



---

Depression detection app

*Subject: CS691*

*Prof. Henry Wong*



# Agenda

- » Detailed discussion on technologies used for development
- » Description of minimal viable product and all attributes, including product backlog
- » Acceptance Criteria and user stories
- » Sprint 2 backlog with test cases and stories
- » Team Velocity for this sprint including burndown chart and completed/committed ratio
- » Retrospective for sprint 2
- » Plans for sprint 3
- » Application screenshot



# Team members



Omkar Shitloe  
Developer & DBA



Yuxiang Liu  
Developer



Shivani Chavan  
Developer



Wangbo Gu  
Developer



Artem Kolmogorov  
Project Manager & Developer



Siddarth Ravirala  
Developer

# Improvements made from professor's feedback

Persona's section was improved and supplemented with user stories

More focus is made on technologies and architecture

Videos of presentation is reduced in size and compartmented for uploading video files on wiki page

New template is used for sprint 2 presentation



# Project Description



Our detection system will be trained by a unique dataset for 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 is that the system can analyze the input (messages, images, and video) from users, and detect the type of depression such as anxiety, bipolar, or paranoia. Finally, the possibility of different depressions that the person might have will be provided.

# 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 discuss 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

CS-691

1

TEAM AGREEMENT

CS-691

2

TEAM AGREEMENT

CS-691

3

- 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 voluntary, 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

\* 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
Shivani Chavan	shivani.chavan@pace.edu
Yuxiang Liu	yj26417@pace.edu
Omkar Shinde	os31654n@pace.edu
Wangbo Gu	wg10154n@pace.edu
Siddharth Ravurala	sr64119n@pace.edu
Artem Kolmogorov	ak71778n@pace.edu



# 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\$/annualy

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
- » Information about the app's privacy policy and data handling practices, as well as any relevant disclaimers or warnings
- » Contact information for the app's support team or customer service, in case users have questions or need assistance.



## Profile/History of consultation

- » A section where you can edit your personal information, such as your name, email address, and password
- » A dashboard that displays your mental health history and mood trends over time, based on the data you've inputted into the app's mood tracker
- » A list of any self-assessments you've taken within the app, along with their results

# Minimal Viable Product



## Image Upload/Take Picture

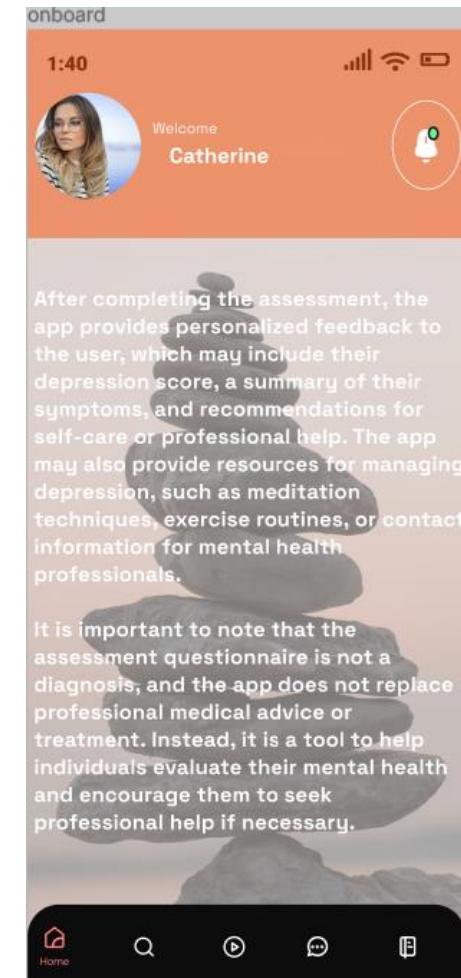
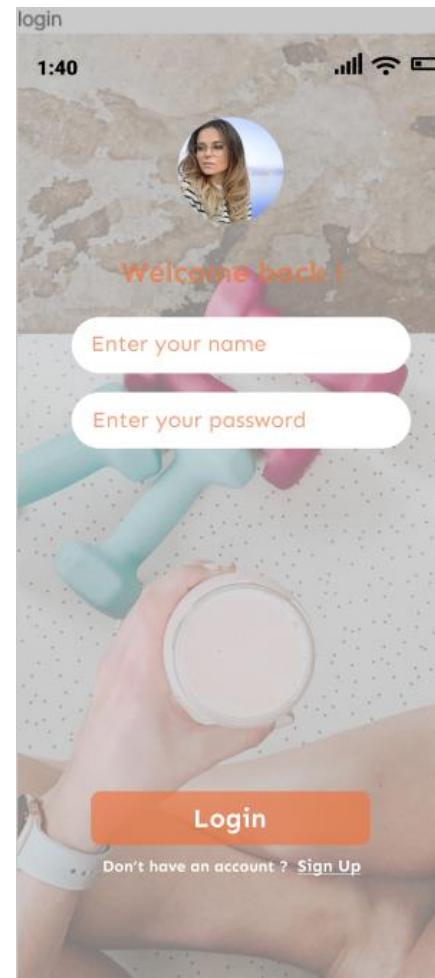
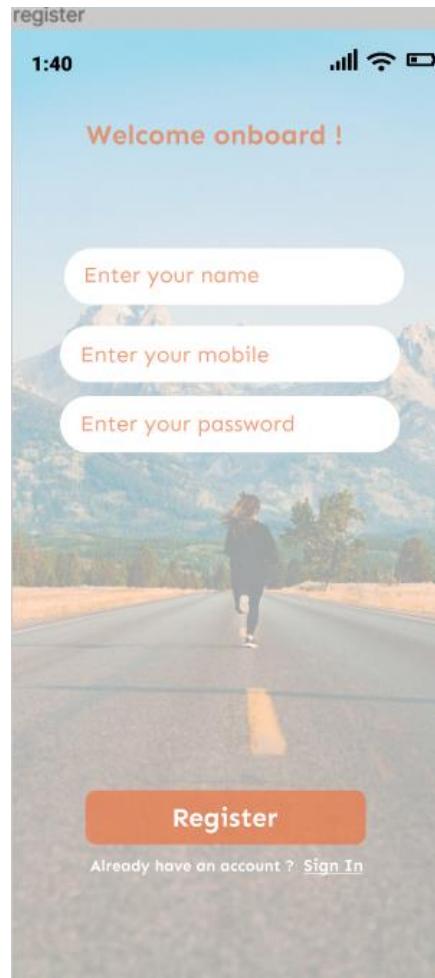
- » A camera button that allows you to take a picture directly within the app
- » A gallery button that allows you to upload pictures from your camera roll
- » An option to add captions or notes to each image, to help you remember important details or context



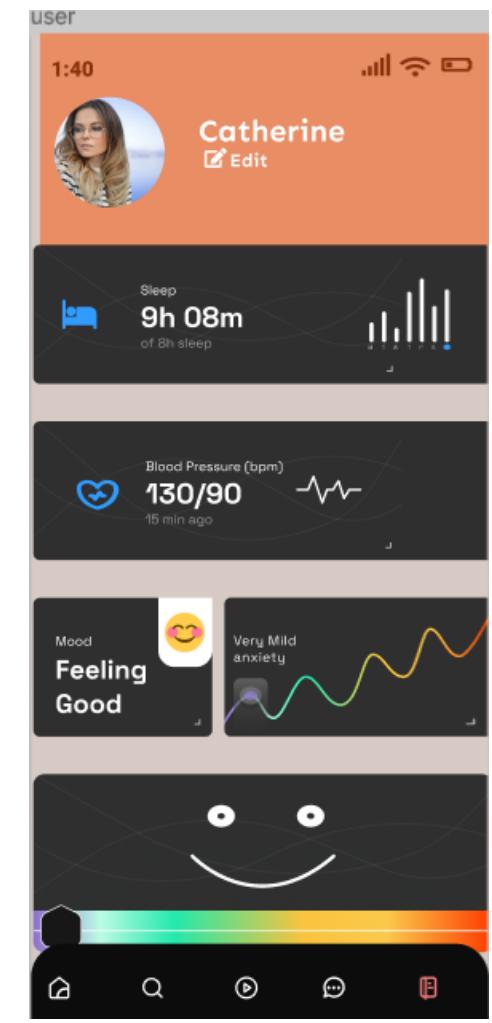
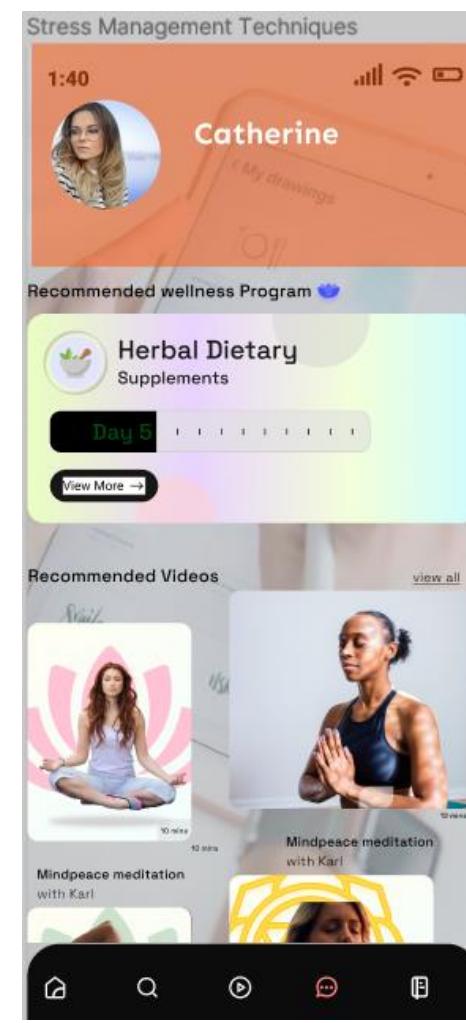
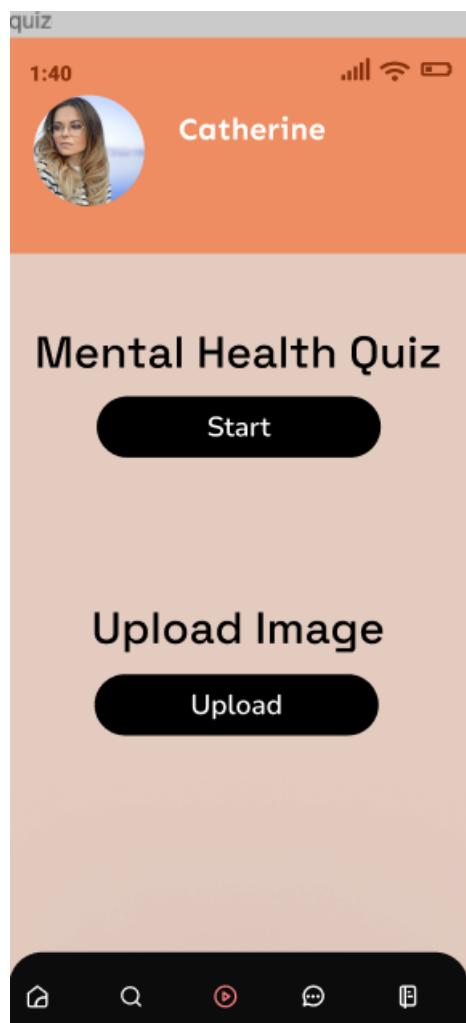
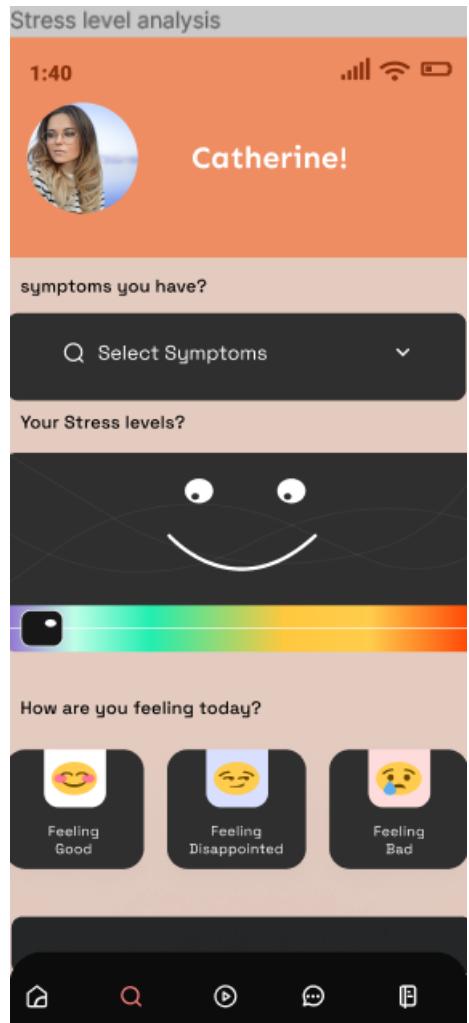
## Recommendation

- » 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
- » Resources and information about different types of mental health treatment, such as therapy, medication, or alternative therapies
- » Tips and strategies for managing symptoms of depression or other mental health conditions, such as mindfulness exercises, stress reduction techniques, or sleep hygiene practices

# Prototype



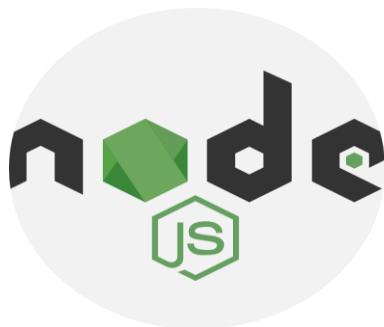
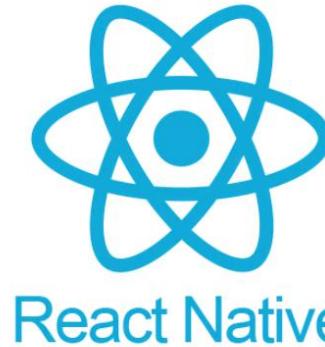
# Prototype



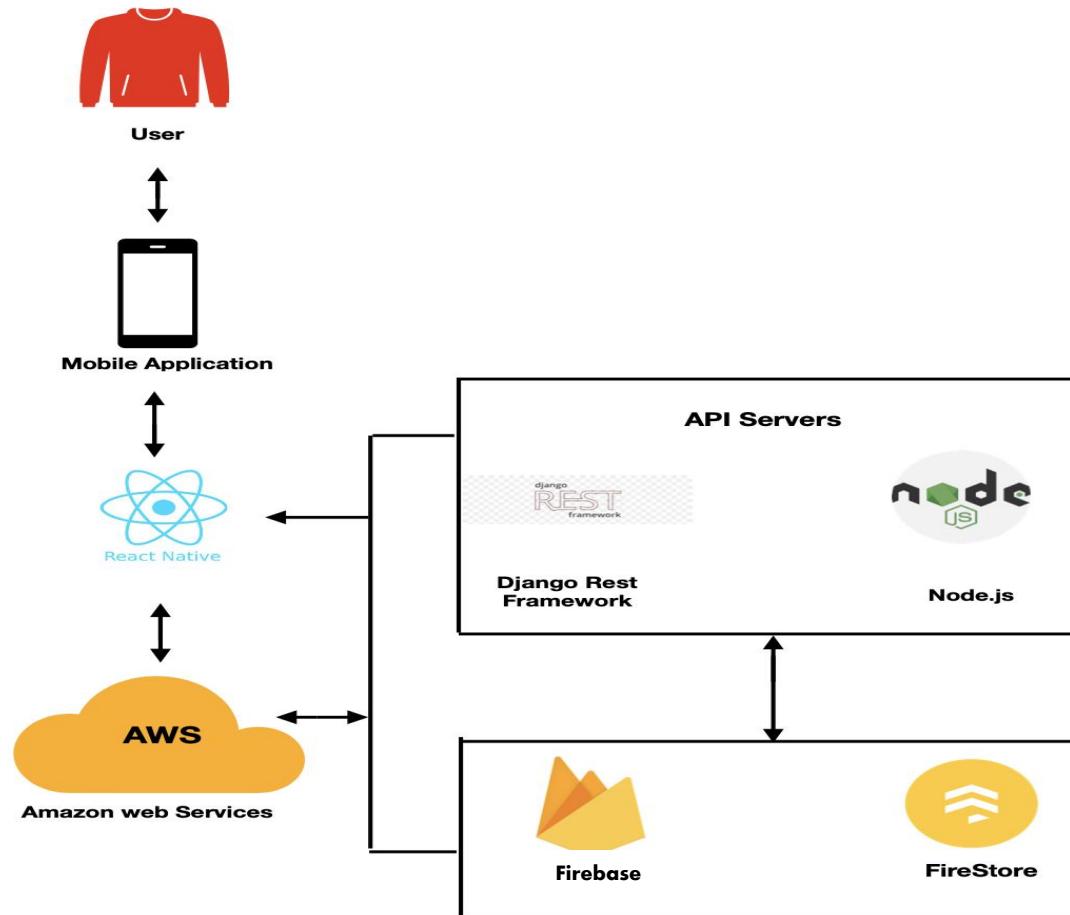
# Algorithms and Technology



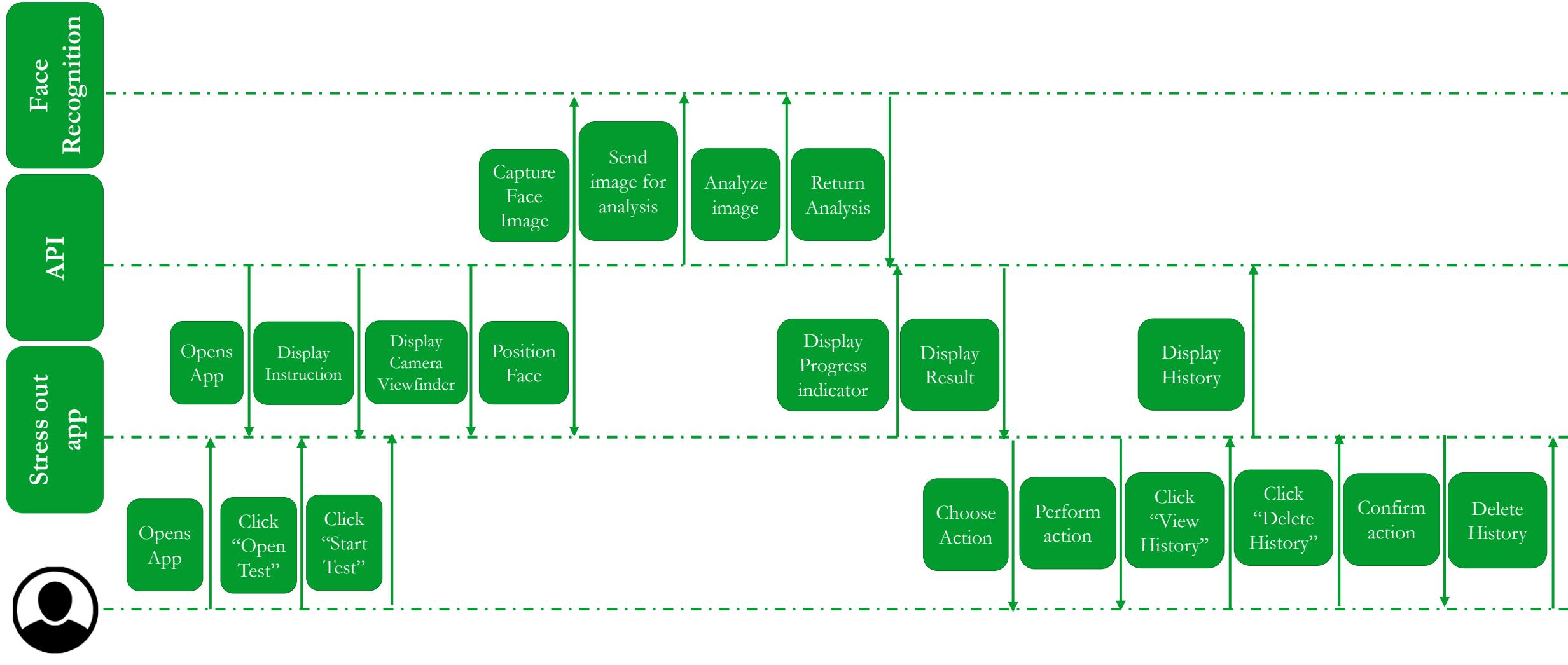
TensorFlow



# Conceptual Architecture Diagram



# Sequence diagram



# Product Backlog

User Stories			
Key	Summary	Status	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.	Done	Home Page
STRES-20	As a user, I want to login in app. So that I can use it to store all my information.	Done	Home Page
STRES-21	As a user, I want to upload my picture from phone gallery to analyze	To be done	Image Upload/Take Picture
STRES-22	As a user, I want to take a picture from my front and back camera to upload for analyze	To be done	Image Upload/Take Picture
STRES-23	As a user, I want to view my upload history and their results	To be done	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.	Done	Logout/Login
STRES-25	As a user I want to be able to find contacts for professional help	To be done	Recommendation
STRES-26	As a user I want to be able to view history of my recommendation	To be done	Recommendation
STRES-27	As a user, I want to create my profile So that I can store my account information.	To be done	Profile/History of consultation
STRES-28	As a user, I want to be able to edit my informaiton detail	To be done	Profile/History of consultation
STRES-29	As a user I want to be able to add captions for pictures I have uploaded	To be done	Image Upload/Take Picture
STRES-30	As a user, I want to be able to view personalized tips and strategies for managing symptoms	To be done	Recommendation
STRES-31	As a user, I want to know the sign of depression, and the risk of depression	To be done	Recommendation
STRES-32	As a user, I want to link to the hospital so that I can make a appointment with doctor	To be done	Recommendation
STRES-33	As a user, I want the app to keep checking my depression level	To be done	Profile/History of consultation
STRES-34	As a user, I want to know the risk of depression about me after I take pictures	To be done	Image Upload/Take Picture
STRES-35	As a user, I want to know some tips for reveling depression	To be done	Recommendation

# Test cases & Acceptance Criteria



# Acceptance criteria

Scenario	Summary	Criteria
1. User needs to get his mental health to be checked without going to the clinic	<p><b>Given</b> I'm in the role of customer searching for a way to get his/her treatment from home.</p> <p><b>When</b> I open the app</p> <p><b>Then</b> the app asks me to register and login</p> <p><b>And</b> then after my successful login, I should be able to tell my problems</p> <p><b>And</b> I click the "submit" button</p> <p><b>Then</b> the system starts to depict and analyze my Depression status.</p>	<p><b>Accuracy:</b> The app should provide the user to login and provide an accurate and reliable depiction of depression, including its symptoms, causes, and treatments. This information should be based on scientific research and clinical evidence.</p> <p><b>User Experience:</b> The app should have an easy-to-use interface and be designed with the user's experience in mind. It should be visually appealing, intuitive, and engaging.</p>
2. User wants to access account from a different device	<p><b>Given</b> I'm in the role of the user trying to login to my account from another device</p> <p><b>When</b> I try to login from another device</p> <p><b>Then</b> the app asks me for my login details on the other device now</p> <p><b>Then</b> I login to my account</p>	<p><b>Compatibility:</b> The app should be compatible with a wide range of devices and operating systems, including smartphones and tablets.</p>

# Acceptance criteria

Scenario	Summary	Criteria
3. User forgot password	<p><b>Given</b> I'm in the role of the user trying to login but I have forgot my password</p> <p><b>Then</b> the app shows me the option of 'forgot password'</p> <p><b>Then</b> the app asks me for my registered phone number or the registered email id</p> <p><b>Where</b> I will get the opt used for logging in my account again</p>	The app should save the users registration details so that if they forget their passwords then the app will be able to connect to them through their registered phone number or email id.
4. User wants to contact proper counselors or mental health professionals.	<p><b>Given</b> I'm in the role of the user looking for proper mental health professionals</p> <p><b>Then</b> the app shows me the option to connect to the app's support team</p> <p><b>Where</b> I can get the relevant details I want.</p>	The app should let the user to connect to the customer service team.

# Acceptance criteria

Scenario	Summary	Criteria
5. User wants to give his feedback.	<p><b>Given</b> I'm in the role of the user who have got my depression and mental health checked by the app</p> <p><b>Then</b> the app gives me my results</p> <p><b>And</b> allows me to give my feedback.</p>	<p><b>Continuous Improvements:</b> the app should be regularly updated and improved based on user feedback and changes in the field of depression research and treatment.</p>
6. User want to keep personal information and results to himself.	<p>Given I'm in the role of the user trying to see if anybody else can see my information</p> <p>Then I go to my home page and the settings section</p> <p>There I set my privacy settings.</p>	Privacy: The app should be designed with privacy in mind, ensuring that users' personal information and data are kept secure.

# Test cases

Unit to test	Scenario	Test data	Expected Results
Login	Successful login	Email – <a href="mailto:user@stressout.com">user@stressout.com</a> Password - userpass	Check results on entering valid User id & Password
Login	Invalid Username or Password	Email – <a href="mailto:user@stressout.com">user@stressout.com</a> Password - userpass	Check results on entering valid User id & Password
Login	Invalid Username or Password	Email – <a href="mailto:user@stressout.com">user@stressout.com</a> Password - userpass	Check results when User id is Empty & Login Button is pressed
Sign Up	Successful login	Email – any, Password -anything between 8 to 16 characters	Check results on entering valid User id & Password
Sign Up	error message as “username already in use”	Email – <a href="mailto:user@stressout.com">user@stressout.com</a> , Password - userpass	Check results on entering valid User id & password
Forgot password	Will direct the email to reset the password	Email – <a href="mailto:user@stressout.com">user@stressout.com</a> , Password - user	Check respond when a Password is containing all the given parameters
Profile	Profile creation		A list of features and resources will show up

# Test cases

Unit to test	Scenario	Test data	Expected Results
Privacy	User data		All the user data is safe within their profile.
Profile	Show an error with missing fields		Check to missing/mandatory fields
Homepage	Services on the homepage will show up		Check if the categories are correct
Homepage	User should be able to access the homepage		Once directed with url, you will be first redirected to homepage
Homepage	User should be able to contact the customer service		Homepage must provide resources
Homepage	User should be able to search the desired resources		Contact information should be present for assistance

# Sprint backlog

▼ STRES Sprint 3 >Add dates (6 issues)

6 0 0

Start sprint

...

STRES-33 Develop Front End - homepage

TO DO ▾



STRES-35 Develop Front End - service page

TO DO ▾



STRES-34 Develop ML model

TO DO ▾



STRES-38 Develop API and test

TO DO ▾



STRES-37 Develop the database

TO DO ▾



STRES-36 Demo

TO DO ▾



# Completed Stories

As a user, I want to register so that I know what's this app can do

 Attach  Add a child issue  Link issue ▾

Description

Add a description...

Activity

Show: All  

Newest first ↴

As a user, I want to login and store my information

 Attach  Add a child issue  Link issue ▾

Description

Add a description...

Activity

Show: All  

Newest first ↴

As a user, I want to know where I can take a picture for detect the depression level

 Attach  Add a child issue  Link issue ▾

Description

Add a description...

Activity

Show: All  

Newest first ↴

create ML model

 Attach  Add a child issue  Link issue ▾

Description

Add a description...

Activity

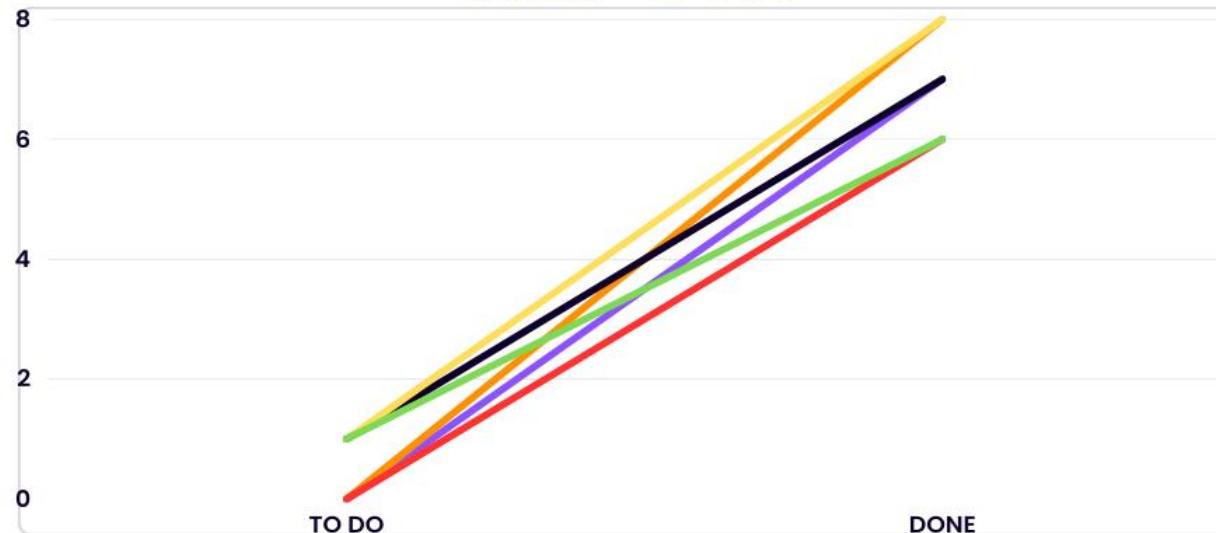
Show: All  

Newest first ↴



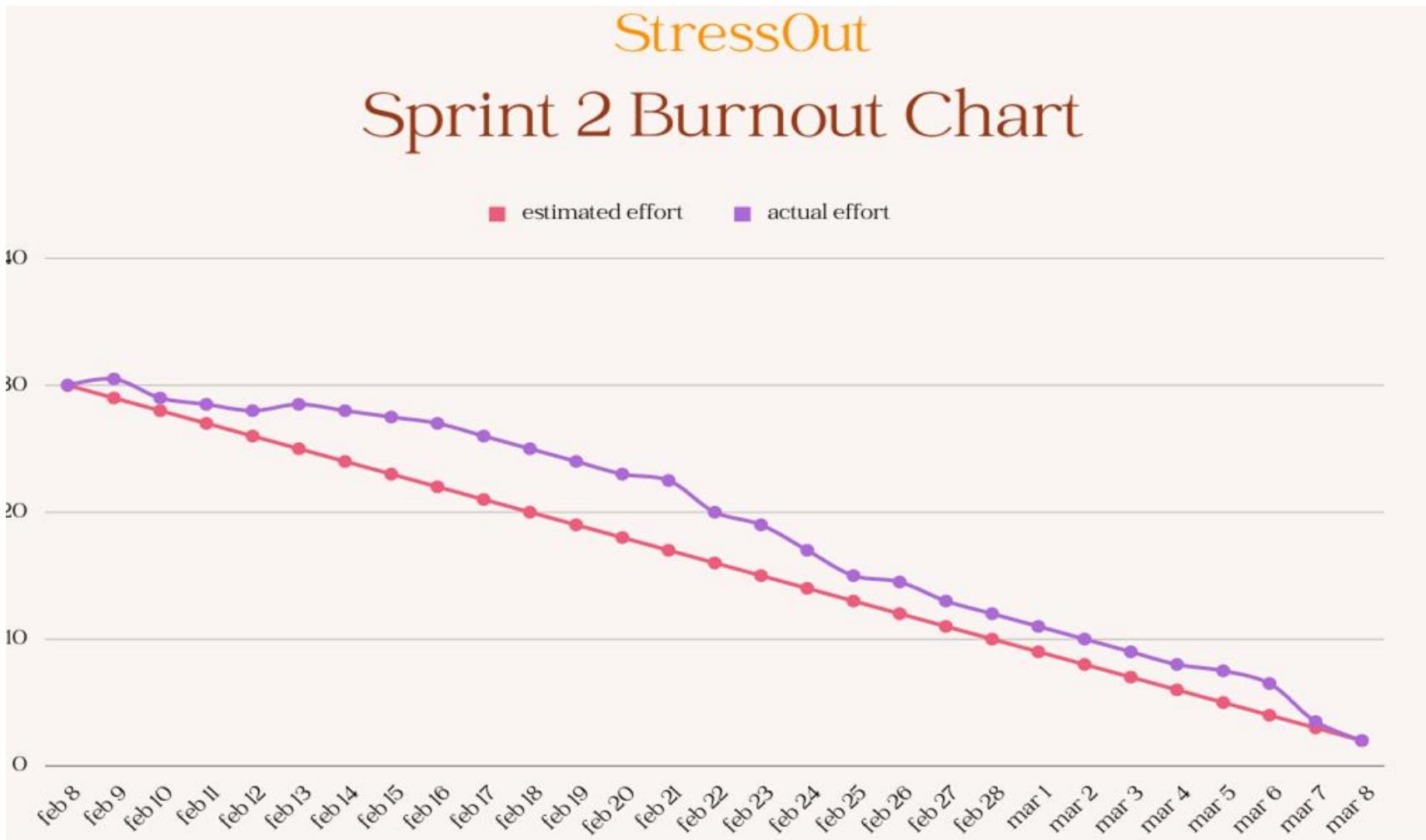
# Team members velocity report

## TEAM MEMBERS VELOCITY REPORT



● YUXIANG   ● OMKAR   ● SHIVANI   ● WANGBO  
● ARTEM   ● SIDDHARTH

# Sprint 2 burndown chart



# App Screenshots

## Home Page

App has 5 Functionality Buttons

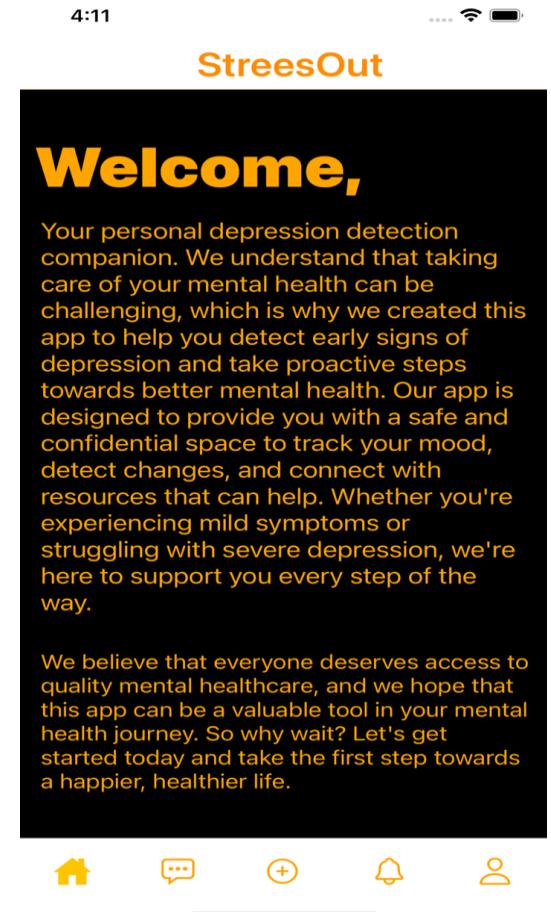
Onboarding Screen: A screen that welcomes the user to the app and provides an overview of its app.

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

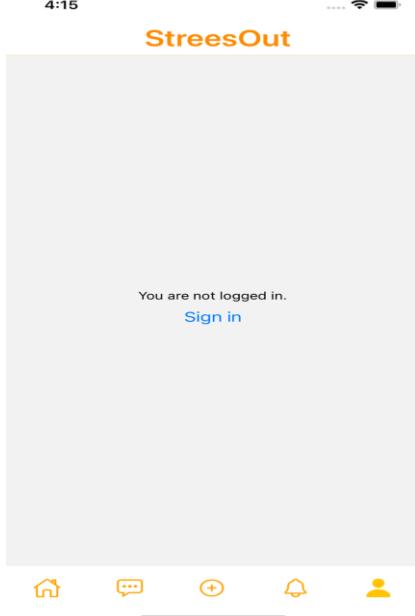
Quiz / Upload Images Screen: Quiz screen that asks the user questions to identify their sources of stress. Upload screen that allows the user to upload images

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

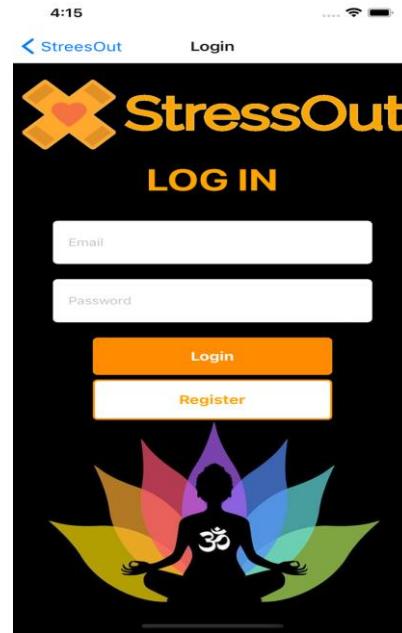
Registration / Login Screen: A screen that allows the user to create an account or log in to an existing one.



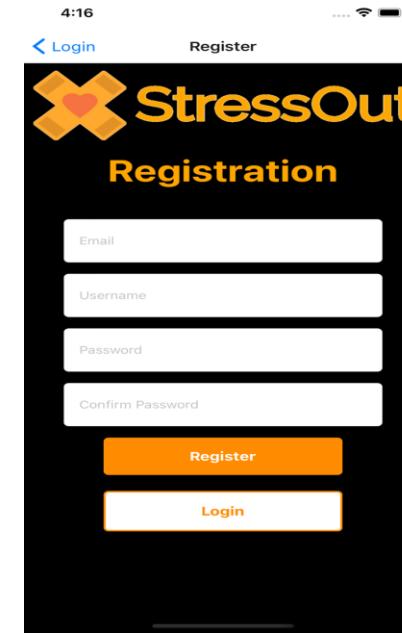
# API Screenshots



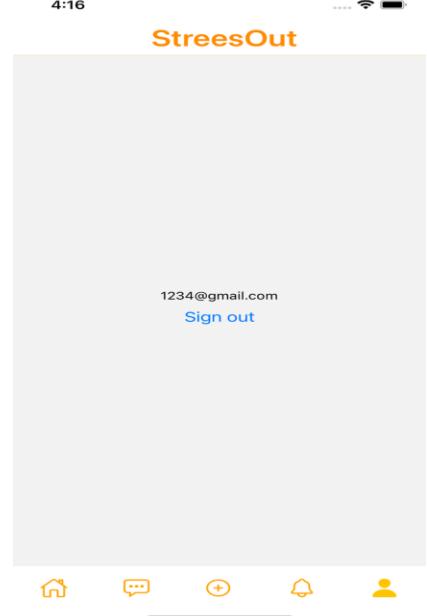
Profile Screen



Login Screen



Registration Screen



User Profile

# Database of the User (Firebase)

The screenshot shows the Firebase Authentication console under the project "Omkarlogin-signup". The left sidebar has icons for Home, Authentication, Firestore, Storage, Functions, and Cloud Pub/Sub. The main header includes "Go to docs", a notification bell, and a user profile picture.

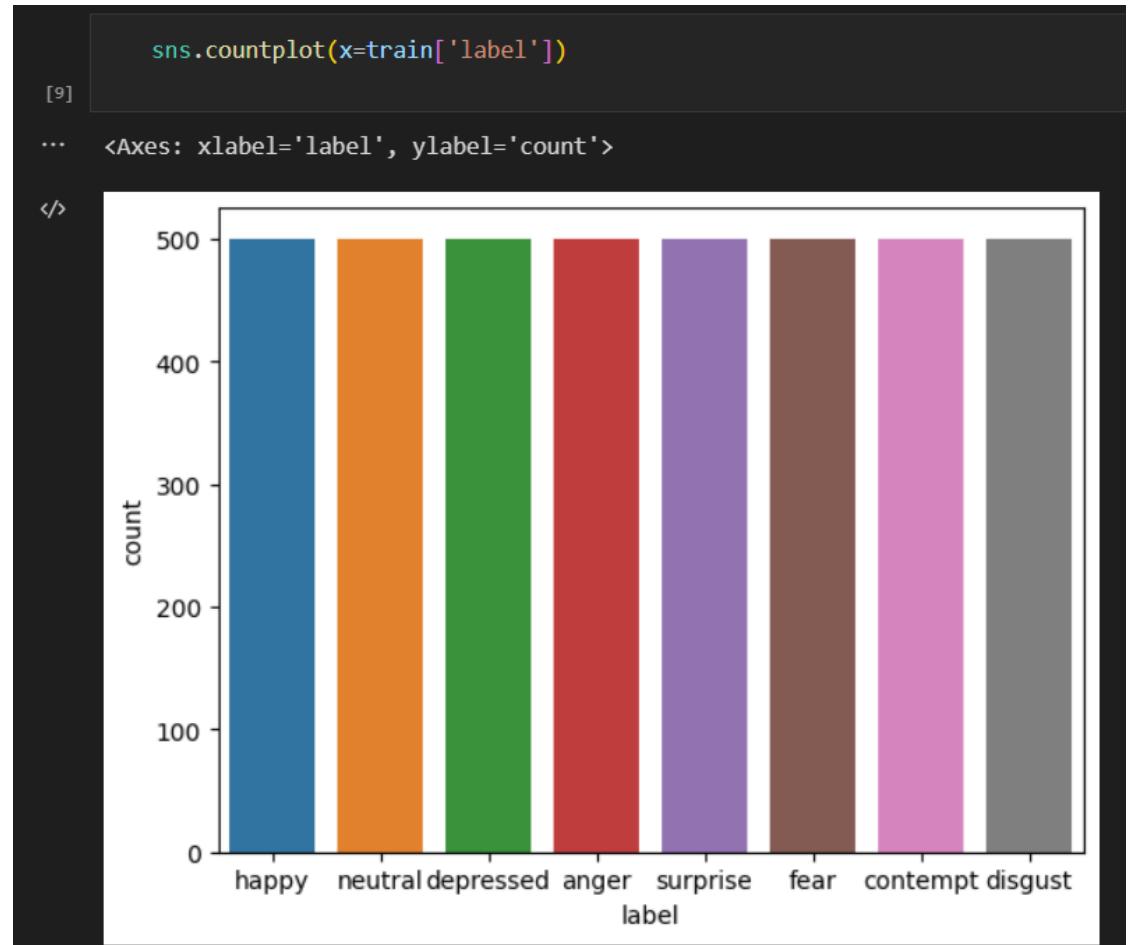
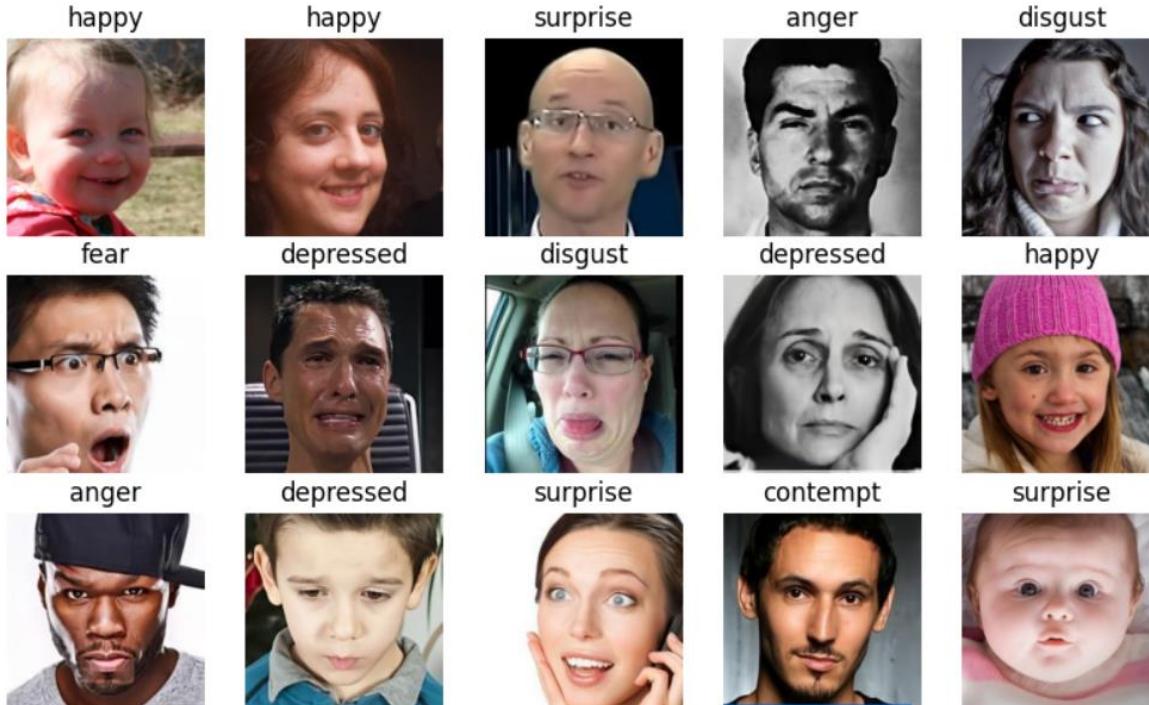
The "Authentication" section is selected, showing the "Users" tab. A search bar at the top allows searching by email address, phone number, or user UID. Below it is a table with columns: Identifier, Providers, Created, Signed In, and User UID. A single user entry is listed:

Identifier	Providers	Created	Signed In	User UID
1234@gmail.com	✉️	Feb 27, 2023	Mar 2, 2023	MDjB8osfXXWGsyKm2CwHw9Fo...

At the bottom of the table are pagination controls: "Rows per page: 50", "1 - 1 of 1", and navigation arrows.

# Machine Learning Model : Data Collection

8G dataset containing 27000+ facial images labeled with 8 emotional types



# Machine Learning Model : Data Collection



- » Training dataset: 70%-80% of the data
- » Testing dataset: 20%-30% of the data
- » The model will be trained on the training set, and the performance is evaluated on the testing set.
- » Resizing all images to 200 x 200 pixels

# Machine Learning Model : Data Collection

```
[[[[253 248 220]
 [253 248 220]
 [252 247 219]

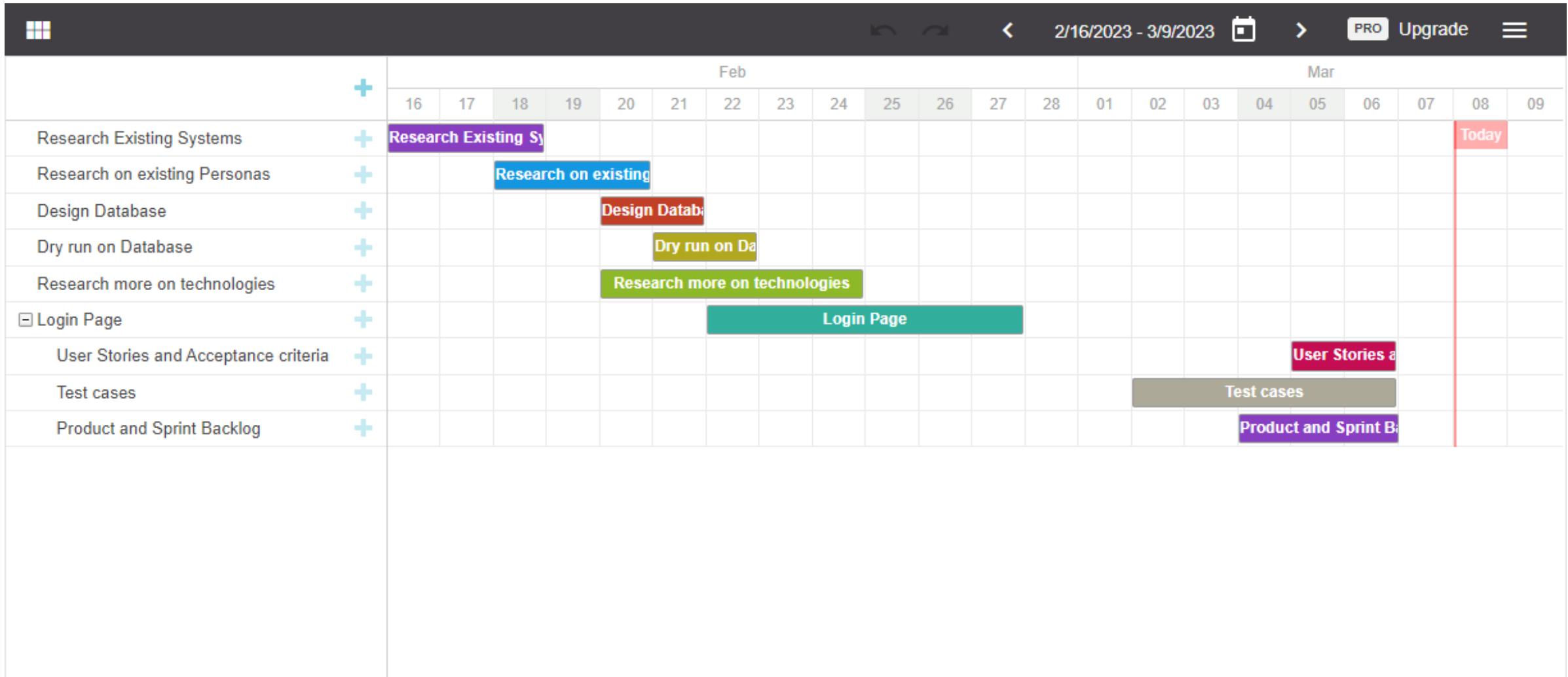
 ...
 [253 242 224]
 [253 242 224]
 [254 243 225]]]

[[253 249 223]
 [254 249 223]
 [253 248 221]

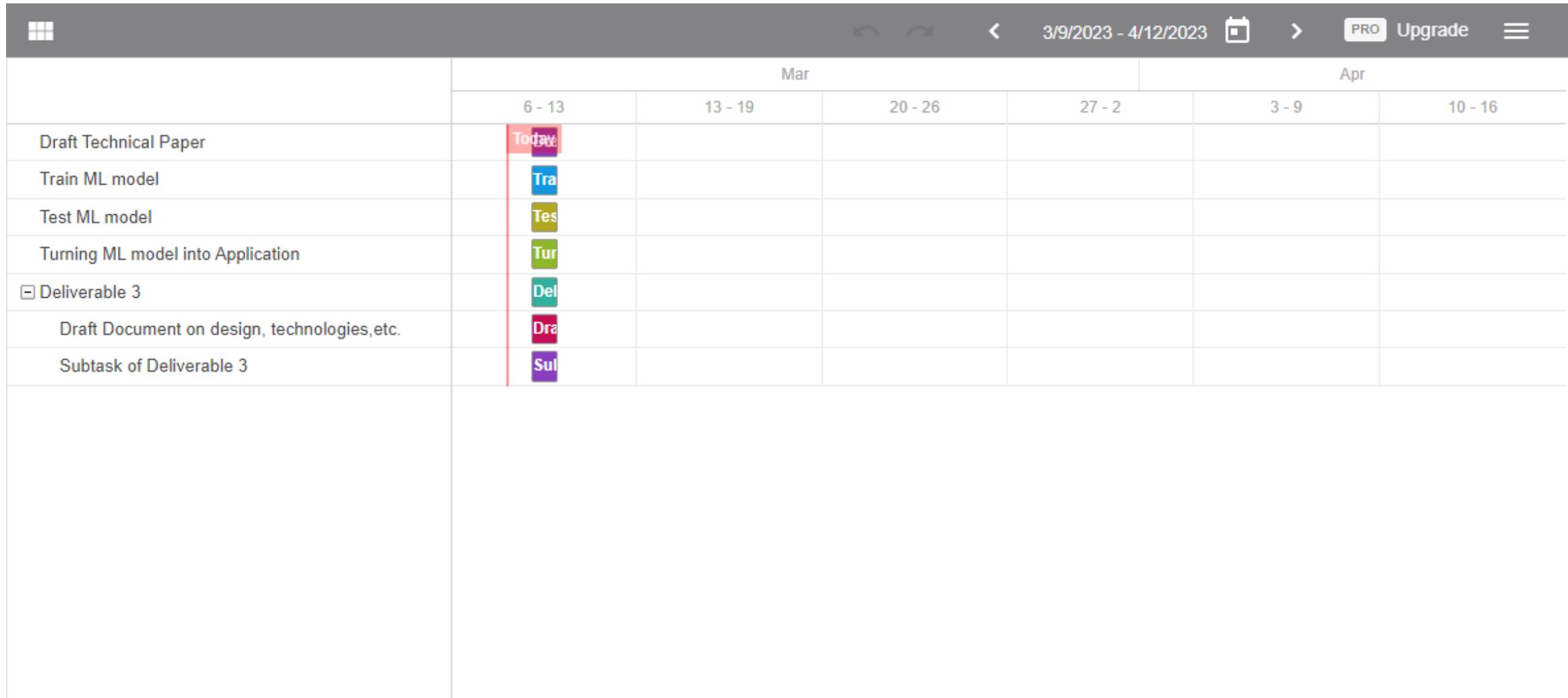
 ...]
```

- » Converting images to 4 dimensional NumPy array (RGB)
- » 4 dimensions: Batch size, Height, Weight and Channels
- » The values in the array represent the intensity of the red, green, and blue color channels at each pixel location in the image.
- » The intensity values can range from 0 to 255 for each channel, where 0 represents no intensity or darkness and 255 represents maximum intensity or brightness

# Sprint 2 Schedule



# Sprint 3 Schedule



# Retrospective

During Sprint 2, it was great to see that everyone in the team was cooperating with each other. The team members were actively engaged in the project, asking questions, providing feedback, and sharing their ideas. This helped to create a positive and productive atmosphere, where everyone felt comfortable expressing their opinions.

We were able to meet our deadlines for the most part, but there were some edits that needed to be made as we approached the deadline. This was due to a variety of factors, including unexpected issues that arose during the sprint and changes in requirements. However, the team was able to adapt quickly and make the necessary adjustments to ensure that we stayed on track.

One of the strengths of our team during Sprint 2 was our ability to take feedback from the professor and incorporate it into our work. We recognized the importance of listening to the professor's feedback and using it to improve the quality of our work.

# Stories planned for sprint 3

User Stories			
Key	Summary	Status	Place
STRES-23	As a user, I want to view my upload history and their results	To be done	Profile/History of consultation
STRES-25	As a user I want to be able to find contacts for professional help	To be done	Recommendation
STRES-26	As a user I want to be able to view history of my recommendation	To be done	Recommendation
STRES-27	As a user, I want to create my profile So that I can store my account information.	To be done	Profile/History of consultation
STRES-28	As a user, I want to be able to edit my informaiton detail	To be done	Profile/History of consultation
STRES-30	As a user, I want to be able to view personalized tips and strategies for managing symptoms	To be done	Recommendation
STRES-31	As a user, I want to know the sign of depression, and the risk of depression	To be done	Recommendation
STRES-32	As a user, I want to link to the hospital so that I can make a appointment with doctor	To be done	Recommendation
STRES-33	As a user, I want the app to keep checking my depression level	To be done	Profile/History of consultation
STRES-35	As a user, I want to know some tips for reveling depression	To be done	Recommendation



---

*Thank You*

CS-691

Team 2: Bug Terminator

Depression Detection System

