



SARS covid-19 detection through AI

**Team-4
Mission:Possible**

SPRING 2023 - CS 691- CAPSTONE PROJECT

PROFESSOR HENRY WONG

PACE UNIVERSITY

Agenda



Agenda

- 1. Improvement from Professor's Feedback.
- 2. Project Description
- 3. Personas
- 4. Minimum Viable Product
- 5. Technologies
- 6. Architecture Diagrams
- 7. Sprint 3 Recap
- 8. Product Backlog, User Stories and Sprint 4 Backlog
- 9. Metrics
- 10. Retrospective
- 11. Sprint 5
- 12. Product Demo-Sprint 4
- 13. Live Application Demo
- 14. Technical paper

Agenda

1. It's worth noting that Artificial Intelligence is a subset of machine learning. Our focus is on utilizing machine learning to detect cases of covid-19. Within machine learning, we make use of specific techniques such as Convolution Neural Networks (CNN) and Recurrent Neural Networks (RNN).
2. CNN is a type of neural network architecture that is mainly utilized in deep learning algorithms. It is specifically designed to process pixel data, making it ideal for tasks such as image recognition. CNNs operate by extracting relevant features from the input data through a series of convolution and pooling layers, followed by fully connected layers for classification or regression purposes.
3. RNN is a type of neural network that is capable of recognizing sequential patterns within data and using them to predict the most probable next scenario. Unlike other types of neural networks that process inputs independently, RNNs are able to maintain a memory of past inputs and use it to influence their outputs. This makes them particularly useful in tasks such as natural language processing, speech recognition, and time-series prediction.
4. We opted to use CNN for our project as it is well-suited for tasks such as medical analysis, drug discovery, and image analysis. On the other hand, we did not use RNN as it is more appropriate for tasks such as text summarization, speech recognition, and entity extraction.

Team Member Roles and Responsibilities



Vekatesh
(Quality Analyst)



Vamshi
(Product manager)



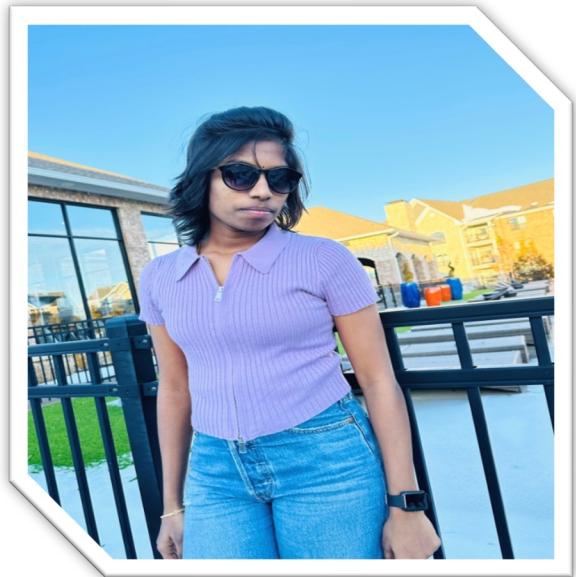
Reshma Gonu
(Developer)



Hanith Atluri
(Tester)



Alekhyaa
(Facilitator)



Anusha Nunna
(Developer)

Improvements made from Professor Feedback

1.The team did not implement the last feedback provided by the professor

→ Based on professors feedback this time we create the tables for Product backlog and Sprint backlog

2.User stories were missing

→ We have added the user stories for this sprint-4

3.The team is unable to show its demo

→ We have shown our demo for sprint-3 lately and sprint-4 in-time

4.Next Sprint you have to show a Demo of your MVP in which just login is insufficient.

→ We have showed the demo for covid-19 reports feedback for this deliverable we will implement more.

5.Regarding Technical Paper

→ This time all of our team members work on Tech paper

6.Team was missing the Stories Not Completed slide.

→ This time we add Stories Not Completed slide as well.

7. Team velocity report and Burn down chart.

→ This time we have deliver the stories properly and we took the report correctly

Project Description



"Whomever pulls the sword from the stone will lead this project."

| | |
|-----------------------------|---|
| Project Name: | SARS covid-19 detection through AI |
| Team: | Mission:Possible |
| Project Description: | <p>For users who want to know their feedback on covid-19 reports the let it free is a mobile app that checks users reports and provides the accurate result unlike if users not able to go to hospitals in the covid-19 situation our application will help them to submit their reports and they can get their accurate result. Based on their result they can order the medical kit and they can make an appointment to the doctors as well.</p> |
| | |
| Benefit Outcomes: | If the users can use our application they can easily get their covid-19 accurate feedback. Based on that they can order the tool kit and they can take the precautions as well. |
| Github Link: | https://github.com/htmw/2023S-Team4/wiki |

Team Working Agreement

Team Agreement

Personal Interaction

1. There will be several ways for team members to communicate with one another.
2. This team will be using the zoom meetings once a week for productive team conversations.
3. There will be more partnership and visibility on the team if everyone keeps their straight faces.
4. A Whatsapp chat group or zoom meet will be utilized for any last-minute questions or concerns, as well as for any other pressing matters.
5. Google Docs, Whatsapp, slack where all members of the team may work together to create a single document, will be used to distribute the final yields, and provide quality control.

The distribution of the work and levels of participation

1. Every member of the team should have about the same amount of responsibility for the project, and the workload should be split proportionally.
2. Everyone on the team needs to get their task done on time
3. Their inability to meet deadlines will have a negative impact on the efficiency of the whole group. In the event that a squad member is having difficulty at any moment, they may let their teammates know so that they could still all pitch in to get things done on time.

4. It is anticipated that each member of the team would show up to the meetings in a timely manner.

5. When a member of the squad is going to be absent from the meeting, they should let the leader of the team know in advance so that they may make up the time before a subsequent meeting is planned.

6. Activity is split amongst participants in the group on a limited basis; nevertheless, in the event that members fail to participate, the product owner retains the right to delegate appropriate responsibilities to absentee individuals.

7. In the event that they are unable to attend meetings, members have agreed to support any decision that is reached and unanimously agreed upon during such sessions.

Managing conflicts

1. Each member of the group would be in charge of coordinating the meeting's logistics and presiding over the gathering.
2. Each person in the group is responsible for contributing ideas, engaging in conversation, and reporting on the status of their assigned tasks.
3. Virtual weekly team meetings will take place on Zoom between Mondays and Wednesdays. Except perhaps in emergencies, engagement at team meetings is required of all personnel.

Others

1. Maintaining an open forum where everyone on the team may voice their thoughts at all times

2. It is understood that no one will disturb another team member in the wee hours unless absolutely necessary for the occurrence of a specified event.

Team members

| Name | Email-id |
|---------------------|-------------------|
| Hanith atluri | Ha71689n@pace.edu |
| Reshma reddy gonnu | Rg95745m@pace.edu |
| alekhyaa boddu | ab81963n@pace.edu |
| Anusha Nunna | an21822n@pace.edu |
| Venkatesh Kaniganti | vk91272n@pace.edu |



PERSONAS



JIMMY ANDERSON

AGE :- 28 YEARS

GENDER:- MALE

HE WENT TO THE HOSPITAL TO GET CHECKED OUT SINCE HE WASN'T FEELING VERY WELL, AND THE DOCTORS WANTED TO SEE WHETHER HE WAS SHOWING ANY SIGNS OF CONVULSIONS.

THE CT SCAN WAS CARRIED OUT, AND THE FINDINGS WERE GATHERED. YET, NONE OF THE DOCTORS ARE AVAILABLE TO TALK ABOUT THE PAPERS AND PROVIDE THEIR FEEDBACK. HE IS ABLE TO INPUT THE REPORT INTO THE PROGRAM AND OBTAIN THE FINDINGS BY MAKING USE OF THE SARS COVID-19 DETECTION WITH AI TECHNOLOGY



ALENA WILLIAMS



AGE :- 32 YEARS

GENDER:- FEMALE

SHE IS UNSURE ABOUT THE COVID 19.SHE REALLY WANT TO TEST HER OWN ABILITIES.SHE CAN ORDER TESTING KITS BY UTILIZING SARS COVID 19

DETECTION VIA ARTIFICIAL INTELLIGENCE. BECAUSE OF HER CHILDREN, SHE IS UNABLE TO RELIABLY APPROACH HER INFANT CHILD WHEN HE OR SHE IS EXPERIENCING SYMPTOMS.



CHARLES JOHN

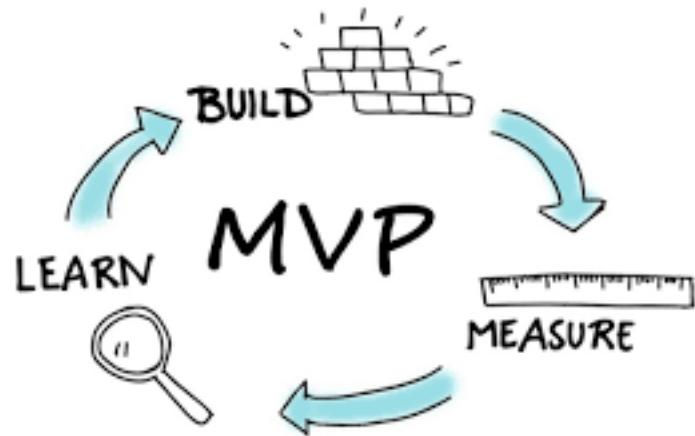
AGE :- 23 YEARS

GENDER:- MALE

HE WENT TO THE HOSPITAL TO GET WEIGHED OUT BECAUSE HE HADN'T BEEN FEELING VERY WELL, AND THE DOCTORS THERE LOOKED FOR SIGNS OF CONVULSIONS IN HIM.

HE IS CONFINED TO THE HOUSE AND UNABLE TO GO ANYWHERE ELSE BECAUSE OF THE SIDE EFFECTS OF COVID-19. HE IS ABLE TO DISCUSS HER HUSBAND'S ILLNESS WITH A CHATBOT THAT EMPLOYS SARS COVID- 19 DETECTION UTILIZING AI, AND IN RETURN, SHE WILL OBTAIN ADVICE FROM TRAINED MEDICAL SPECIALISTS

MINIMAL VIABLE PRODUCT



MINIMAL VIABLE PRODUCT

The software takes as input a patient's X-ray results and outputs whether the patient has been influenced by covid (a "positive" result) or not (a "negative" result).



INPUT



OUTPUT

Technologies and Algorithms



Technologies and Algorithms

Planning:

Step 1: Image Dataset Exploration.

Step II: Importing Pretrained Model.

Step III: Splitting dataset into testing& training dataset to find accuracy of the model.

Step IV: Actual image input for analysis.

Step V: Testing & debugging

ALGORITHM:

Step 1: A publicly available chest x-ray images dataset is taken for the development of the system.

Step 2: Steps like exploration and feature extraction are performed to make the dataset suitable for the use.

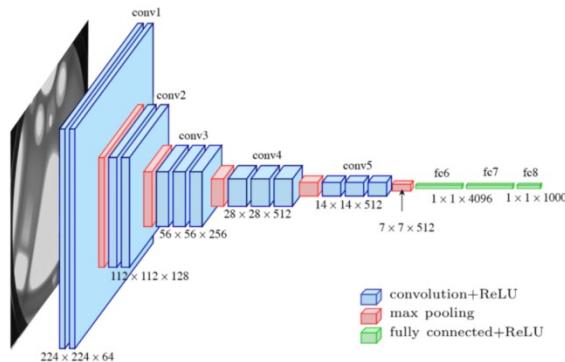
Step 3: Once the dataset is ready, we will split it into train and test dataset.

Step 4: Pretrained ML model will be used for training and testing and accuracy will be determined.

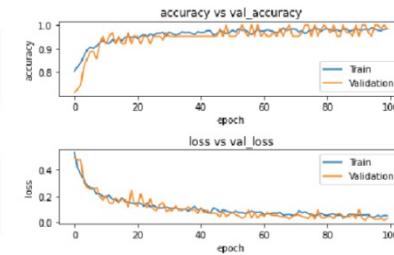
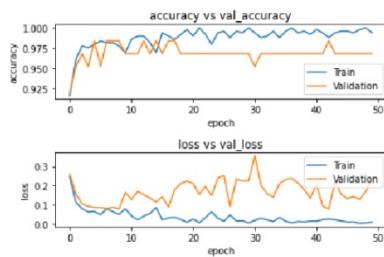
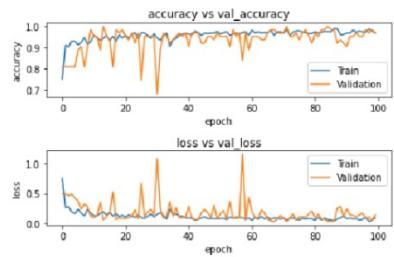
Step 5: Once everything is done then the user can provide actual test data for COVID19 Prediction.

Step 6: User Interface is provided using Streamlit PythonModule.

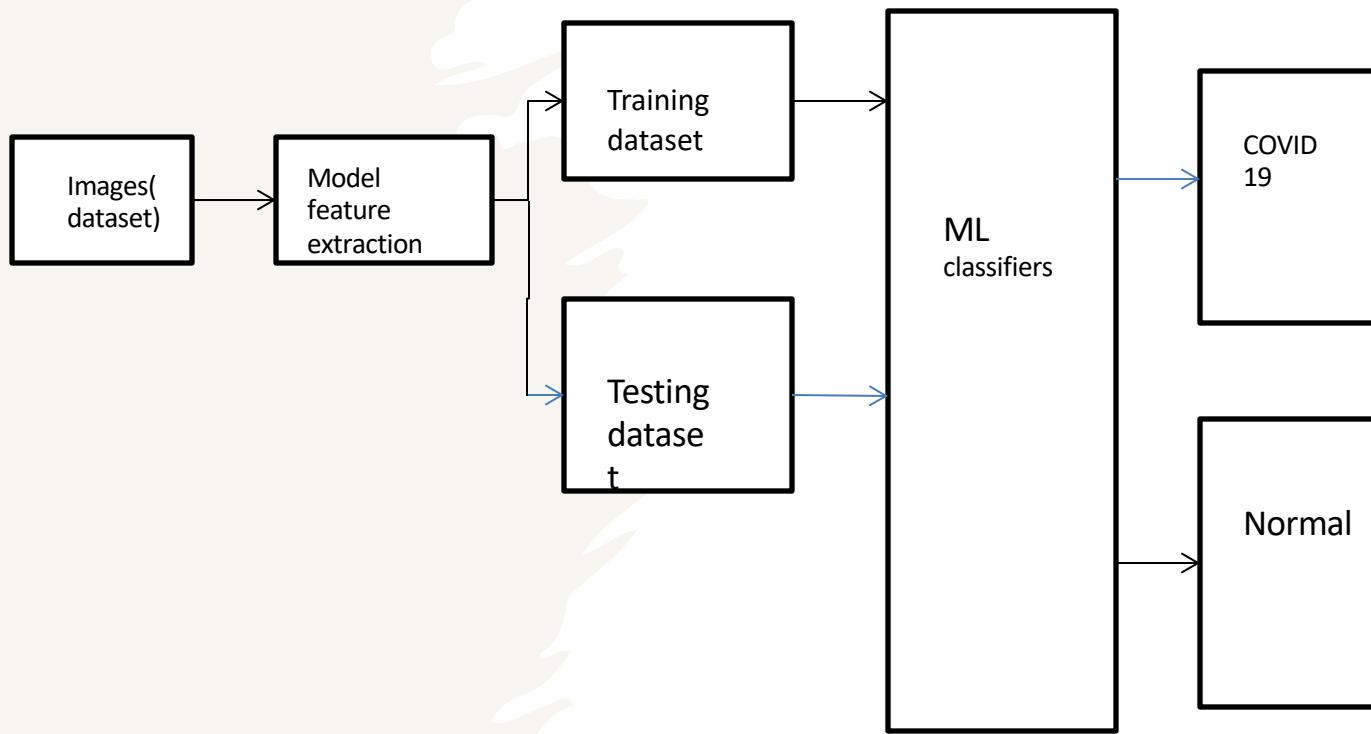
- **Convolutional Neural Network:**
- Recently, CNNs are the most studied machine learning (ML) algorithms for the medical lesions diagnosis using images. The justification behind this is that CNNs retain complex features while scanning input images. As stated above, spatial relationships are of primary importance in radiology, such as how the bone joins the muscle, or where the standard lung tissue interfaces with infected cells.



Machine Learning Model: Statistics Gathering



System Architecture:



Recap of sprint-3

- Explored a variety of essential machine learning algorithms, such as linear regression, logistic regression, decision tree, KNN algorithm, TensorFlow, deep learning classification, image recognition, and pattern recognition.
- Discussed different UML diagrams, including architecture, sequence diagram to better understand our project's design and structure.
- Analyzed the remaining items in the product backlog and walked through them to ensure a clear understanding of what still needs to be accomplished.

SPRINT 3 VS SPRINT 4

Sprint 3

Login
Feedback
Remainders

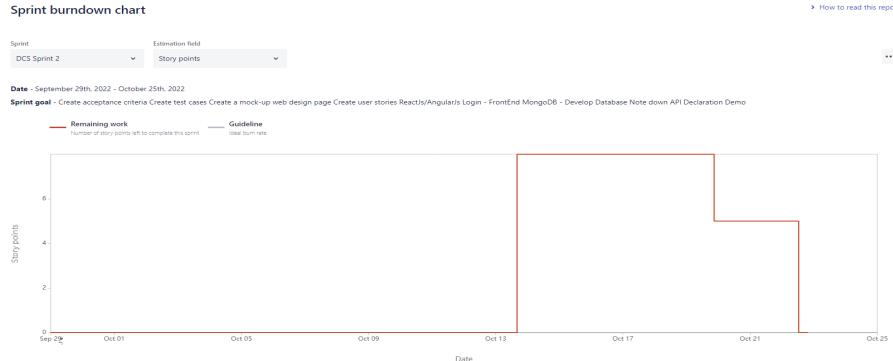
Sprint 4

MVP
CHAT BOT
Deployment

Sprint 1

| Issue Type | Key | Name |
|------------|---------|---|
| Task | SARS-12 | Develop the deliverable one presentation |
| Task | SARS-13 | Set up weekly meetings |
| Task | SARS-14 | Assign roles to the team |
| Task | SARS-15 | Configure the development tools Jira and GitHub |
| Task | SARS-16 | Develop a crucial business application. |

| Issue Type | Key | Sprint_02 | Story Points Estimate |
|------------|--------|---|-----------------------|
| Story | DCS-14 | I want to log out of the signed-in gateway so that I may access my patient information on the app. | 3 |
| Story | DCS-13 | As a customer, I want to register myself to the application So that I can keep my account private and login using email/phone and password. | 5 |
| Story | DCS-12 | I want to sign in as a user so that I may sign in using my full name and account information through the portal. | 5 |
| Task | DCS-10 | Create MVP Prototype – android studio | 3 |



Product backlogging

Projects / SARS Covid-19 detection through AI

Backlog

Q AH +2 Version

| SC1DTA-241 | Implement new machine learning algorithms for more accurate virus detection and analysis. | 10:00 | OK |
|------------|---|-------|----|
| SC1DTA-242 | Improve the user interface and user experience to make the application more intuitive and user-friendly. | 10:00 | OK |
| SC1DTA-243 | Expand the application to include more languages and support for users from different countries and regions. | 10:00 | OK |
| SC1DTA-244 | Integrate with more wearable devices for monitoring vital signs and other health metrics. | 10:00 | A |
| SC1DTA-245 | Develop a subscription-based revenue model to monetize the application and provide additional features for paid users. | 10:00 | A |
| SC1DTA-246 | Enhance the contact tracing feature to allow for more detailed tracking and analysis of potential exposures. | 10:00 | A |
| SC1DTA-247 | Add more detailed data visualizations and analytics to provide users with better insights into the spread of the virus. | 10:00 | RG |
| SC1DTA-248 | Develop a more robust customer support system to assist users with any issues they may encounter. | 10:00 | RG |
| SC1DTA-249 | Implement a referral program to encourage users to invite their friends and family to use the application. | 10:00 | AH |
| SC1DTA-250 | Add a feature for users to book COVID-19 tests and vaccinations directly through the application. | 10:00 | AH |
| SC1DTA-251 | Develop partnerships with healthcare providers and clinics to expand access to testing and treatment for users. | 10:00 | VA |
| SC1DTA-252 | Integrate with social media platforms to allow users to share information and updates about their COVID-19 status. | 10:00 | VA |
| SC1DTA-253 | Conduct regular user surveys and feedback sessions to gather insights and suggestions for improving the application. | 10:00 | AH |
| SC1DTA-254 | Expand the team of developers and support staff to provide better service and faster updates. | 10:00 | AH |
| SC1DTA-255 | Conduct regular security audits and updates to ensure the application is secure and protects user data. | 10:00 | OK |

Quickstart

Sprint-4 Backlog / Sprint Backlog

| Issue Type | Name | Story Points Estimate |
|------------|--|-----------------------|
| Story | As a User, I want to submit my x-ray reports in the application for evaluation to predict the covid-19. | 3 |
| Story | As a User, I want to discuss my/other health condition via chatbot | 4 |
| Story | MVP | 4 |
| Story | Deployment | 3 |
| Task | Finish Technical paper | 6 |



User stories and acceptance criteria

User stories and acceptance criteria

| SCIDTA | user story | Acceptance criteria | Place |
|------------|--|---|-------|
| SCIDTA-220 | As a user, I can able to provide update on health condition to the bot so that I can get ouptus of the reports | Scenario : User needs to send updates on his health Given I logged in as user, When I open the application and click on bot option then I can share updates on my health | BOT |
| SCIDTA-221 | As a user, I need suggestion on drug usage so that I can use it from the bot | Scenario : User needs to suggestions on drug usage Given I logged in as user, When I open bot and give the inputs of reports and bot an suggest the medications | BOT |
| SCIDTA-222 | As a user , I need suggestions to choose required drug to cure myself so that I can cure my self | Scenario: User needs to suggestions on drug usage Given I logged in as user, Giving health report to the bot and give is drug usage and specifications | BOT |
| SCIDTA-223 | As a user, I can able to check my symptoms by providing inputs so that I can be sure of my health | Scenario : User needs to check confirm disease by providing symptoms Given I logged in as user, When I logged in and open bot then I need an interface where I can provide my symptoms and get confirmation | BOT |

Test cases

Test cases

| Test Id | User story Id | Test Case | Current state | Test Data | steps to follow | Expected Result | Result |
|---------|---------------|--|-----------------------------|---|----------------------------------|--|--------|
| TS-48 | SCIDTA-220 | User should able to open chat bot | User logged into the portal | user details(Login details) | login->bot | user should able to get a interface of chat bot where he can able to share his updates | Pass |
| TS-49 | SCIDTA-220 | User should able to send updates via chat bot | User logged into the portal | user details(Login details) , Update message | login->bot->send | User should able to send the messgae he wish to share | Pass |
| TS-50 | SCIDTA-221 | user need to open durgs interface and find required drug | User logged into the portal | user details(Login details) | login-Chat bot | User should able to get a new interface where he find information related to drugs | Pass |
| TS-51 | SCIDTA-221 | user could able to get suggestions related to a drug usage | User logged into the portal | user details(Login details), drug details | login->chatbot -> details | User can able to have get relevant information about the usage of their drug which there are using | Pass |
| TS-52 | SCIDTA-222 | User should able to get suggestions to choose the drug | User logged into the portal | user details, main activity | login-> main activity-->Chat bot | User can get alternative drug using chat bot so, based on their availability | Pass |

Stories completed

| NAME | STATUS | DATE |
|--|--------|-----------|
| As a User, I want to submit my X-ray reports in the application for evaluation to predict the covid-19. | Done | 4/28/2023 |
| As a User, I want to discuss my/other health condition via chatbot | Done | 4/28/2023 |
| MVP | Done | 4/25/2023 |
| Deployment | Done | 4/30/2023 |
| Draft Technical paper | Done | 5/2/2023 |

Stories not completed

| Name | status | Date |
|---|--------|------|
| As a user , I need suggestions to choose required drug to cure myself so that I can cure my self | To-DO | TBD |
| As a user, I can able to check my symptoms by providing inputs so that I can be sure of my health | To-DO | TBD |
| As a user , I need personal treatment recomandations so that I stable my health condition | To-DO | TBD |
| As a user, I can able to fetch infected area's details so that I can avoid commuting that area | To-DO | TBD |
| As a user, I can send voice messages to explain my health situation so that it could be easy to explain | To-DO | TBD |
| As a doctor/admin , I can able to listen the voice messages sent by the user so that I can easily understand user problem | To-DO | TBD |

Metrics

The baby weighed
8lbs 6oz

I have no idea what
that means. I was
taught the metric
system

Team velocity - this sprint

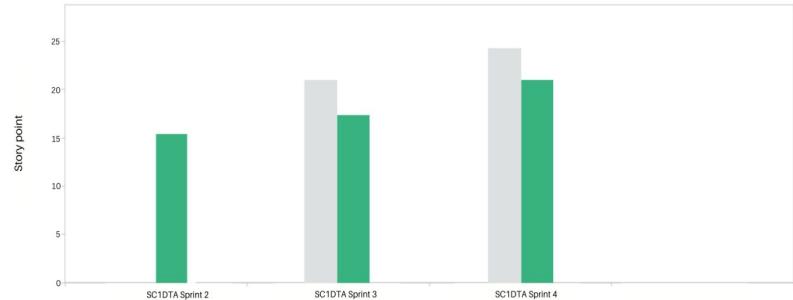
Projects / SARS Covid-19 detection through AI / Reports

Velocity report

[How to read this report](#)

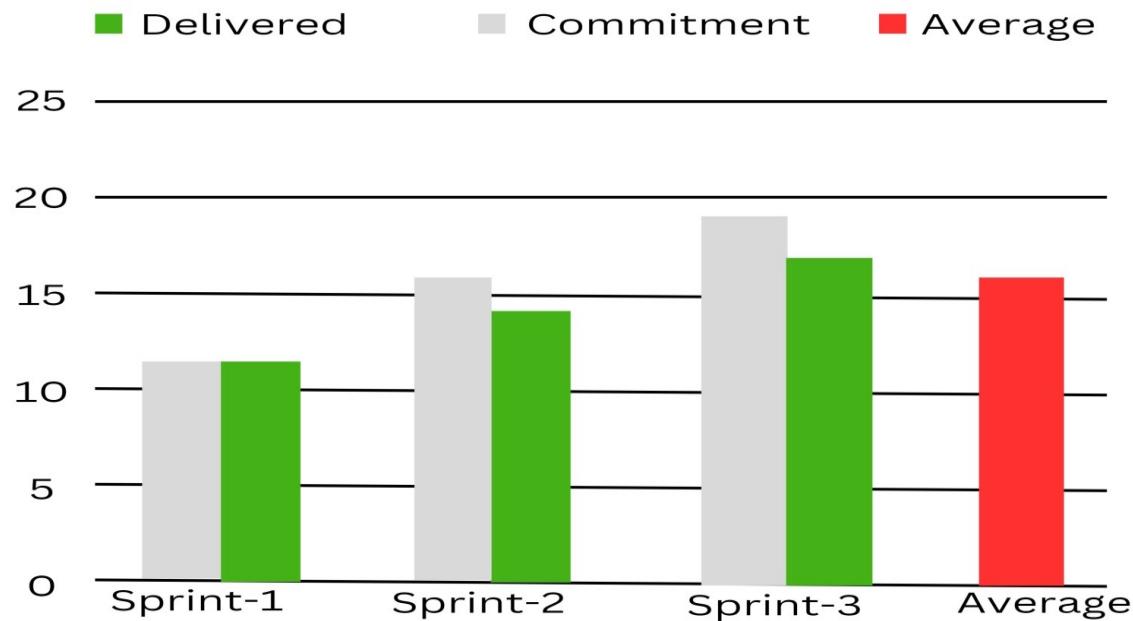
——— Commitment
The amount of work in the sprint when it began.

——— Completed
The amount of work done during the sprint.



Team's historical velocity (average)

Sprint 2, Sprint 3 and Average



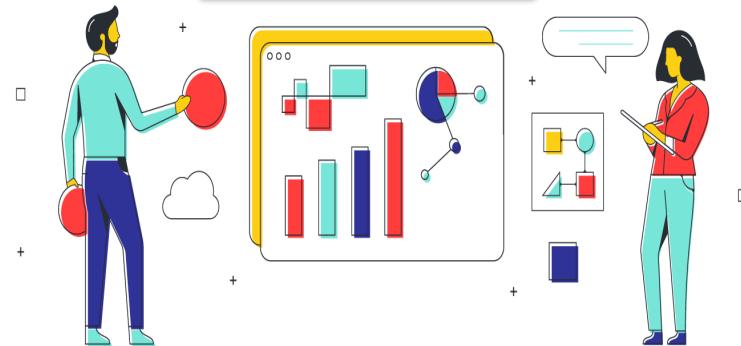
Burndown Charts



Completed/Committed Ratio

- ❖ The completion ratio of a story refers to the percentage of stories delivered in a sprint that meet the initial commitment.
- ❖ If our team commits to completing 30 user stories in a sprint and successfully delivers 25 of them, then our story completion ratio would be 90%.
- ❖ Story completion ratio is calculated as $(\text{total number of delivered stories} / \text{total number of committed stories}) \times 100$.

Retrospective



Retrospective



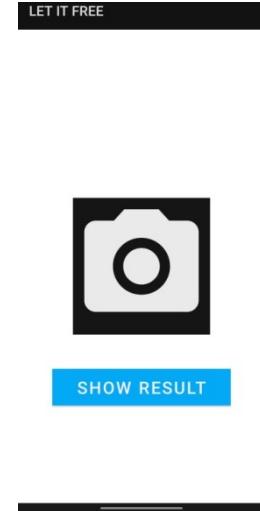
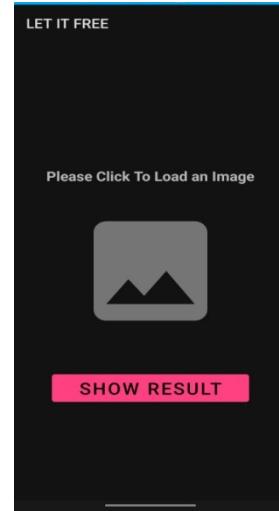
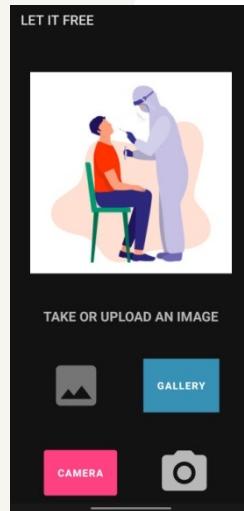
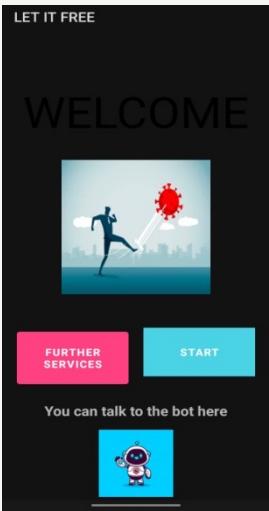


Sprint-5

Stories planned and committed for Sprint 5

| Issue Type | Name | Status | Story Point Estimate |
|------------|---|--------|----------------------|
| Story | As an user, I want to order medications for COVID-19 include antiviral drugs. which can help reduce inflammation in the lungs | To Do | 3 |
| Story | As an user, I want to get Facilities for that are equipped with the necessary medical supplies and equipment to manage patients with COVID-19 | To Do | 4 |
| Story | As an user, I want to receive a report indicating whether they have tested positive or negative for the virus. | To Do | 3 |
| Story | As an user, I want to do regular checkup Checklist, So that I can get the graphical analysis on my health reports. | To Do | 4 |
| Story | As a user, I want to know my health status through the collection and interpretation of health data by monitoring and analysis of my reports. | To Do | 5 |

Slides of app screenshot



SLIDES FOR API

https://api.openai.com/v1/chat/completions

POST https://api.openai.com/v1/chat/completions

```
[{"model": "gpt-3.5-turbo", "messages": [{"role": "user", "content": "hi, How are you?"}, {"role": "assistant", "content": "I'm an AI language model. I don't have feelings like humans, but I'm functioning perfectly. Thank you for asking! How may I assist you?"}, {"role": "user", "content": "stop"}, {"role": "assistant", "content": "Index"}]}
```

Body Headers (23) Test Results

```
[{"id": 1, "role": "user", "content": "hi, How are you?"}, {"id": 2, "role": "assistant", "content": "I'm an AI language model. I don't have feelings like humans, but I'm functioning perfectly. Thank you for asking! How may I assist you?"}, {"id": 3, "role": "user", "content": "stop"}, {"id": 4, "role": "assistant", "content": "Index"}]
```

Make authorizing this easy for your users. Set up authentication for your APIs

LET IT FREE

hi

Hello! How may I assist you today?

Enter your message

GitHub Link

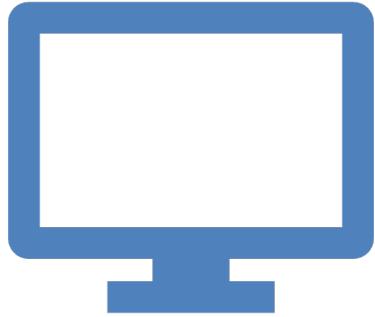
<https://github.com/htmw/2023S-Team4>

LET IT FREE TECHNICAL PAPER

Technical paper Link

API Document

Deployment manual



Live Application Demo

Live Application Demo



