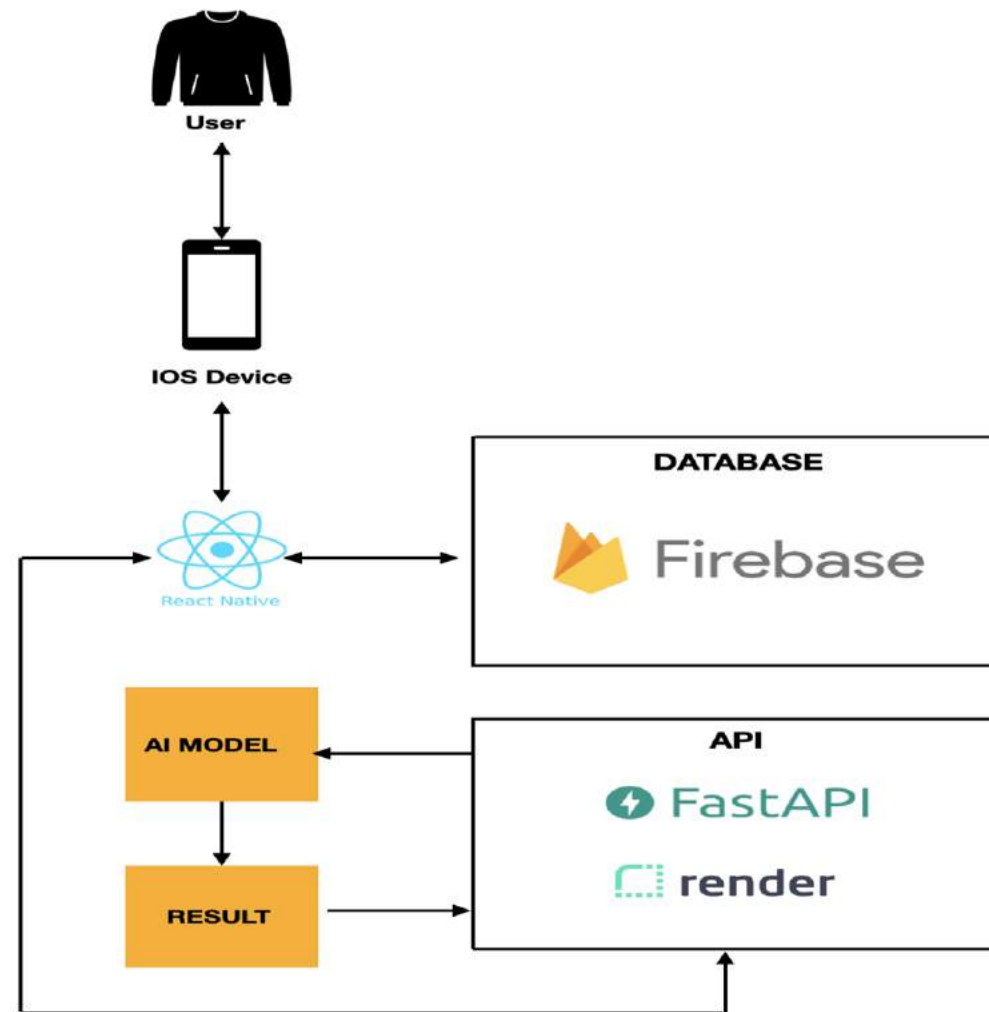


Firebase

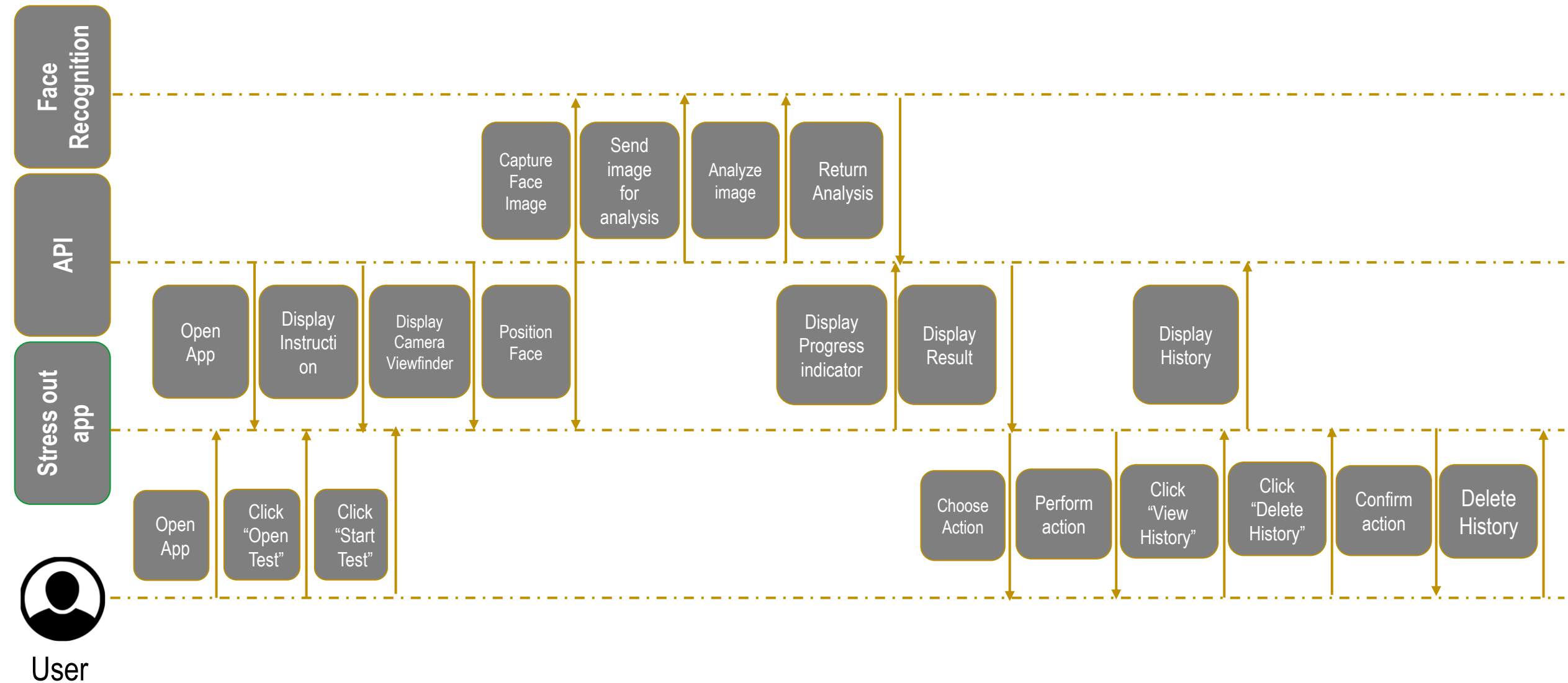




# CONCEPTUAL ARCHITECTURE DIAGRAM

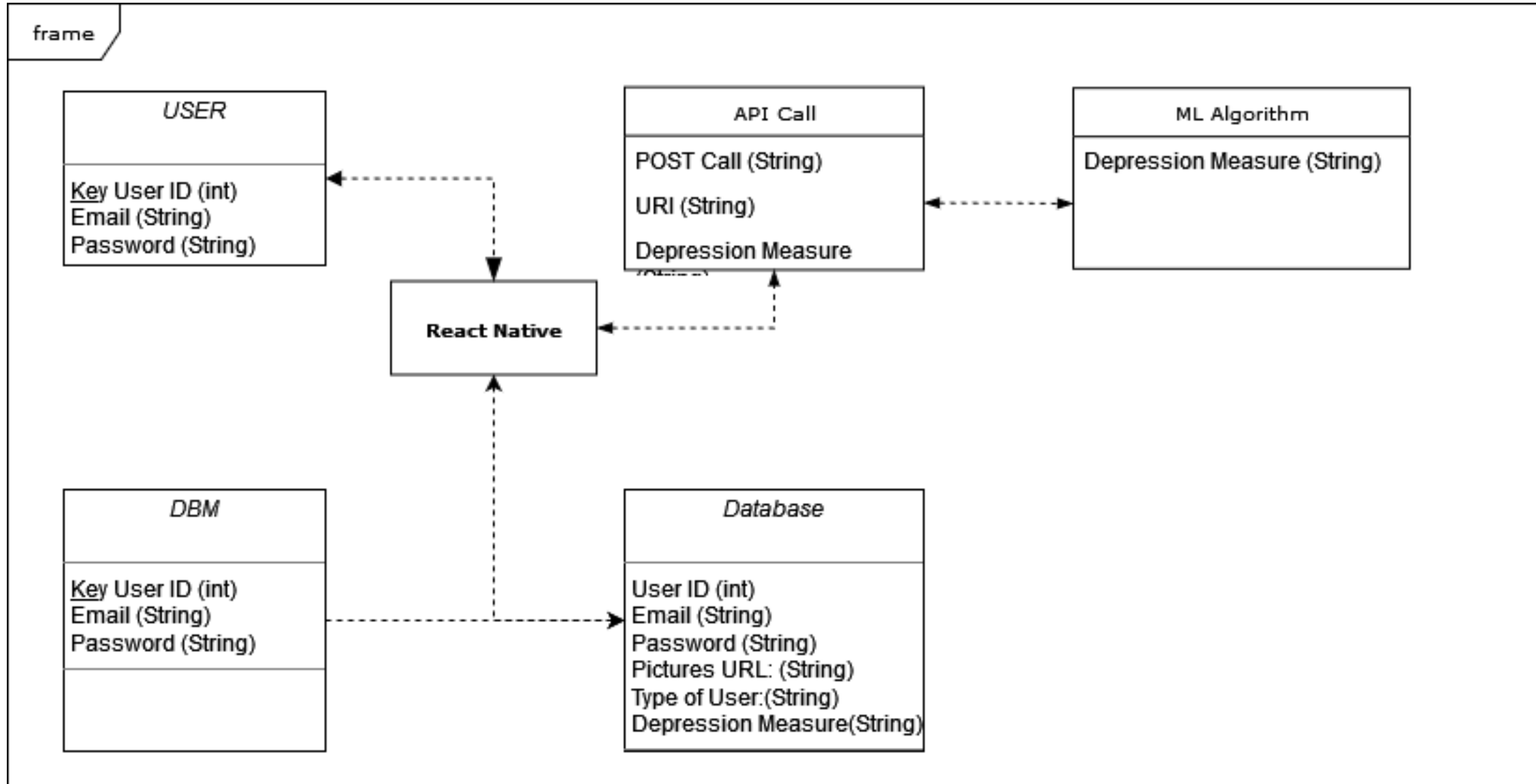


# SEQUENCE DIAGRAM





# UML CLASS DIAGRAM



# MACHINE LEARNING API

- API ready to deploy
- Setting up Render environment
- Solving Libraries incompatibility
- Deploy the API



# MACHINE LEARNING API

---

```
Sep 25 03:13:04 PM ==> Uploading build...
Sep 25 03:13:48 PM ==> Build uploaded in 24s
Sep 25 03:13:48 PM ==> Build successful 🎉
Sep 25 03:13:50 PM ==> Deploying...
Sep 25 03:14:32 PM ==> Using Node version 14.17.0 (default)
Sep 25 03:14:32 PM ==> Docs on specifying a Node version: https://render.com/docs/node-version
Sep 25 03:14:36 PM ==> Running 'uvicorn model_API:app --host 0.0.0.0 --port 10000'
```

```
Sep 25 03:14:50 PM ==> Detected service running on port 10000
Sep 25 03:14:50 PM ==> Docs on specifying a port: https://render.com/docs/web-services#port-detection
Sep 25 03:14:52 PM INFO:      Started server process [52]
Sep 25 03:14:52 PM INFO:      Waiting for application startup.
Sep 25 03:14:52 PM INFO:      Application startup complete.
Sep 25 03:14:52 PM INFO:      Uvicorn running on http://0.0.0.0:10000 (Press CTRL+C to quit)
```

# MACHINE LEARNING API

🌐 WEB SERVICE

## Render\_Detection\_API

Python 3

Free

🔄 YuxiangLiuGC / Detection\_API 📄 main

<https://render-detection-api.onrender.com> 📄

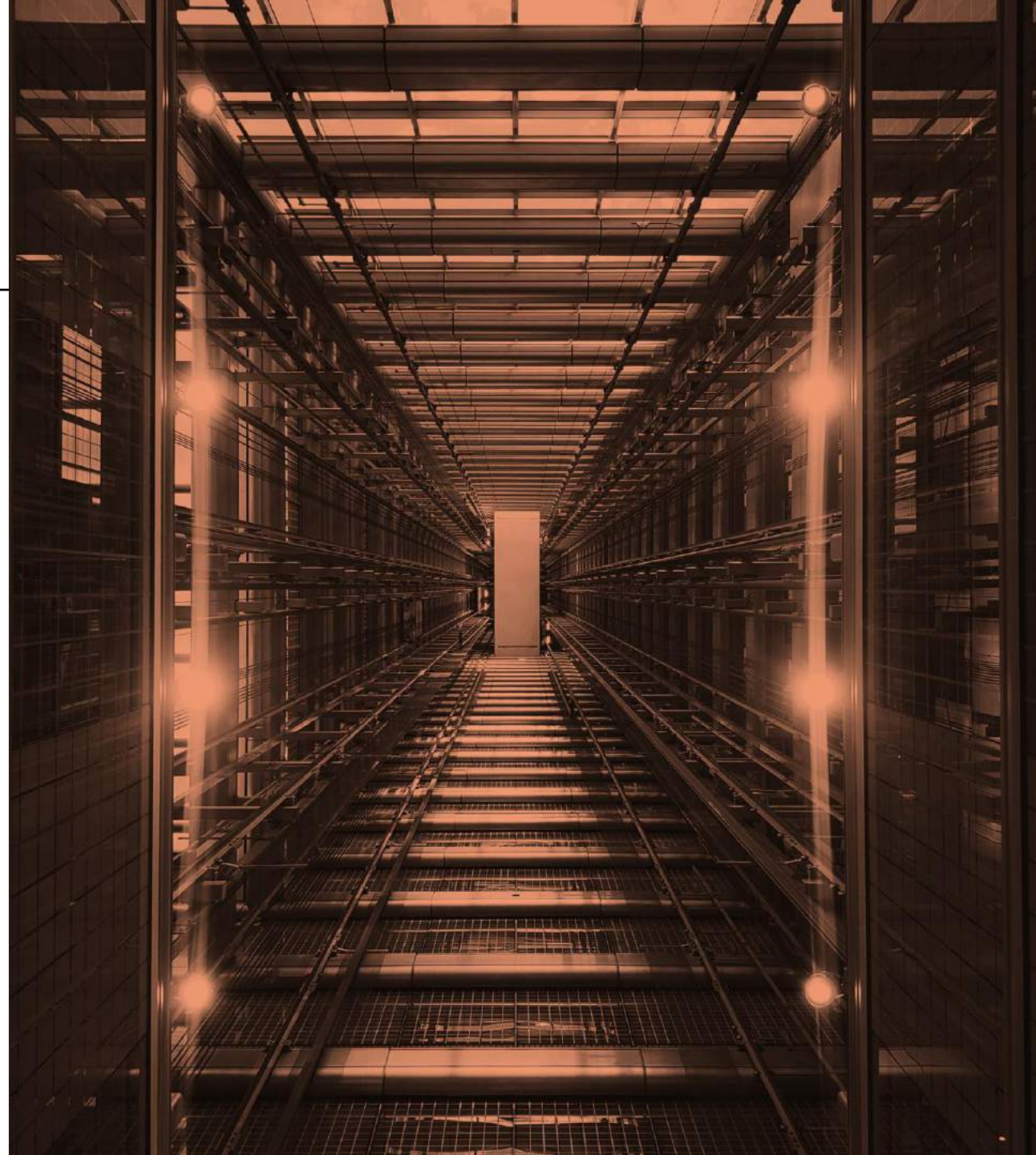


<https://render-detection-api.onrender.com> x



<https://render-detection-api.onrender.com>

```
{"Hi there": "You reached the endpoint!"}
```





# MACHINE LEARNING API

The screenshot displays a REST client interface with a POST request to `https://render-detection-api.onrender.com`. The request body is a JSON object with an `image` field containing a long base64-encoded string. The response status is `200 OK` with a response time of `12.64 s` and a body size of `345 B`. The response body is a JSON object with a `prediction` field set to `"0.01"`.

**Request:**

```
POST https://render-detection-api.onrender.com
```

**Body (JSON):**

```
{  "image": "/9j/4AAQSkZJRgABAQAAQABAAD/2wBDAAYEBQYFBAYGBQYHBWYIChAKCgkJChQODwwQFxQYGBcUFhYaHSUfGhshjBYWICwgIyYnKSopGR8tMC0oMCUoKSj/2wBDAQcHBwoIChMKChMoGhYaKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCj/wAARCAPoBkADASIAAhEBAxEB/8QAHAAAwADAQEBAQAAAAAAAAAAAECAwQFBgcI/8QASBAAAgECBAQEAWYBAUDAwMFAAECAxEEeIEiBTEyQYQTQlFSYXEUl2KBkaEHM3KxFUPB8CSC0eHxNFOSFm0iCCVEshdz0oP/xAAbAQEBAQEBAQEBAQAAAAAAAAAAQIDBAUGB//EAC8RAQEAAgICAgEEAgICAgUBAAABAhEDIQQxEKEFEyJRYQYyFHEjgUIzUmKRsaH/2gAMAwEAAhEDEQA/APHsLAhpntUa+4WKJbAEimhR6QsA0xXGJgMVguMBWfCr0sajtuAlu1KTCC2jQDEwY0EKyGNk2CmS3l1YdkeLuATRLTKBoBJmSJEV1LALdwY"
```

**Response:**

```
200 OK 12.64 s 345 B
```

```
{  "prediction": "0.01"}
```

# SPRINT 5 RECAP

Issue type	Key	Name
STRES-36	task	Implemented a functionality to the app that permits users to upload images.
STRES-39	story	As a user, I would like the ability to upload images to save them and assess my depression levels.
STRES-48	story	As a user, I want guidance on the ways to prevent my depression from worsening.
STRES-50	task	Connected App with firebase Storage where the raw images uploaded by the users were stored.

# PRODUCT BACKLOG

User Stories		
Key	Summary	Place
STRES-19	As a user, I want to register myself to the application. So that I can keep my account private and login using email/phone and password.	Home Page
STRES-20	As a user, I want to login in app. So that I can use it to store all my information.	Home Page
STRES-42	As a user, I want to upload my picture from phone gallery to analyze so that get more accurate information.	Image Upload/Take Picture
STRES-22	As a user, I want to take a picture from my front and back camera to upload so that the app can analyze	Image Upload/Take Picture
STRES-23	As a user, I want to view my upload history and their results	Profile/History of consultation
STRES-24	As a signed in user, I want to log out So that I can have my privacy in the app.	Logout/Login
STRES-25	As a user I want to be able to find contacts for professional help	Recommendation
STRES-26	As a user I want to be able to view history of my recommendation	Recommendation
STRES-27	As a user, I want to create my profile So that I can store my account information.	Profile/History of consultation
STRES-28	As a user, I want to be able to edit my information detail	Profile/History of consultation
STRES-29	As a user I want to be able to add captions for pictures I have uploaded	Image Upload/Take Picture
STRES-30	As a user, I want to be able to view personalized tips and strategies for managing symptoms	Recommendation
STRES-31	As a user, I want to know the sign of depression, and the risk of depression	Recommendation
STRES-48	As a user, I want to link to the hospital so that I can make a appointment with doctor	Recommendation
STRES-52	As a user, I want the app to keep checking my depression level so that I know when my depression level is worse	Profile/History of consultation
STRES-34	As a user, I want to know the risk of depression about me after I take pictures	Image Upload/Take Picture
STRES-35	As a user, I want to know some tips for relieving depression so that I can become better	Recommendation

# SPRINT 6 BACKLOG

Key	Name	Story points
STRES-60	Make an API Call	5
STRES-61	Saving and updating user details	5
STRES-48	Improve the UI of the app	5
STRES-57	Improving backend of the app	5
STRES-62	Improving database on firebase	5

# STORIES AND ACCEPTANCE CRITERIA

Scenario	User Story	Status
1. customers want to see their pictures <b>Given</b> I'm in the role of customer <b>When</b> I open the profile screen <b>And</b> I click the update button <b>Then</b> the user can update the details	<b>As a customer</b> <b>I want</b> to update my details on the app <b>so that</b> I can see how I've changed these days	<b>Done</b>
2. customers want to see their past result <b>Given</b> I'm in the role of customer <b>When</b> I open the history page <b>Then</b> I want to see the quiz result I took before <b>And</b> I click the quiz result <b>Then</b> I can see the grades and date	<b>As a customer</b> <b>I want</b> to check my grade of the quiz <b>so that</b> I can know my depression level at that time	<b>Done</b>



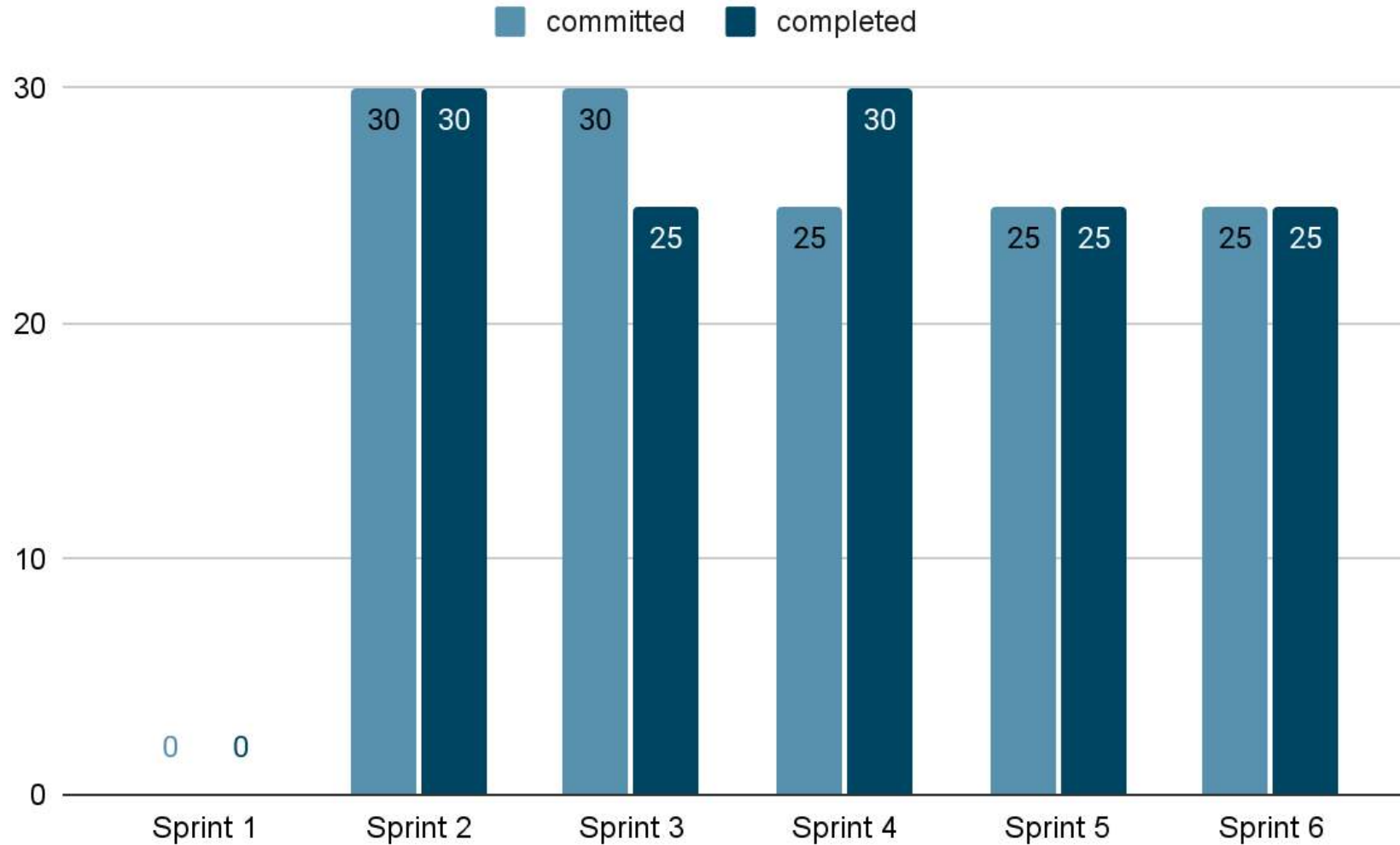
# TEST CASES

Test case for	Key	Test case id	Test data	Expected results	Actual results	Pass/fail
User portal	STRES-61	Test-73	email: <a href="mailto:test@gmail.com">test@gmail.com</a> password:test123	Customers can add details on user information	Click the button, the page show update successful	P
User portal	STRES-61	Test-74	email: <a href="mailto:test@gmail.com">test@gmail.com</a> password:test123 one of the photo from phone	Customers can select document from the phone and upload	Select the document, click the upload button, show upload successful	P
History page	STRES-59	Test-65	email: <a href="mailto:test@gmail.com">test@gmail.com</a> password:test123 one of the photo from phone	Customers can check their pictures	Click the history and click pictures, show all the previous pictures	P
History page	STRES-59	Test-62	email: <a href="mailto:test@gmail.com">test@gmail.com</a> password:test123 quiz grade	Customers can check the past result	Click the history and click other details, show the previous quiz grade	P
Take picture page	STRES-55	Test-64	email: <a href="mailto:test@gmail.com">test@gmail.com</a> password:test123	After customers take pictures, pictures will be stored and found	Take the picture, it showed in history and can be found in firebase storage	P

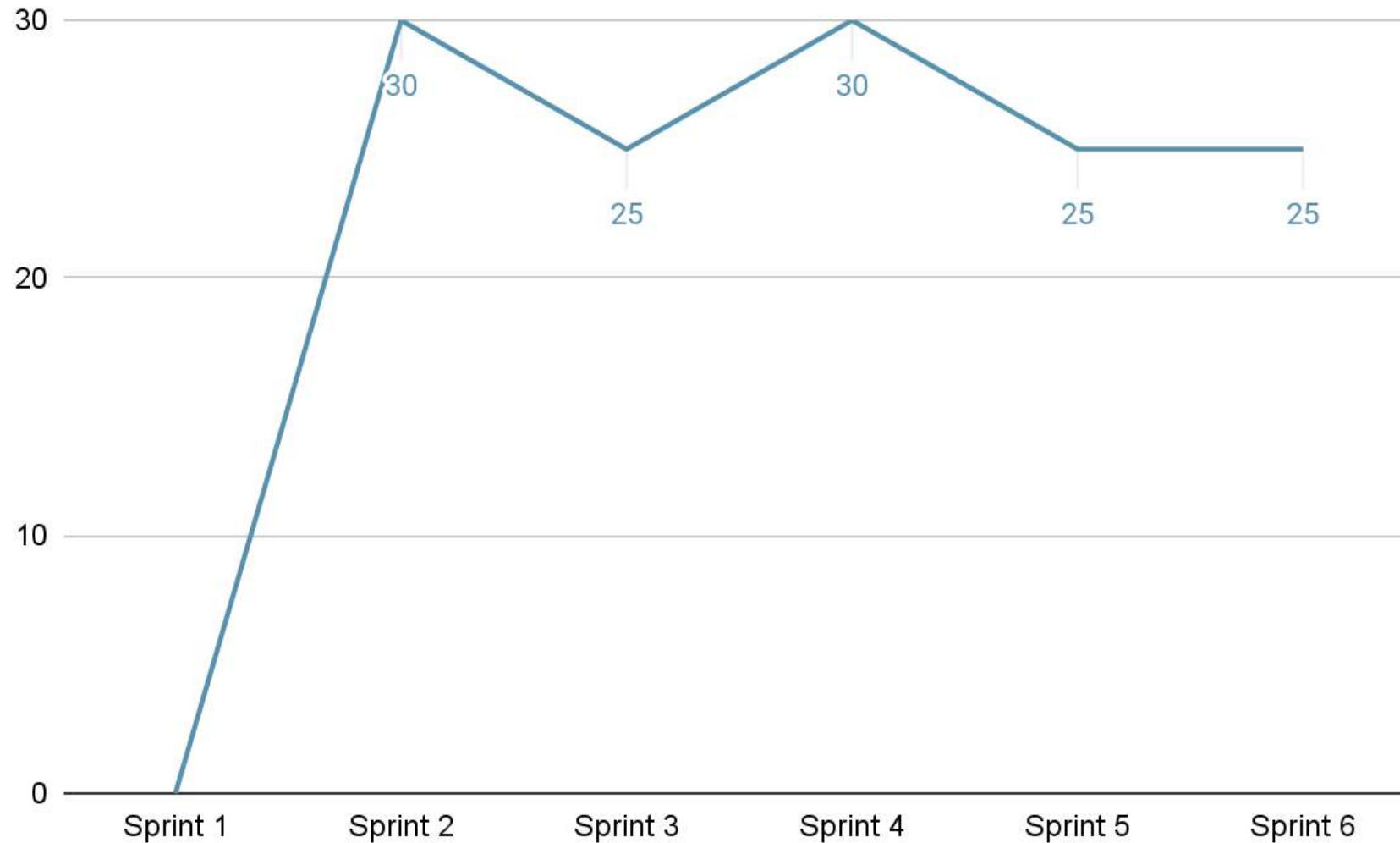
# COMPLETED AND NOT COMPLETED STORIES

Key	Name	Status
STRES-61	Saving and updating user details	Done
STRES-59	Saving User details and results to the firebase database	Done
STRES-48	Improve the UI of the app	In processing
STRES-60	Make an API call	Done
STRES-54	Upload images from phone	Done

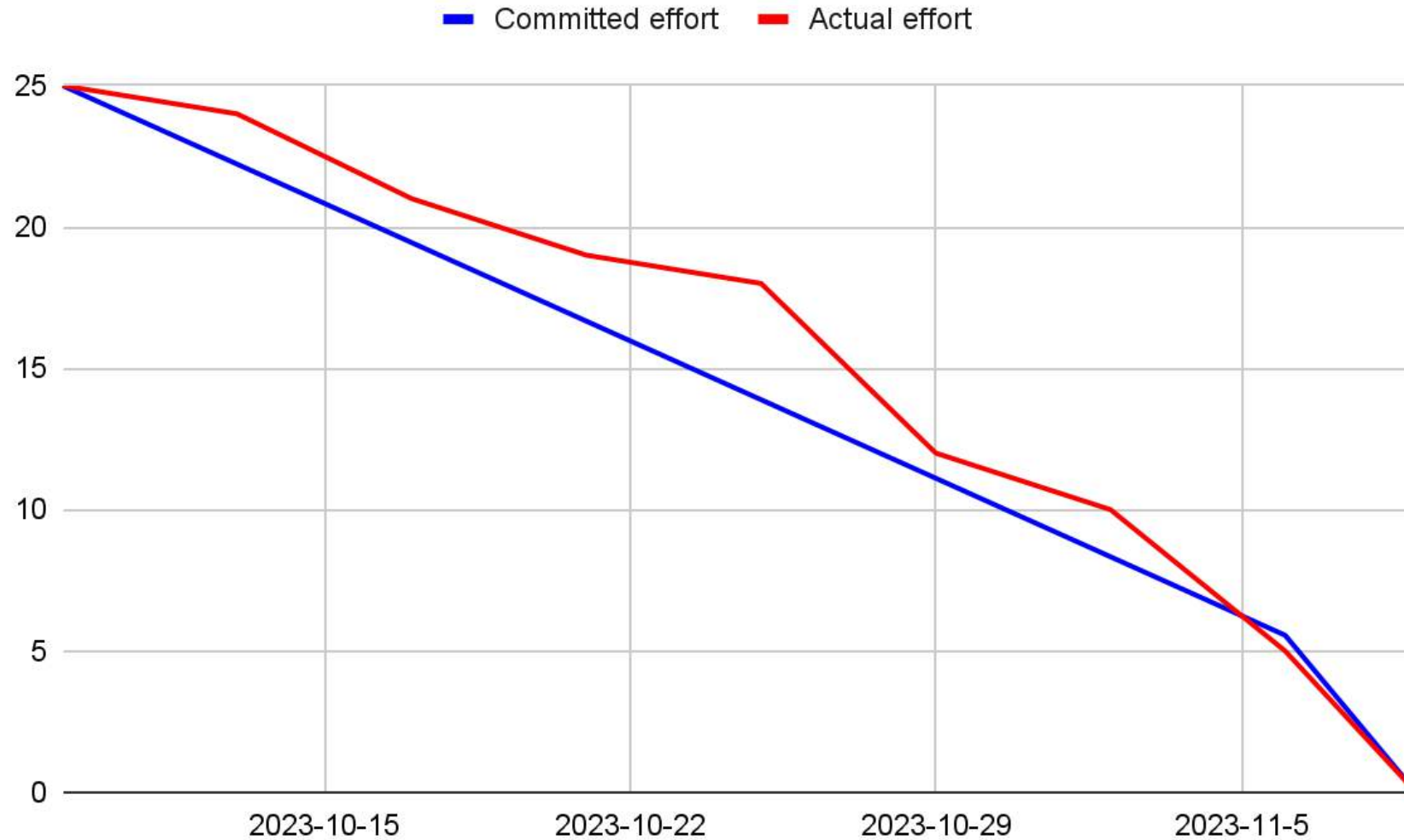
# TEAM VELOCITY



# TEAM'S HISTORICAL VELOCITY (AVERAGE)



# SPRINT 6 BURNDOWN CHART





# APP SCREENSHOTS

## Home Page

App has 5 Functionality Buttons

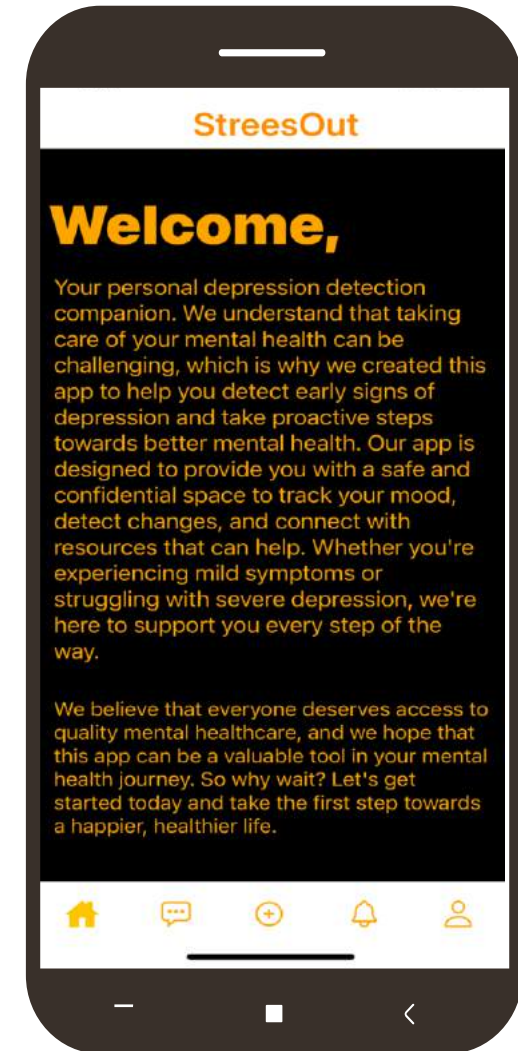
**Onboarding Screen:** A screen that welcomes the user to the app and provides an overview of its app.

**Stress level analysis screen:** A screen that displays the user's stress level based on the biometric data collected.

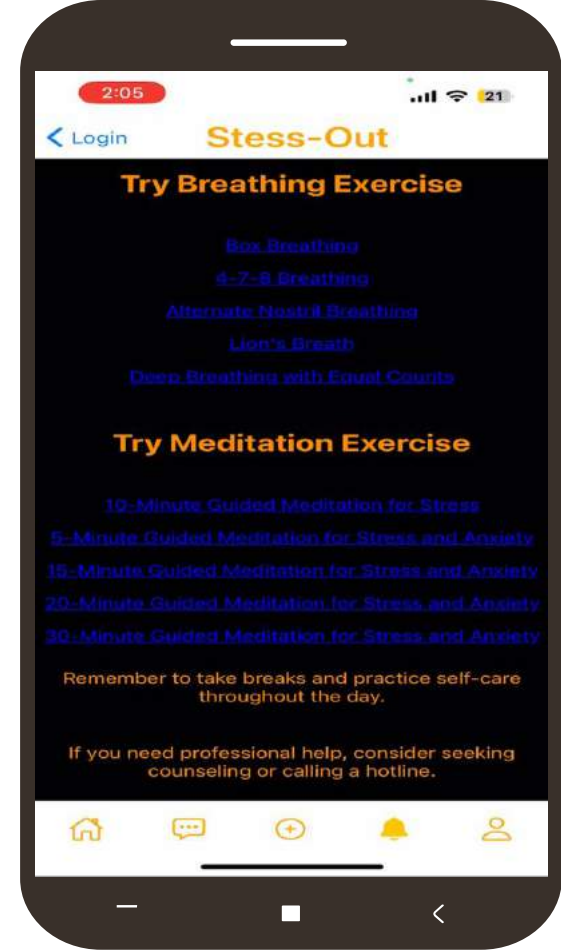
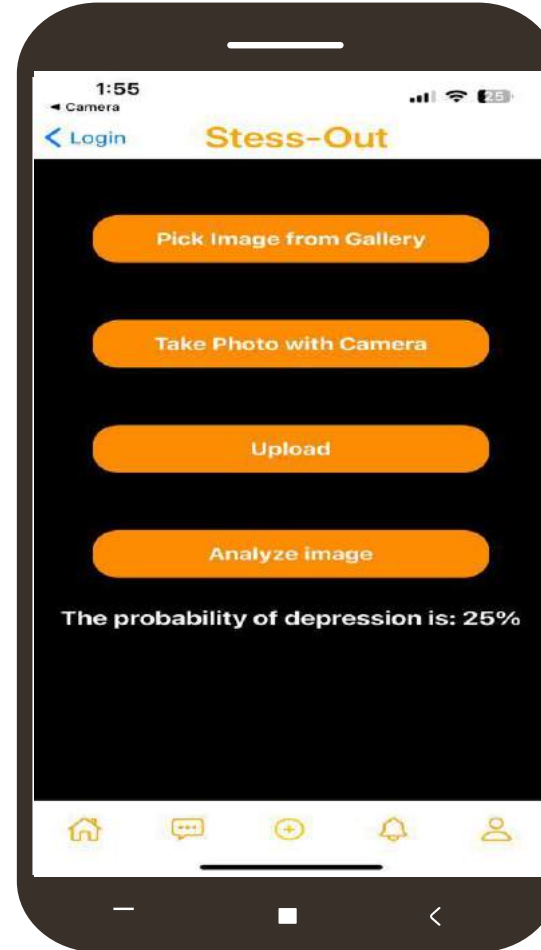
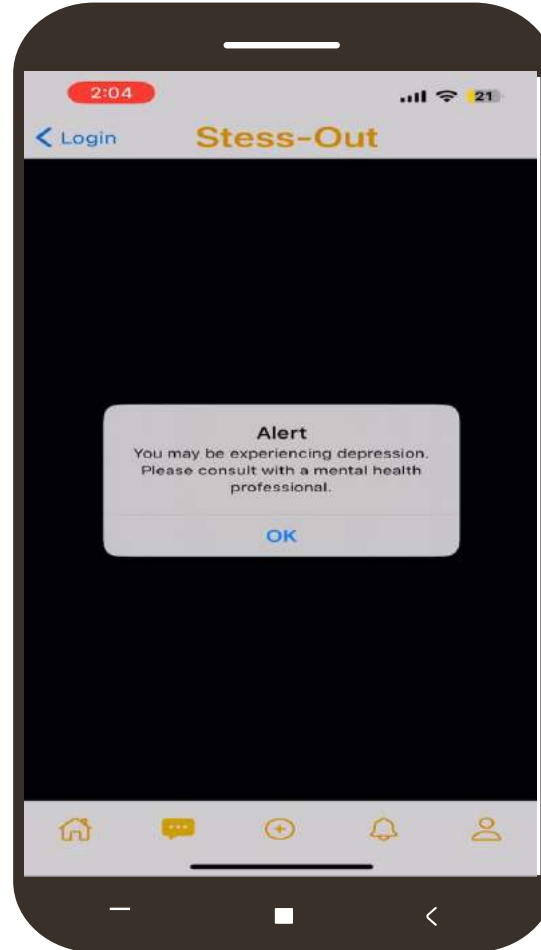
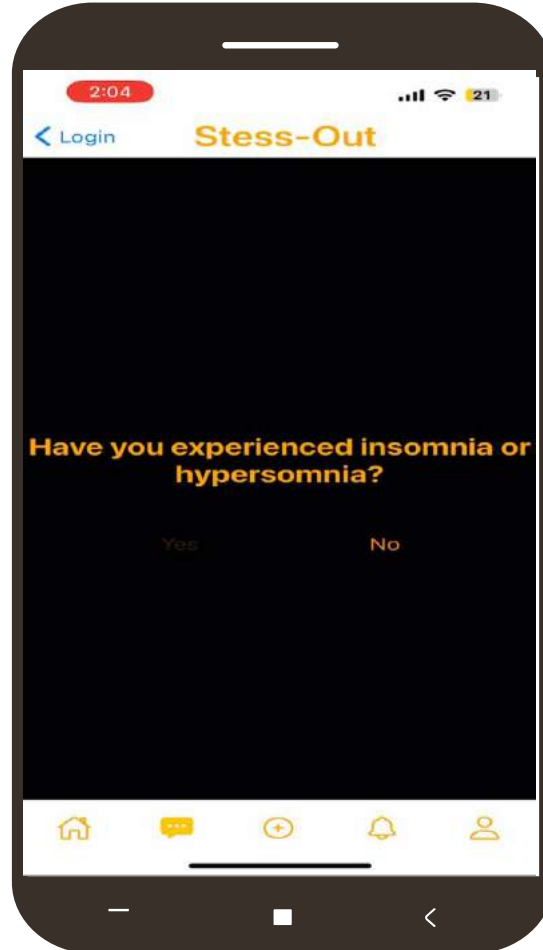
**Quiz / Upload Images Screen:** Quiz screen that asks the user questions to identify their sources of stress. Upload screen that allows the user to upload images

**Stress management techniques Screen:** A screen that provides stress management techniques, such as breathing exercises, meditation, or cognitive behavioral therapy.

**Registration / Login Screen:** A screen that allows the user to create an account or log in to an existing one.



# APP SCREENSHOTS



# USER DETAILS

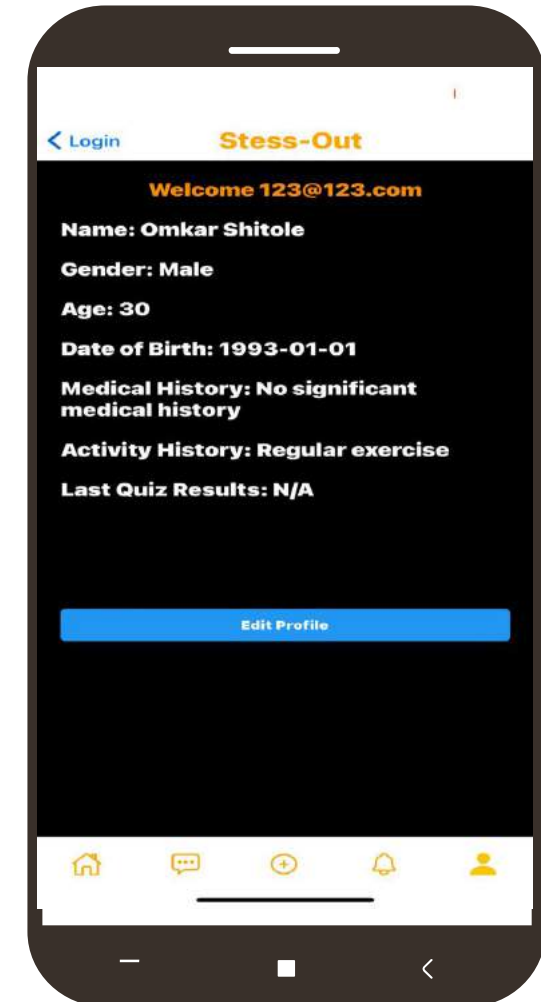
## Profile Screen

In this screen user can edit and save profiles information like name, gender, age, DOB, medical history, and activity history.

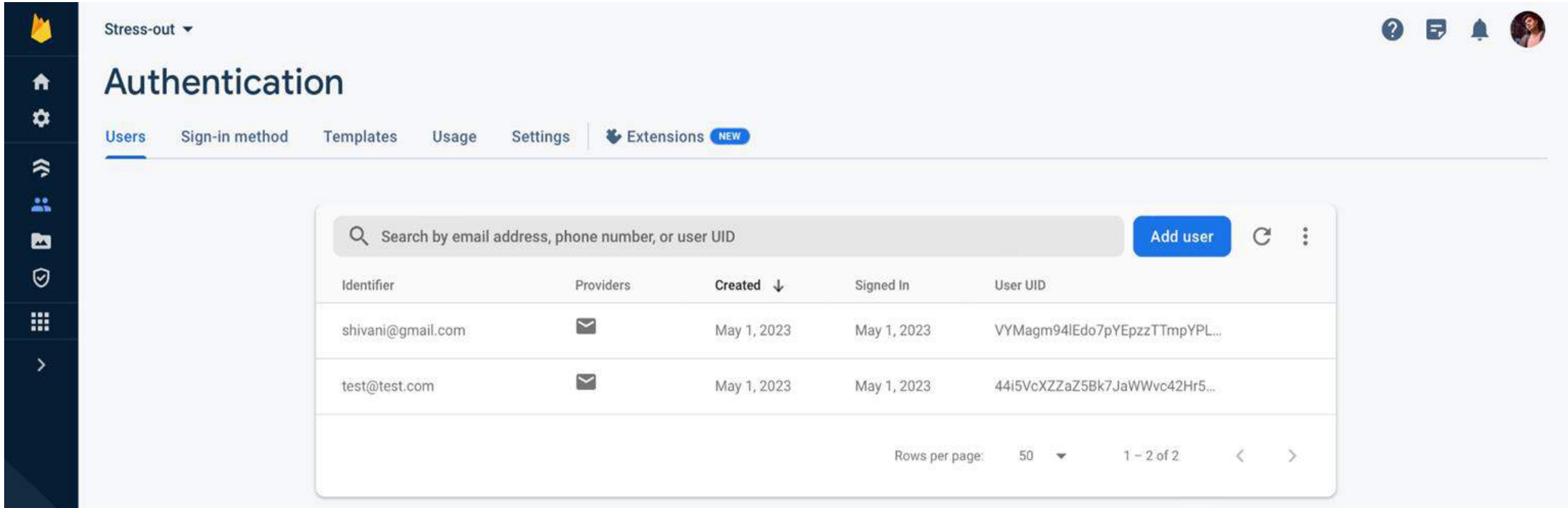
User quiz results are saved in real-time to a Firestore database as part of their profile data.

The app's profile screen provides a comprehensive overview of the user's personal information and quiz results, aiding in stress assessment.

By combining facial recognition technology and profile data storage, the app aims to offer effective stress detection and management.



# FIREBASE AUTHENTICATION



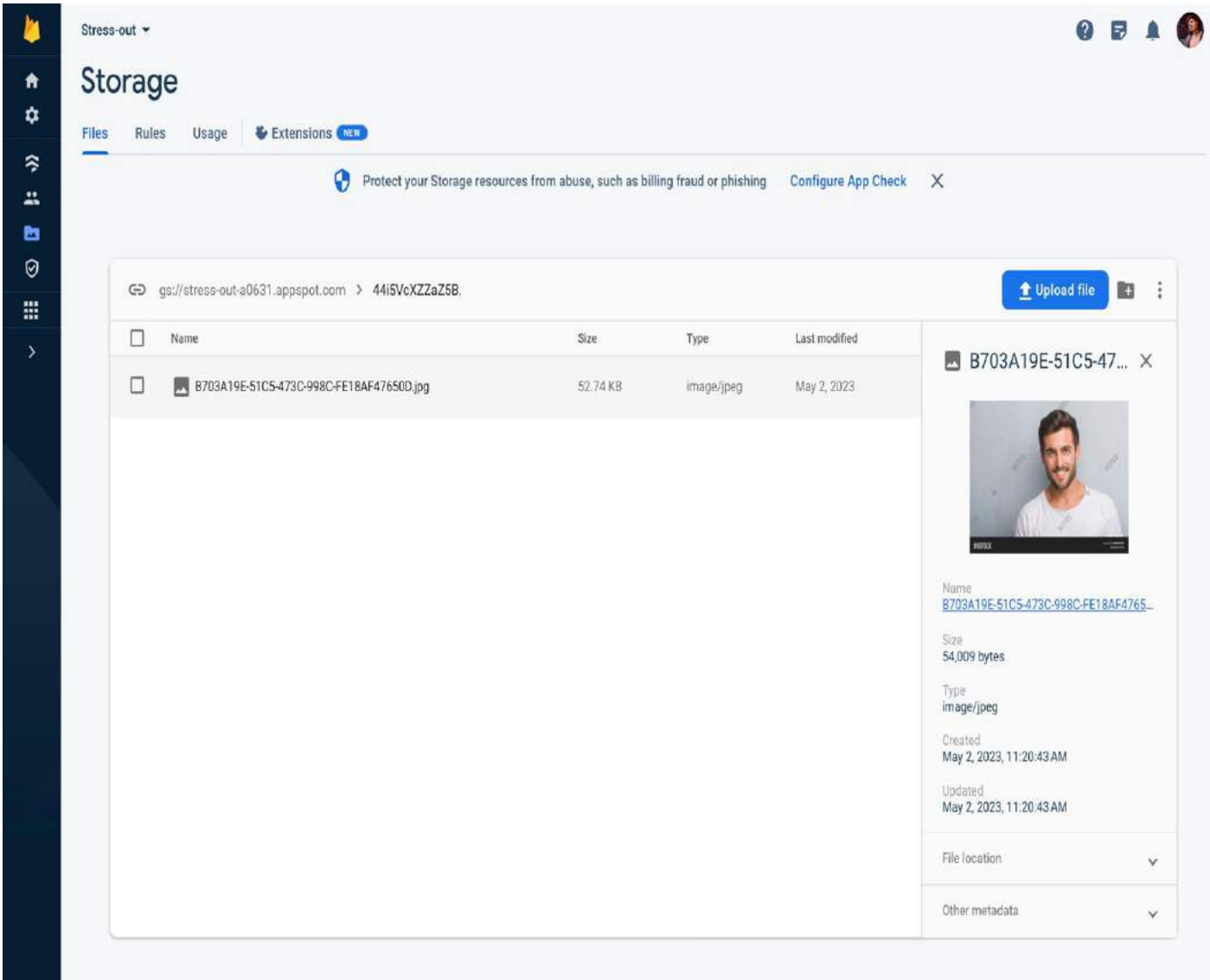
The screenshot displays the Firebase Authentication console for a project named "Stress-out". The "Users" tab is selected, showing a table of registered users. The table has five columns: Identifier, Providers, Created, Signed In, and User UID. Two users are listed: "shivani@gmail.com" and "test@test.com", both created on May 1, 2023. A search bar at the top allows filtering by email, phone number, or user UID. An "Add user" button is visible in the top right of the table area.

Identifier	Providers	Created ↓	Signed In	User UID
shivani@gmail.com	✉	May 1, 2023	May 1, 2023	VYMagm94IEdo7pYEpzzTTmpYPL...
test@test.com	✉	May 1, 2023	May 1, 2023	44i5VcXZZaZ5Bk7JaWWvc42Hr5...

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When a new user creates an account using Firebase Authentication in our app, the user's email address and a unique user ID (UID) are automatically generated and stored securely in the Firebase Authentication server.

# FIREBASE AUTHENTICATION



When a user uploads or takes a picture in our app, the image is stored in Firebase Storage using the Firebase Storage client SDK. To maintain a separation between different users' data, we create a separate folder for each user in Firebase Storage, with the user's UID associated with that folder. This ensures that each user's data is stored in separate location. Firebase Storage generates a unique URL for each file that is stored, which can be used to retrieve the file later.



# SPRINT 6 SCHEDULE

Issue Type	Key	Name	Status	Story Point Estimate
Story	STRESS-59	As a user, I want to track what my mood was last month/year	to be done	5
Story	STRESS-70	As a applicant, I would like to use a dashboard that displays any recommendations based on my self-assessment results	To be done	5
Story	STRESS-72	Update technical paper.	To be done	3



# RETROSPECTIVE

**What went well:** Team quickly responded professor's criticism of our sprint 5 deliverables. Each member evaluated their own pitfalls and made corrections accordingly.

**What needs improvement:** We need to improve our production speed to introduce all necessary features. There are still some features left for last sprint

**Next Steps:** With preparation for next sprint, we have to make sure all part of our application works as expected.



# THANK YOU

[Wiki page link](#)

[Updated Technical Paper](#)

[Deployment Manual Link](#)

[User Manual Link](#)

