

SARS COVID-19 DETECTION THROUGH AI

CS-691



# AGENDA



## Techniques for Detecting SARS-CoV-2: A Brief Overview



Conventional techniques for detecting SARS-CoV-2 include reverse transcription polymerase chain reaction (RT-PCR) and antigen testing.



Advantages of AI in SARS-CoV-2 Detection and Prevention  
Review of AI Methods for SARS-CoV-2 Detection and Prevention



Outline of artificial intelligence (AI) approaches used to identify SARS-CoV-2 (e.g., machine learning, deep learning); AI's benefits and drawbacks; Examples of effective AI applications for SARS-CoV-2 detection;



Data limits, potential sources of data, and methods for overcoming data restrictions are discussed in the following sections:  
• Data Collecting and Preprocessing  
• Overview of data needs for AI-based SARS-CoV-2 detection  
• Challenges in collecting and preparing SARS-CoV-2 data.

## IMPROVEMENTS MADE BY PROFESSOR FEEDBACK





1.Team  
velocity chart



2.burn chart



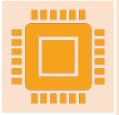
3.user-stories



# PROJECT DESCRIPTION

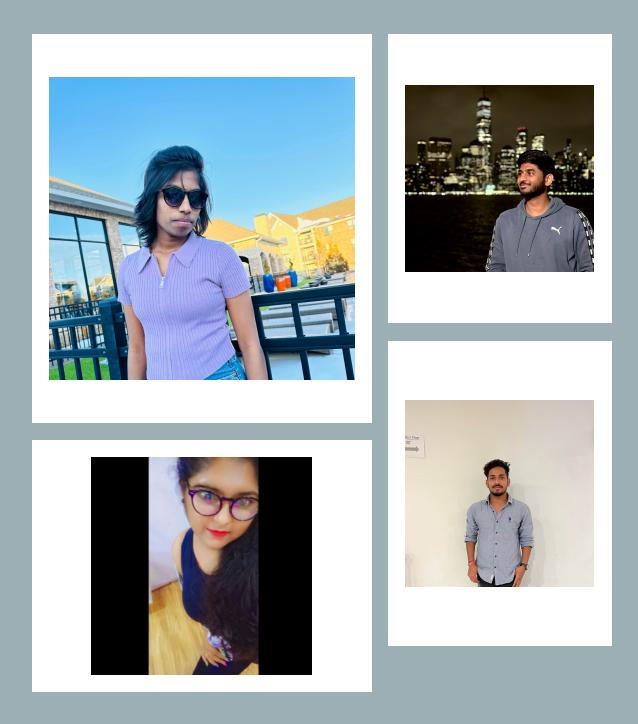


To create and verify AI models for SARS-CoV-2 viral identification in patient samples is the goal of the SARS-CoV-2 Detection using AI project.



In order to create effective and efficient virus detection models, the project will investigate several artificial intelligence approaches such as deep learning or machine learning.

# TEAM MEMBERS



1. Anusha
2. Reshma
3. Venkatesh
4. Hanith
5. Vamsi
6. alekhya

# ALGORITHMS



## **I. Linear Regression:**

Linear regression is a statistical algorithm used to analyze the relationship between two or more variables. It finds a linear relationship between a dependent variable and one or more independent variables. Linear regression can be used to analyze the relationship between various factors and the number of COVID-19 cases in a particular region. By using historical data, the algorithm can predict the spread of the virus in the future.

## **2. Logistic Regression:**

Logistic regression is a statistical algorithm used to predict the probability of a binary outcome based on one or more predictor variables. Logistic regression can be used to predict the probability of an individual getting infected with COVID-19 based on their age, sex, underlying health conditions, and other factors. The algorithm can be trained using historical data to identify the risk factors associated with COVID-19.

### **3. Decision Tree:**

A decision tree is a type of machine learning algorithm used for classification and regression analysis. It is a tree-like model where each internal node represents a test on an attribute, each branch represents the outcome of the test, and each leaf node represents a class label. Decision tree can be used to classify individuals as either infected or not infected with COVID-19 based on various factors such as their age, sex, symptoms, and exposure to the virus. The algorithm can help identify the most significant factors that contribute to the spread of the virus.

### **4. KNN Algorithm:**

K-Nearest Neighbors (KNN) is a type of machine learning algorithm used for classification and regression analysis. It is a non-parametric algorithm that makes predictions based on the similarity between new data points and existing data points. KNN algorithm can be used to classify individuals as infected or not infected with COVID-19 based on their similarity to other individuals in a particular region. The algorithm can help identify clusters of infected individuals and predict the spread of the virus.

## **5. Tensorflow:**

Tensorflow is an open-source machine learning framework developed by Google. It can be used to develop machine learning models to detect COVID-19 using data from various sources such as X-ray images, CT scans, and other medical imaging techniques. The algorithm can be trained using a large dataset of images to recognize patterns associated with COVID-19.

## **6. Deep Learning Classification:**

Deep learning classification algorithms are a type of machine learning algorithm that use neural networks to recognize patterns in large datasets. They are used to analyze medical images such as X-rays and CT scans to detect signs of COVID-19. The algorithm can be trained using a large dataset of images to recognize patterns associated with COVID-19.

## **7. Image Recognition:**

Image recognition algorithms are used to analyze medical images such as X-rays and CT scans to detect signs of COVID-19. The algorithm can be trained using a large dataset of images to recognize patterns associated with COVID-19.

## **8. Pattern Recognition:**

Pattern recognition algorithms are used to analyze various factors such as symptoms, age, sex, and exposure to the virus to identify patterns associated with COVID-19. The algorithm can help predict the spread of the virus and identify risk factors associated with COVID-19.

# PERSONAS



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



JIMMY ANDERSON

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AGE :- 28 YEARS  
GENDER:- MALE

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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

# MVP(Minimum Viable Product)

REGISTRATION (SIGN UP AND LOG IN )

UNIQUE ACCOUNT

HOME PAGE

SERVICES

PRECAUTIONS

APPOINTMENT WITH DOCTOR

SCHEDULED CONFIRMATION

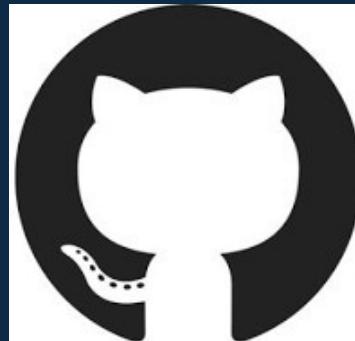
TOOL KITS

MEDICINES

HEALTH TRACKING

DIET

MEDICAL ALARM



**TECHNOLOGIES**

# TEAM AGREEMENT

**There will be several ways for team members to communicate with one another.**

This team will be using the zoom meetings once a week for productive team conversations.

There will be more partnership and visibility on the team if everyone keeps their straight faces.

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.

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**

Every member of the team should have about the same amount of responsibility for the project, and the workload should be split proportionally.

Everyone on the team needs to get their task done on time

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.

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

## Managing conflicts

Each member of the group would be in charge of coordinating the meeting's logistics and presiding over the gathering.

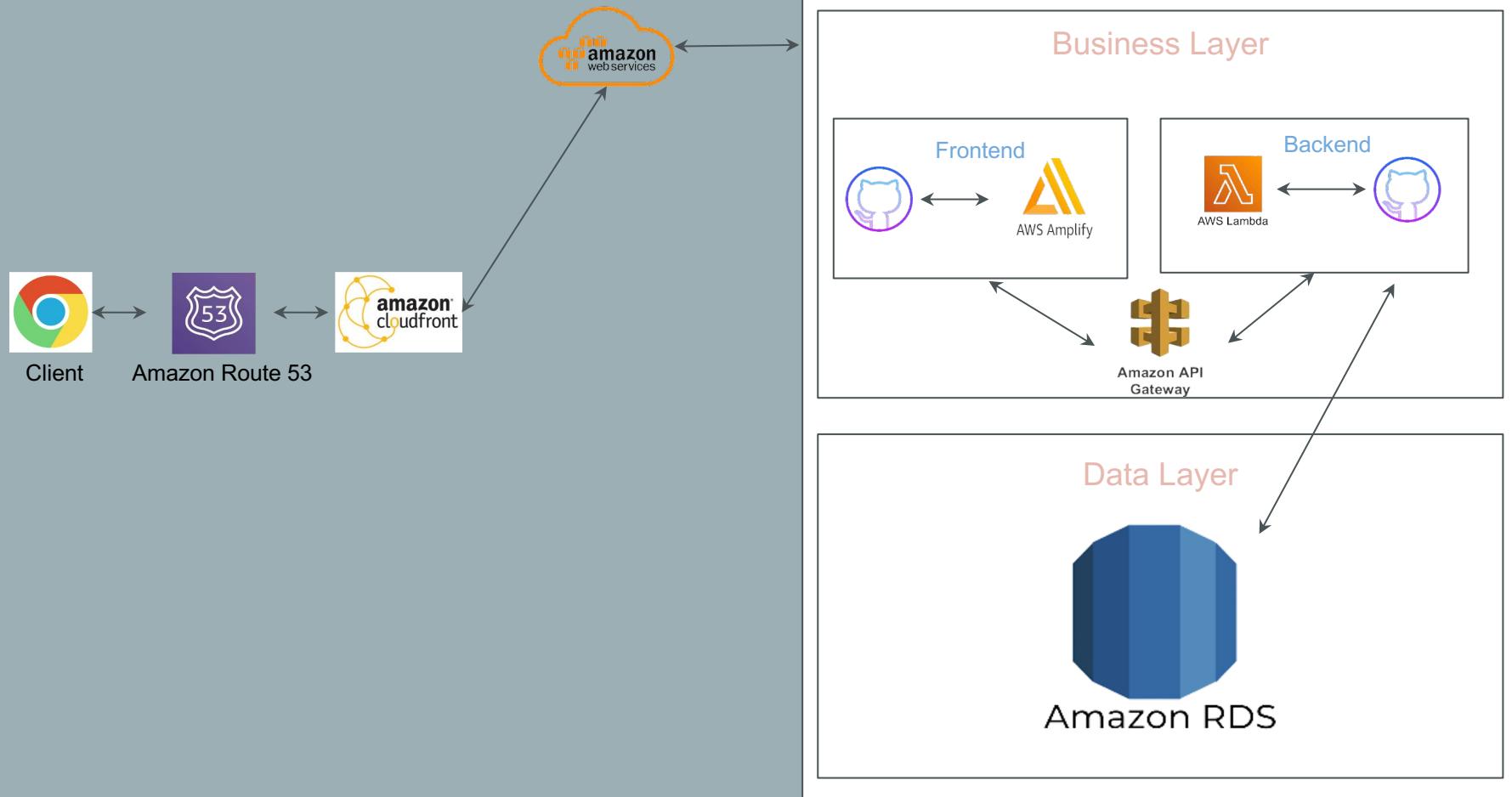
Each person in the group is responsible for contributing ideas, engaging in conversation, and reporting on the status of their assigned tasks

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..

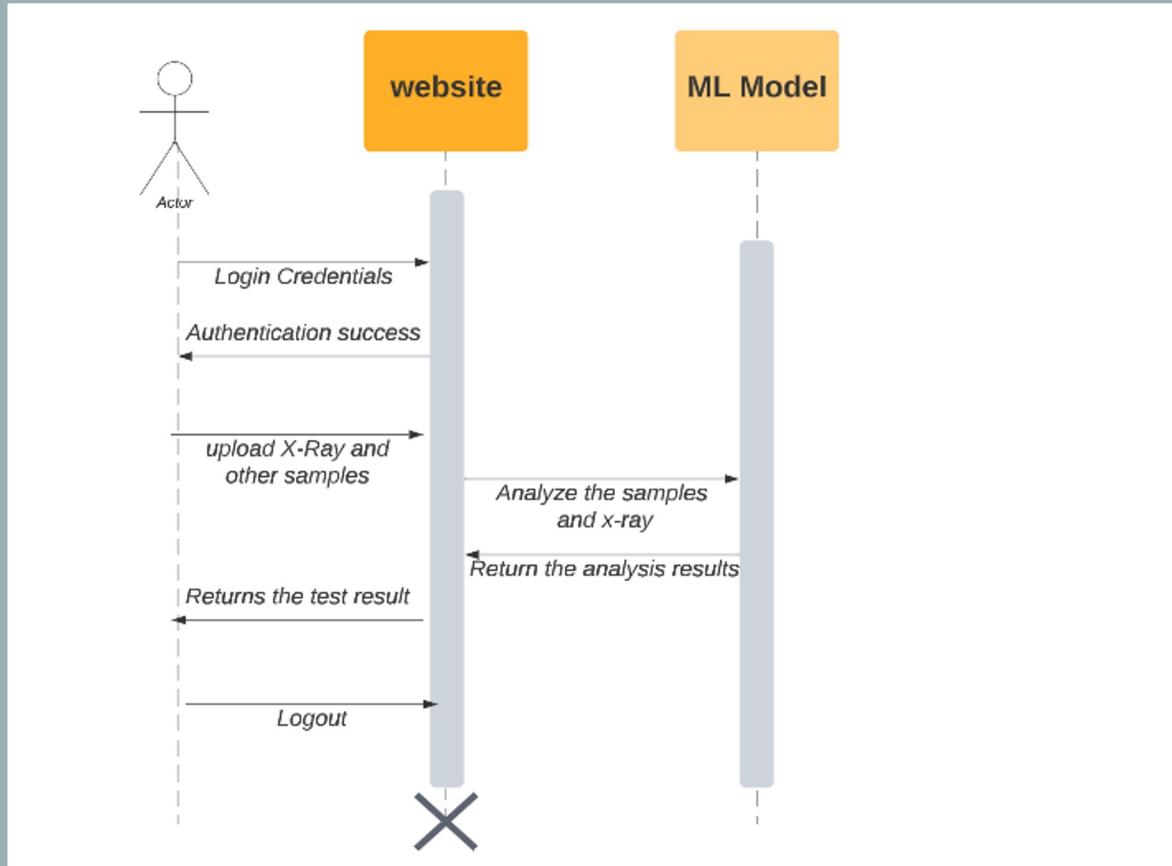
# Diagrams



# Architecture Diagram



# SEQUENCE DIAGRAM



# ER DIAGRAM

## User

User ID	int	PK
Name	varchar(45)	
Email	varchar(45)	
Password	varchar(45)	
Role	enum('admin','doctor','patient')	

## Patient

Patient ID	int	PK
Name	varchar(45)	
Age	varchar(45)	
Gender	varchar(45)	
Test Results	varchar(45)	
Medical History	varchar(45)	

## ML\_Model

Model ID	int	PK
Name	varchar(45)	
Description	varchar(45)	
Model Type	varchar(45)	

## Samples

Sample ID	int	PK
Sample Type	varchar(45)	
Patient ID	int	FK
Date/Time collected	varchar(45)	
Image/File	varchar(45)	

## Authentication

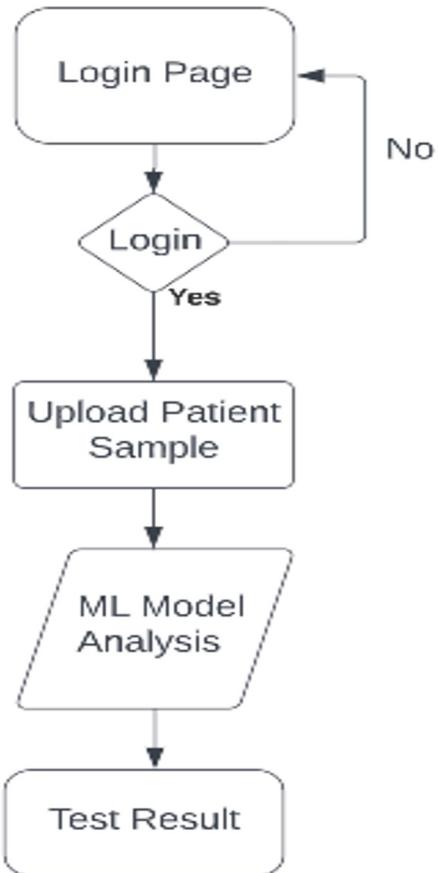
Token ID	int	PK
Token	varchar(45)	
User ID	int	FK
Expiration_Time	datetime	

## Analysis\_Results

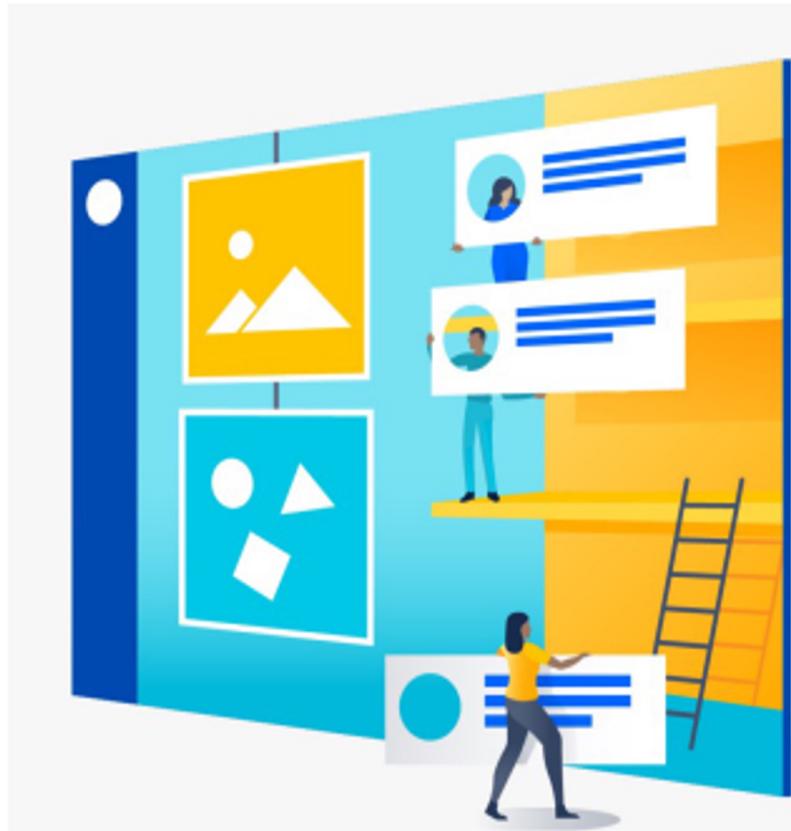
Result ID	int	PK
Result	boolen	
Model ID	int	FK
Patient ID	int	FK

## Database

Database ID	int	PK
Name	varchar(45)	
Host	varchar(45)	
Port	varchar(45)	
Username	varchar(45)	
Password	varchar(45)	



# PRODUCT BACKLOG



## Backlog



Q

KV

A

AR

RG

+2



Epic



Versions



Insights

▼ SC1DTA Sprint 3. 2 Add dates (16 issues)

0 0 0 Start sprint



- SC1DTA-163 As a user, I want to be able to upload patient samples (e.g. X-rays, CT scans) and receive analysis results from an ML model trained to detect COVID-19. TO DO KV
- SC1DTA-164 As a developer, I need to research and implement an appropriate ML model to integrate into the application. TO DO KV
- SC1DTA-165 As a user, I want to be able to create an account and log in securely to the application. TO DO KV
- SC1DTA-166 As a developer, I need to implement user authentication functionality and ensure that user data is securely stored. TO DO A
- SC1DTA-167 As a user, I want to be able to manage patient data (e.g. add, edit, delete patients, view patient history). TO DO A
- SC1DTA-168 As a developer, I need to implement patient management functionality, including appropriate database tables and API endpoints. TO DO A
- SC1DTA-169 As a user, I want the application to be easy to use and navigate. TO DO AR
- SC1DTA-170 As a developer, I need to improve the user interface and ensure that it is responsive and accessible. TO DO AR
- SC1DTA-171 As a user, I want the ML model to have a high level of accuracy in detecting COVID-19. TO DO AR
- SC1DTA-172 As a developer, I need to research and implement techniques to improve the accuracy of the ML model, such as training on more data or fine-tuning hyperparameters. TO DO AH
- SC1DTA-173 As a user, I want to receive notifications when analysis results are available or when my account is updated. TO DO RG
- SC1DTA-174 As a developer, I need to implement a notification system that sends appropriate messages to users. TO DO VA
- SC1DTA-175 As a user, I want to be able to upload different types of patient samples (e.g. blood tests, nasal swabs) for analysis. TO DO AH
- SC1DTA-176 As a developer, I need to research and implement support for different sample types in the ML model and the application. TO DO RG
- SC1DTA-177 As a user, I want to be assured that my data is kept private and secure. TO DO

Quickstart



## SPRINT BACKLOG

-  SC1DTA-210 As a user, I can reset my account password TO DO ▾
-  SC1DTA-211 As a user/doctor , I need to get notifications that are related to me TO DO ▾
-  SC1DTA-212 As a Doctor, I want to be able manage the patient data. TO DO ▾
-  SC1DTA-213 As a user I wanted make an appointment with the doctor TO DO ▾

A black and white photograph of a person from behind, walking up a wide set of stone steps. The person is wearing a dark jacket and light-colored pants. The steps lead up towards a large, multi-story building with many windows, possibly a hotel or apartment complex. The sky is overcast. The overall mood is mysterious and dramatic.

# USER STORIES AND ACCEPTANCE CRITERIA

# User Stories & Acceptance Criteria

ID	User Story	Acceptance criteria	Place
SCIDTA-210	As a user I need to login into the portal to access all the benefits	When user tried to login into the portal, they need to be validated and redirected to the next page	Login
SCIDTA-211	As a user I wanted to provide feedback to the doctor based on his service provided	When user wanted to provide feedback to the doctor, he can able to navigate to web page and provide his feedback to the selected doctor of his wish	Feedback
SCIDTA-212	As a user/doctor , I need to get notifications that are related to me	Whenever an event happened , like login , forget password, results upload etc.. The user should get a notification on the registered email	Notifications/Remainders
SCIDTA-213	As a user, I can reset my account password	As a user, I Can request to reset my password and an email to be triggered to registered email	profile
SCIDTA-214	As a Doctor, I want to be able manage the patient data.	As a doctor, I can view and correct the patient medical data as required to keep patient updated about his health status	Management

# User Stories & Acceptance Criteria

ID	User Story	Acceptance criteria	Place
SCIDTA-215	As a user I wanted make an appointment with the doctor	As a user, I can able to access doctors calender and make an appointment as required	Appointments
SCIDTA-216	As a doctor I can see all the appoinments avaialble for the day	As a doctor, I Can able to view all the appoinments booked for the day and take them.	Appointments
SCIDTA-217	As a admin, I need to send a remainder to the user about his appointment with doctor	As a admin, I need to trigger a continous notification to the user about his appointment with a doctor at specified intervals	Admin
SCIDTA-218	As a admin, I need to send a remainder to the doctor about his appointment with user	As a admin, I need to trigger a continous notification to the doctor about his appointment with a user at specified intervals	Admin
SCIDTA-219	As a user, I Can update my profile	User can able to update his profile details when required and need to be verified	profile



# TEST CASES

Tweaked after hearing from professors

# TEST CASES

Test Id	User story Id	Test Case	Current state	Test Data	steps to follow	Expected Result	Result
TS-31	SCIDTA-210	browse login page	User trying to log into the portal	user details( Login details)	login	users should get a new page where he can enter his login credentials	Pass
TS-32	SCIDTA-210	click on login	User trying to log into the portal	user details( Login details)	login	User credentials should be validated and return response	Pass
TS-33	SCIDTA-212	As a user, I need to receive Notifications	User logged into the portal	User details	login	whenever I have logged into the portal I need to receive an email regarding this activity	Pass
TS-34	SCIDTA-211	provide feedback to the doctor	User logged into the portal	user details( Login details)	login-> doctors-> feedback	user should able to get a page where he can provide his feedback to a doctor	Pass
TS-35	SCIDTA-211	submit feedback	User logged into the portal	user details( Login details) , Feedback	login-> doctors-> feedback-> submit	user should able to submit his feedback to a selected doctor	Pass
TS-36	SCIDTA-212	As a Doctor, I need to receive Notification regarding my feedback	Doctor logged into the portal	Doctor details	login->Notifications	As a doctor, I need to get a new notification regardinf the feedback that I have received	Pass
TS-37	SCIDTA-214	Manage patient Data	Doctor logged into the portal	Doctor details . Patient details	login->patient->manage-data	As a doctor , I can update patient medical data	Pass
TS-38	SCIDTA-214	save patient data	Doctor logged into the portal	Doctor details, Patient details, data	login->patient->manage-data->save	As a doctor, I can able to save the data	Pass

# TEST CASE S

Test Id	User story Id	Test Case	Current state	Test Data	steps to follow	Expected Result	Result
TS-39	SCIDTA-213	Request forget password	User/doctor logged into the portal	User details/Doctor details	forget-password	User/doctor should able to request to reset their password	Pass
TS-40	SCIDTA-213	User/Doctor should get a notification to reset password	User/doctor logged into the portal	User details/Doctor details	forget-password	user/doctor should get a email to reset his password	Pass
TS-41	SCIDTA-215	User can able to access doctors calender	User logged into the portal	User details/Doctor details	login-> doctor-> calender	User should able to view doctors calender	Pass
TS-42	SCIDTA-215	User can able to schedule an appointment with a doctor	User logged into the portal	User details/Doctor details, Appointment details	login-> doctor-> appointment	User should able to make an appointment with a doctor	Pass
TS-43	SCIDTA-216	Doctor can view his appointments	Doctor logged into the portal	Doctor logged into the portal	login->my appointments	doctor can able to check all his appointments blocked	Pass
TS-44	SCIDTA-219	update user profile	User logged into the portal	User details	login-> my profile	User/Doctor should able to browse a page where they can see their profile details	Pass
TS-45	SCIDTA-219	save user profile	User logged into the portal	User details	login->my profile-> save	User can able to save all the changes made to his profile	Pass
TS-46	SCIDTA-217	Appointment	User logged into the portal	User details	login-> notifications	User should able to get remainder notification about his appointment	Pass
TS-47	SCIDTA-218	Send remainder to Doctor about his Appointment	Doctor logged into the portal	Doctor logged into the portal	login-> notifications	Doctor should able to get remainder notification about his appointment	Pass

## STORIES NOT COMPLETED

Name	Status	Date
As a user, I can reset my account password	to-do	TBD
As a Doctor, I want to be able manage the patient data.	to-do	TBD
As a user I wanted make an appointment with the doctor	to-do	TBD
As a doctor I can see all the appointments available for the day	to-do	TBD
As a admin, I need to send a remainder to the user about his appointment with doctor	to-do	TBD
As a admin, I need to send a remainder to the doctor about his appointment with user	to-do	TBD
As a user, I Can update my profile	to-do	TBD



**RECAP**

Recap of the problem statement: "How can a machine learning algorithm be used to detect COVID-19 virus in X-rays and other samples of patients?"

Brief overview of the benefits of using machine learning for COVID-19 detection, such as increased accuracy and faster diagnosis

Overview of the technological stack used in the project, including programming languages, frameworks, and tools

Discussion of the machine learning libraries used, such as Scikit-learn and TensorFlow

Overview of the website development tools, including Flask, HTML/CSS, and JavaScript

Overview of the needs and requirements of each persona, such as ease of use for the medical professional and patient, and accuracy and interpretability for the researcher

Summary of how the project aims to meet the needs of these personas through its design and development.

Overview of the sprint retrospective process, including how feedback was gathered and analyzed

Overview of the product backlogs

# STORIES COMPLETED AND STORIES NOT COMPLETED

Name	Status	Date
As a user I want to login with an extra security like Authentication factor. So that I can secure my account.	Done	4/08/2023
As a user I want to communicate more with chat bot to discuss more details about health condition.	Done	4/09/2023
As a user I want to provide feedback for doctors. So that it will help others to gather information about doctors.	Done	4/09/2023
In order to order the COVID-19 tool kit. I want to register as a user.	Done	4/11/2023
Technical Paper	Done	4/11/2023



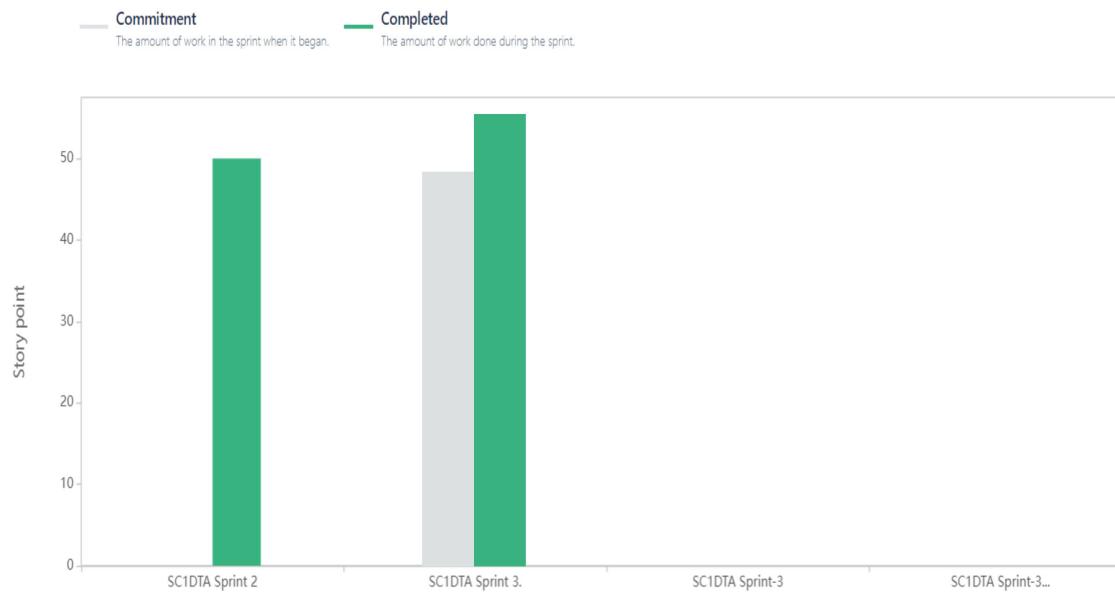
Team Velocity

# TEAM VELOCITY

Projects / SARS Covid-19 detection through AI / Reports

## Velocity report

› How to read this report

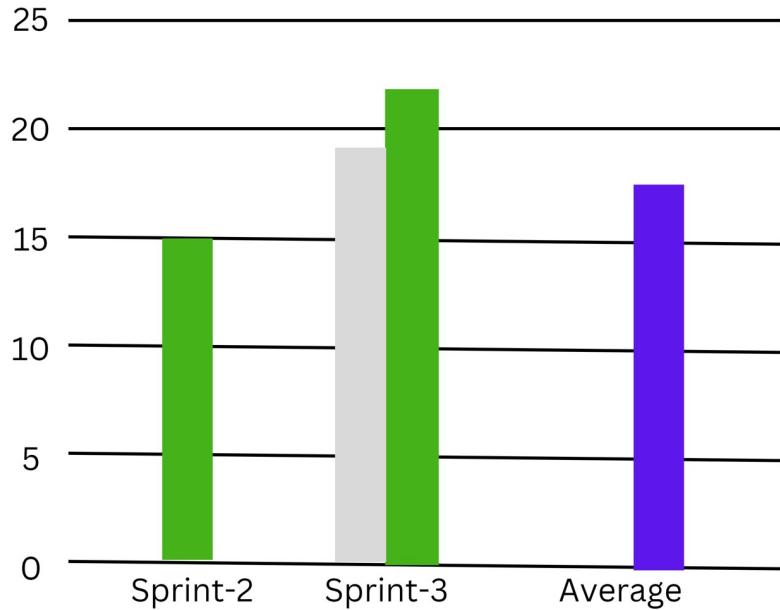


## TEAM'S HISTORICAL VELOCITY (AVERAGE)

- Tweaked after hearing from professors

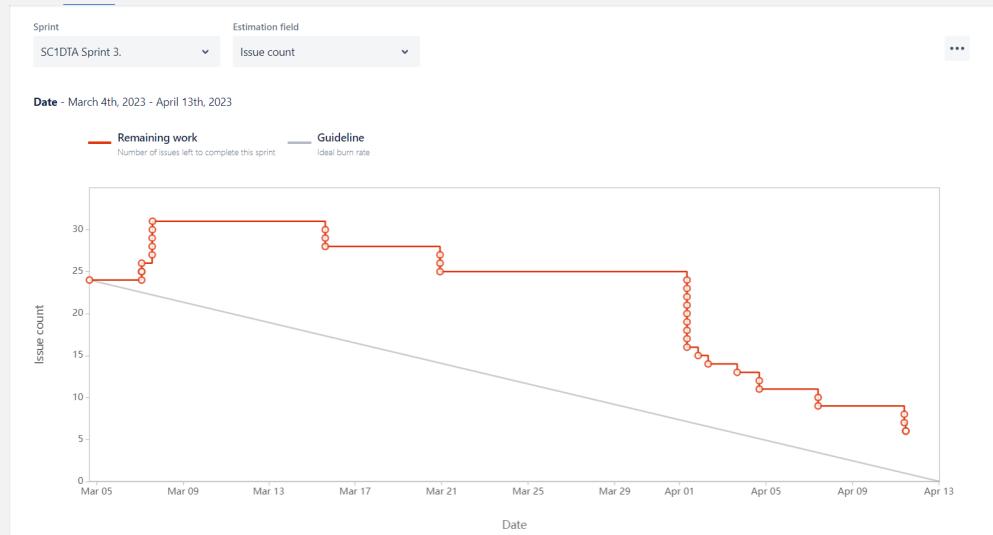
Sprint 2, Sprint 3 and Average

■ Completed ■ Commitment ■ Average



# BURN DOWN CHARTS

- Tweaked after hearing from professors



## COMPLETED/COMMITTED RATIO

- The percentage of all tales delivered in a sprint that match the ones that were committed is known as the story completion ratio.
- The story completion ratio for this team will be 96% since we commit 36 user stories in a sprint and deliver 34, as a result.
- Story completion ratio is calculated as  $(\text{total number of delivered stories} / \text{total number of committed stories}) \times 100$ .

# Retrospective



## WHAT WENT WELL

- Our deliverable was uploaded without any problems and on schedule. This time, we worked well together as well. Because we meet and talk more with all of our teammates.
- We have talked about the work, and we clearly understand our responsibilities with regard to it.
- We have a great time discussing the project further, and the time truly helps us to submit our work on schedule.
- Every member of the group contributes ideas to the project.

## WHAT NEEDS IMPROVEMENT

- This time, we have corrected the errors that we made in the last deliverable, on which the professor provided interpretation.
- We have updated both the user stories and the acceptance critiria in a single slide, as the lecturer indicated in the lecture regarding the user stories and the acceptance criteria.
- The Sprint burn-down chart, which we had reviewed at least once a day, was also updated this time.
- This would make it simpler for us to stay on schedule and guarantee that all urgent tasks are completed on time.
- We also determine the strengths and weaknesses of our team in regard to our work.

## ACTION WE TAKE TO IMPROVE

- We must be more committed to the project's aim and purpose.
- Any threats to the project's success must be identified, and counter measures must be developed.
- To reduce our negative effects on the project, we must be proactive in controlling these risks.
- The success of our project depends on having the appropriate people on my team.
- Verified our team members have the abilities, dedication, and experience required to meet the project's objectives.
- We take lessons from your successes and failures to improve your project deliverable procedures and techniques over time.

## SPRINT-4

Issue Type	Name	Status
Story	As a user, I want to be able to create an account and log in securely to the application.	To Do
Story	As a user, I want to be able manage the patient data.	To Do
Story	As a user, I want the application to be easy to use and navigate.	To Do
Story	As a user, I want to receive notifications when analysis results are available or when my account is updated.	To Do
Task	Technical Paper	To Do



**Thank  
You!**