Capstone Project
CS 5924
11-27-2023

DiagnoSym: Disease Prediction System Using the Symptoms

Sprint 3: Deliverable

1. Domain Model

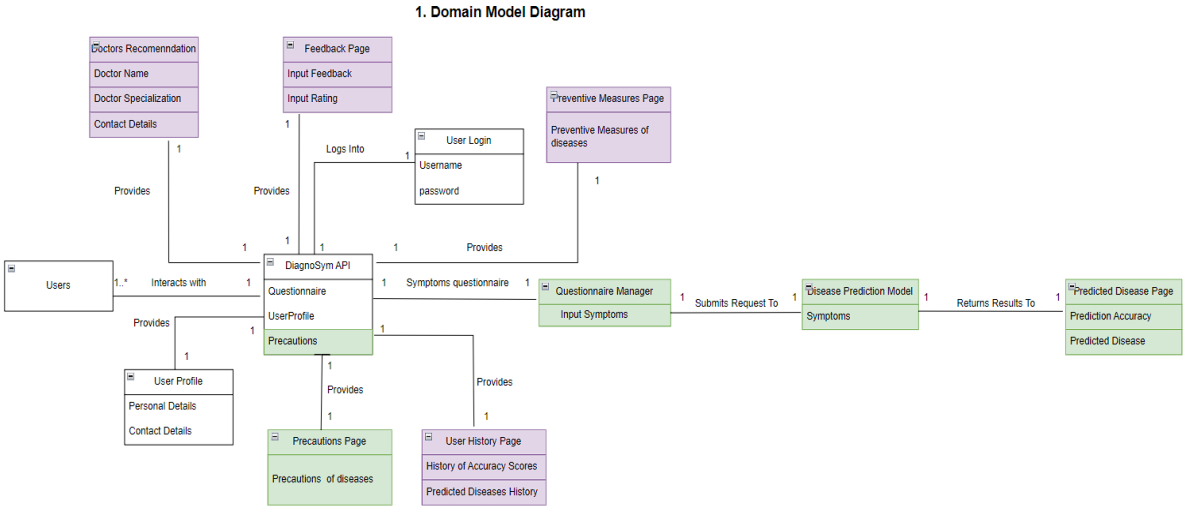

Fig 1: *Domain Model Diagram of this project and the new classes and associations are highlighted.*

2. Interaction Diagrams

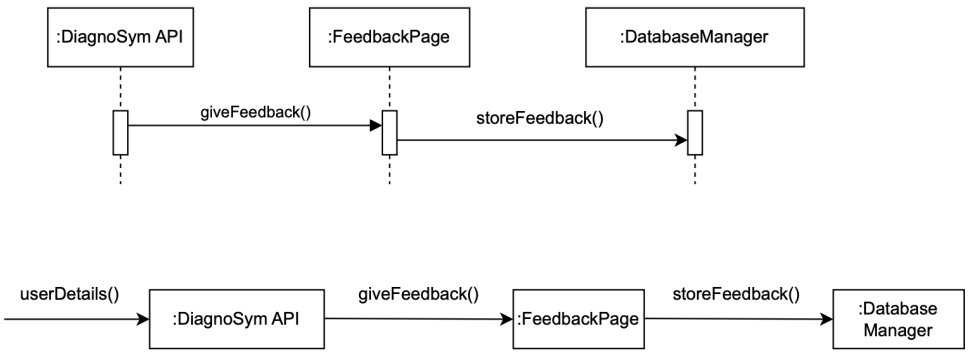

Fig 2: *Sequence and Collaboration Diagrams for Feedback Page*

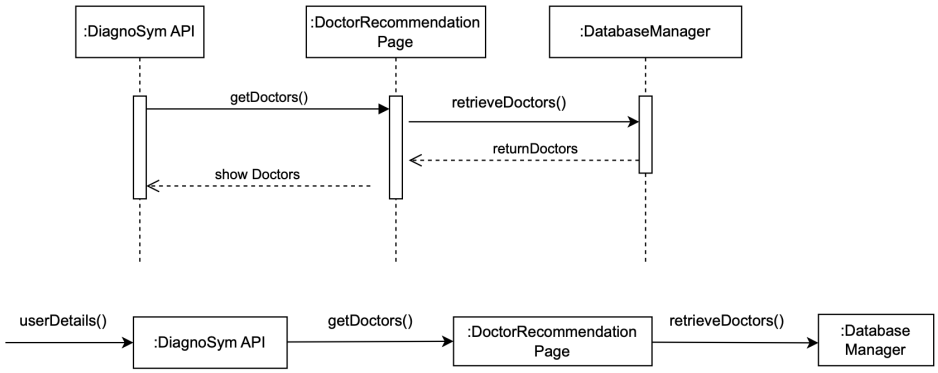

Fig 3: *Sequence and Collaboration Diagrams for Doctors Recommendation Page*

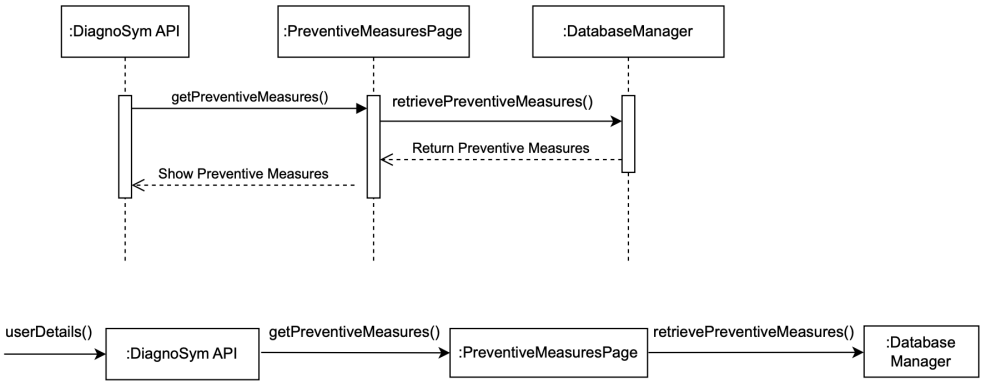

Fig 4: *Sequence and Collaboration Diagrams for Preventive Measures Page*

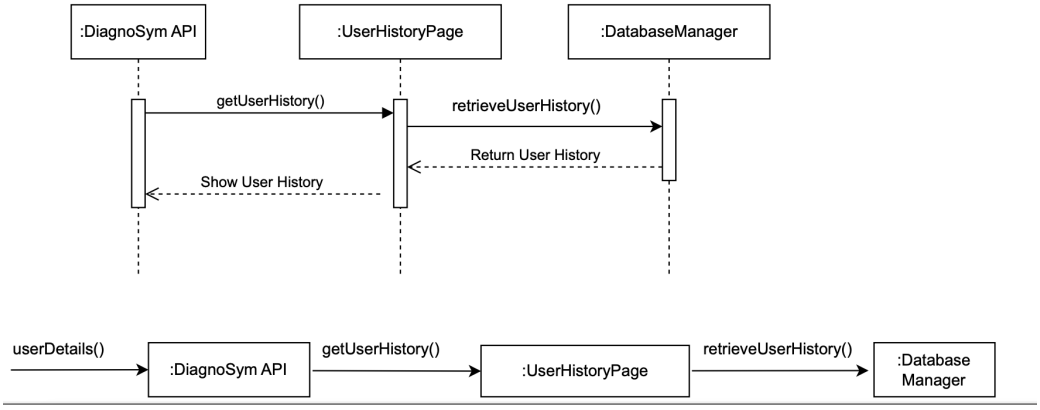

Fig 5: *Sequence and Collaboration Diagrams for User History Page*

3. Design Class Diagram

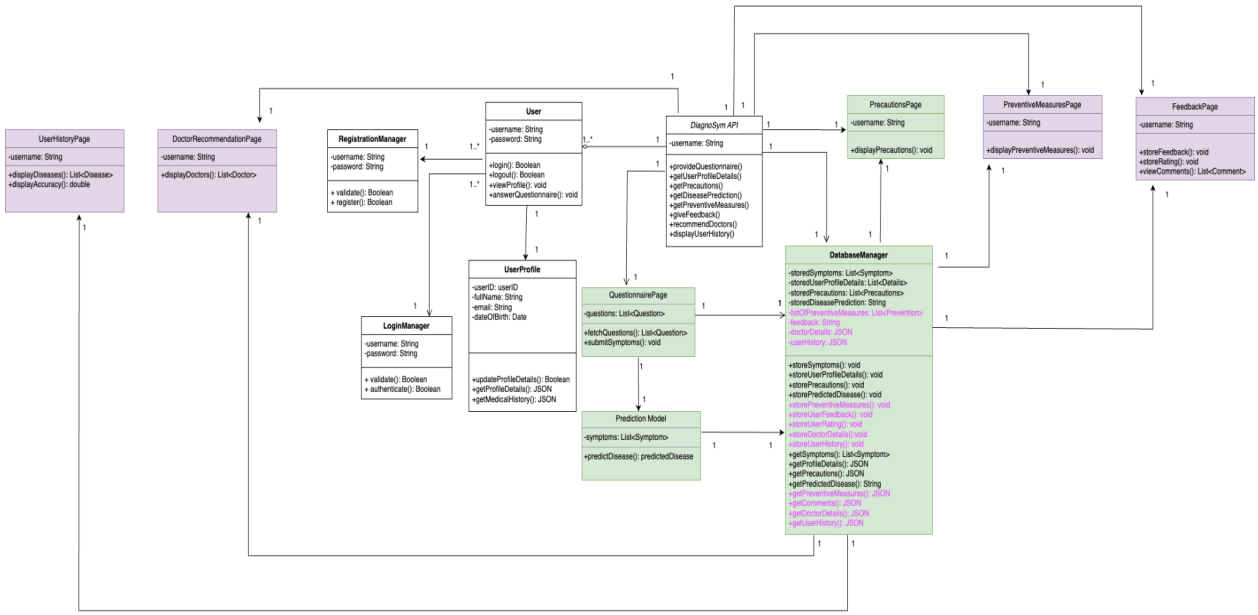

Fig 6: *Design Class Diagram of this project and the new classes and associations are highlighted.*

4. Demo Working Product System

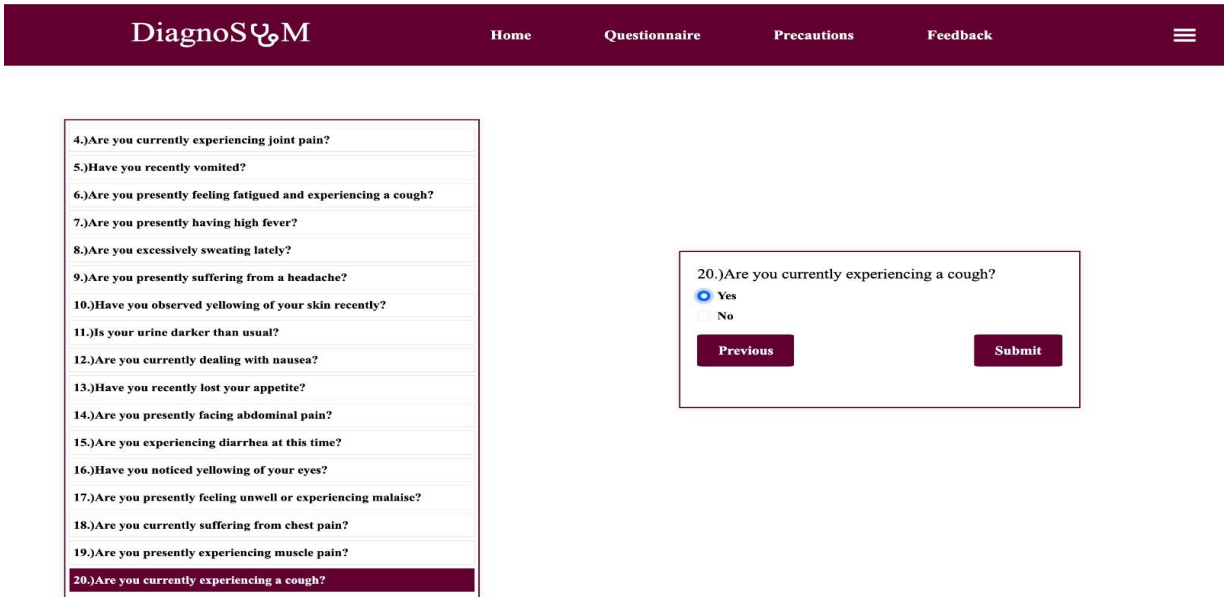

Fig 7: *We've enhanced our questionnaire page and for a quick recap when we answer the questionnaire and submit the form the model will predict the disease and give the result.*

User Story 1: As a user, I want to access a history of my previous disease predictions and results.

The history page stores the results from the previous prediction and displays them on the screen. Users can see the previous prediction and users can clear the history page if they want. Users can see the date of prediction and detailed information about what the user experienced. Also, the actions are taken for previous diseases such as seeking medical advice, self-treatment, etc.

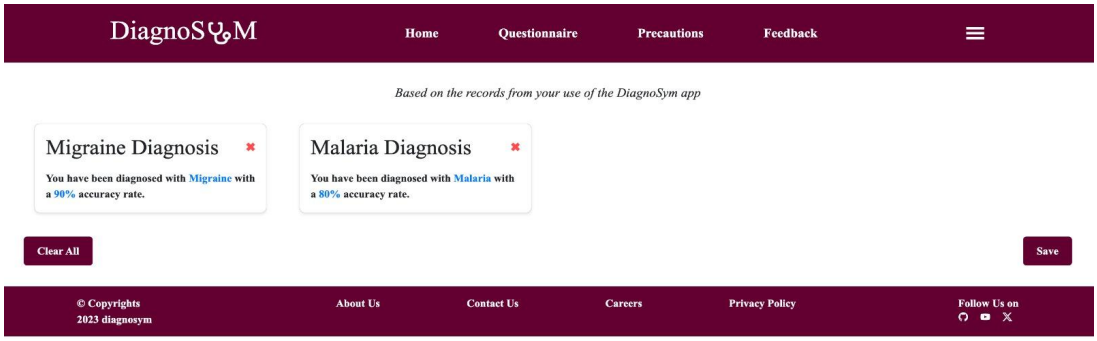

Fig 8: *User Diagnosis History Page with Clear all and delete functionalities.*

User Story 2: As a user, I expect the system to suggest the type of specialist I should consult based on the disease predicted.

The specialist recommendation page is a great addition to the Diagnosym. We integrated the algorithm into the system so that when a user gets the predicted disease on the screen, the system can provide suggestions on the type of specialist they might consider consulting. This page is user-friendly, potentially categorizing the specialists based on relevance to the predicted diseases.

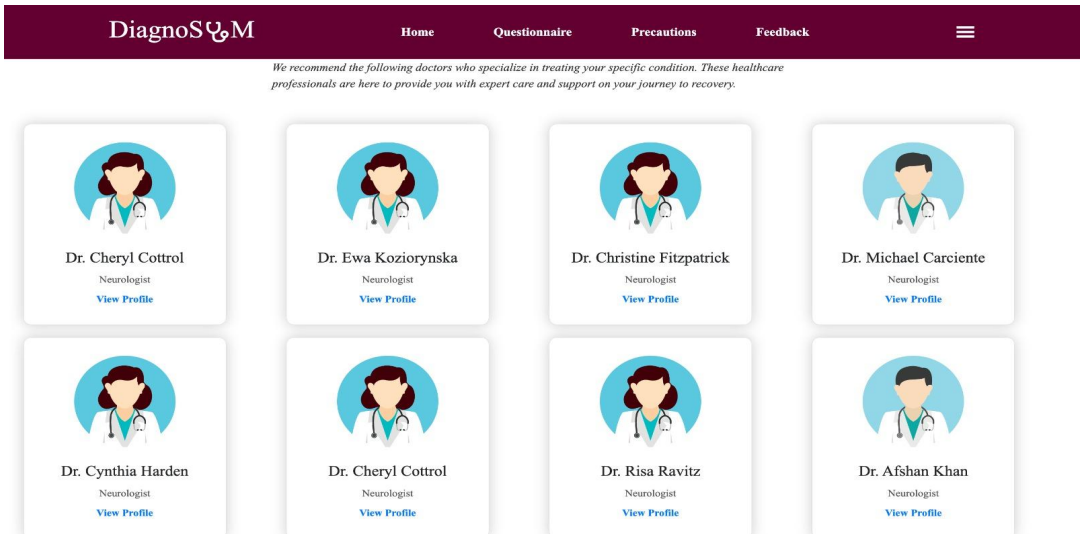

Fig 9: *Doctors recommendation page which filters respective doctors based on their predicted disease results.*

The Doctors profile page can serve as a comprehensive overview for users seeking information about specific doctors. This page includes the specialization, contact information, and office address of the doctors. Users can see the website of the doctors to know more information about the doctors.

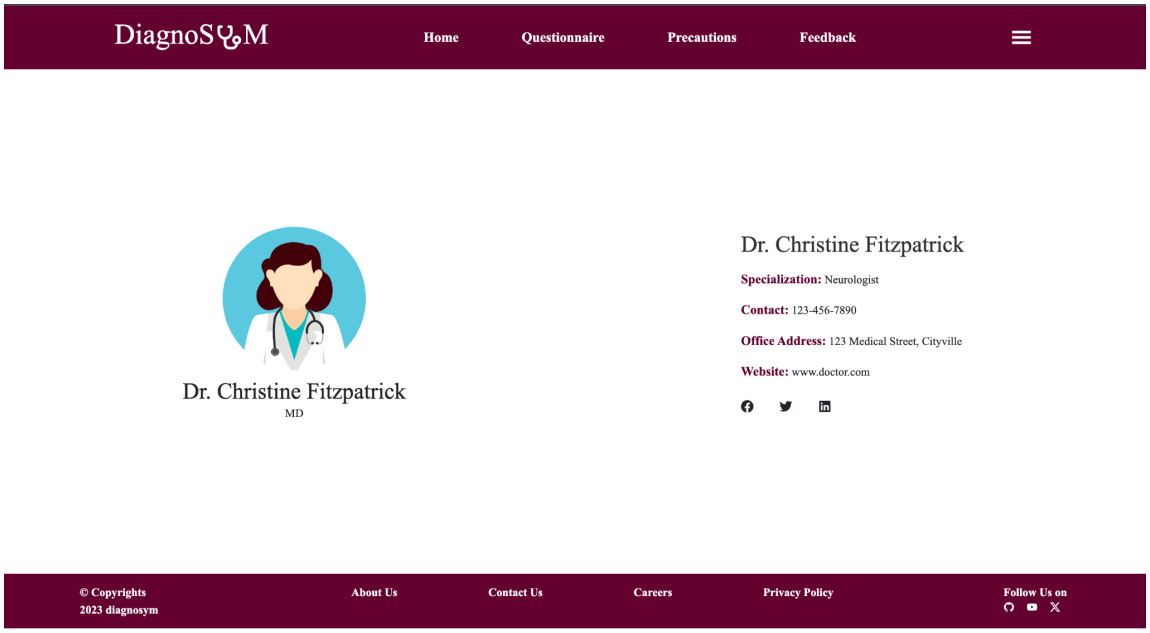

Fig 10: *Doctor's profile page when clicked on respective view profile.*

User Story 3: As a user, I want the system to provide general preventive measures I should follow based on the predicted disease.

Preventive Measures is a user-friendly page that provides the preventive measures of the predicted diseases. We integrated general preventive measures based on the predicted diseases. We developed the algorithm, based on the symptoms entered by the user, to fetch relevant preventive measures from the database. Users can see the preventive measures in a user-friendly format.

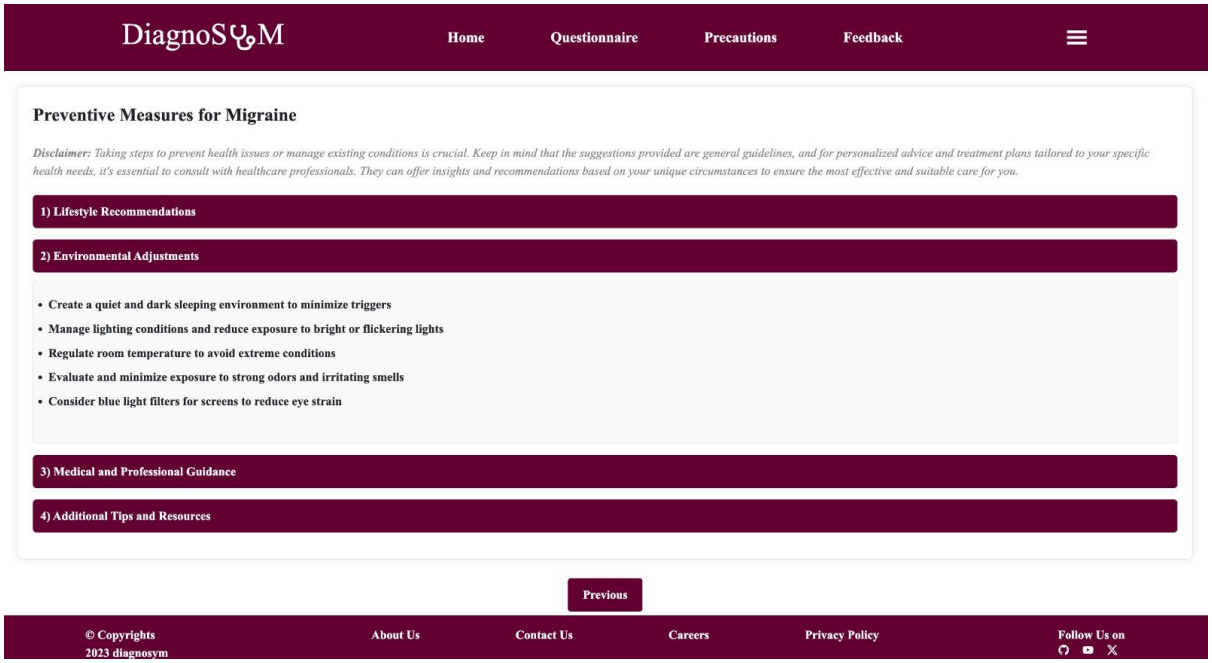

Fig 11: *User-Friendly page that provides the preventive measures of the predicted diseases.*

User Story 4: As a user, I want to provide feedback based on the information provided by the DiagnoSym system.

Feedback form is incredibly valuable for improving the system. We developed a backend functionality to store and manage the user's feedback data. This form includes fields like rating, and suggestions to improve the system in a user-friendly manner.

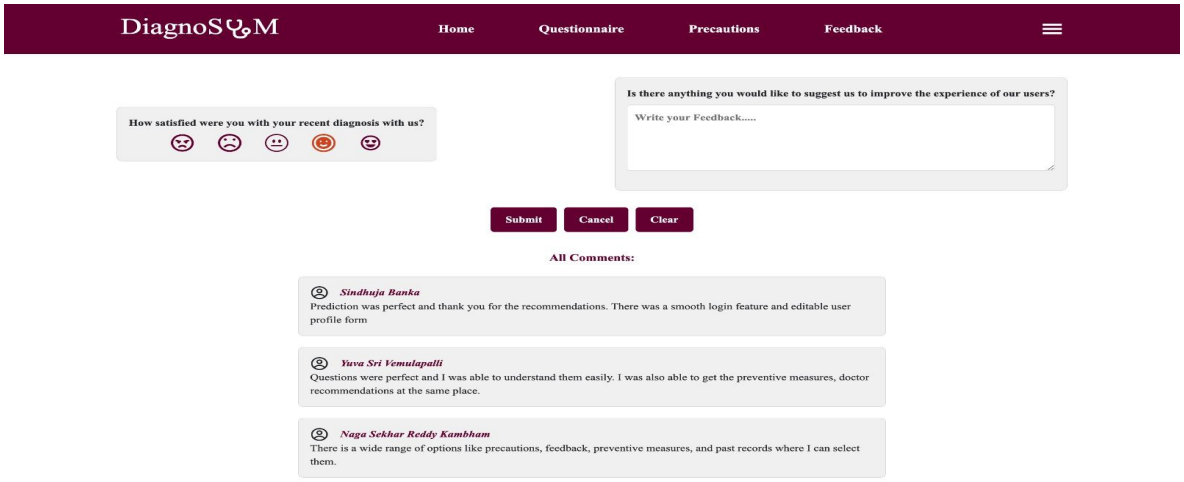

Fig 12: *Feedback page which lets users add comments and retrieve the feedback from database.*

5. Scrum

- **Sprint 3 backlog**

User story -1
As a user, I want to access a history of my previous disease predictions and results.

Task	Hours
Front-end - History page	2h
Database-Storing the data	1.5h
Testing	1h

User story -2

As a user, I expect the system to suggest the type of specialist I should consult based on the disease predicted.

Task	Hours
Front-end - Specialist Recommendations page	2h
Testing	1h

User story -3

As a user, I want the system to provide general preventive measures I should follow based on the predicted disease.

Task	Hours
Front-end - Preventive Measures page	2h
Database-Storing the data	2h
Model training and testing	2h
Testing	1h

User story -4
As a user, I want to provide feedback based on the information provided by the DiagnoSym system

Task	Hours
Front-end - Disease prediction page	1h
Database-Storing the data	1h
Testing	1h

- **Sprint Burndown Chart**
  - Team members created respective child issues according to the story assigned and closed them at regular intervals. So, we were able to achieve a better sprint burndown chart.

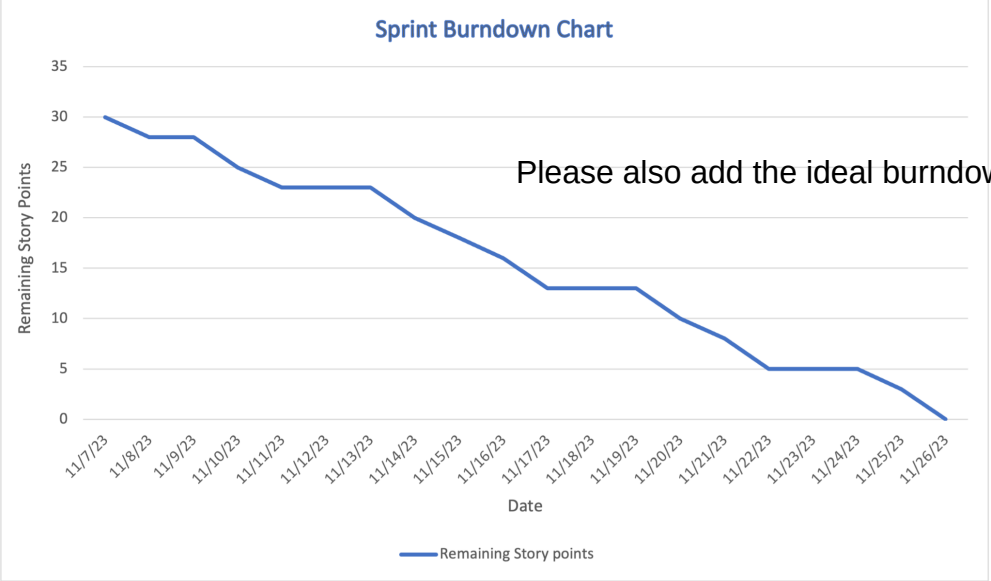

Fig 13: *Sprint 3 Burndown Chart*

- **Sprint Retrospective**

Accomplishments:

- The Machine Learning (ML) Model was completed.
- The ML model has been successfully implemented in the backend of the website.
- The user-friendly specialist recommendation page and preventive measures page that were successfully completed in sprint 2 were refined.

- Integrated the algorithms into the system for preventive measures and specialist recommendations.
- Enhanced the feedback form and backend functionality to store and manage the user's feedback data.

Impediments:

- With respect to the ML model, several techniques were initially considered, including deep learning techniques. However, due to the model taking a long time to run tasks, constraints in computational resources, and low accuracy, this technique was not considered.

Resolution of Impediments:

- Since deep learning techniques did not perform well, the logistic regression technique was applied to achieve similar tasks. This technique is better suited for binary classification, which was our case. The model achieved an accuracy of approximately 81%.

Things that went well:

- The team was able to complete all the tasks that were pending in sprint 2 on time.
- The team collaborated effectively and was able to work with each other and complete the tasks on time.
- The team members contributed equally to this project.

Areas for Improvement:

- The future goal is to improve the accuracy of the Logistic Regression Model.
- We plan to incorporate social media features to boost visibility and provide users with the ability to easily share information.
- Additionally, we plan to implement an error-handling system to address website glitches and eliminate user frustration.

Please note that our design works as expected; however, the above-mentioned improvements are potential future enhancements. The team will attempt to incorporate them if time allows.

- **Product Backlog(updated)**

User Story 5: As a user, I want to access a history of my previous disease predictions and results.

- Implement the functionality to retrieve and display a user's history of the latest disease predictions and results.
- Verify that the user's history is accurately fetched
- Implement the option for users to clear their history.
- Verify that the "Clear History" functionality works as expected and removes all history entries when selected.

User Story 8: As a user, I expect the system to suggest the type of specialist I should consult based on the disease predicted.

- Verify that a comprehensive dataset of diseases and their corresponding specialists has been selected and integrated into the system.
- Test the integration to ensure that the system can access and utilize the dataset effectively for specialist recommendations.
- Confirm that there is a user-friendly and accessible page or interface for displaying recommended specialists.
- Test the accuracy and appropriateness of specialist recommendations for various diseases.

User Story 9: As a user, I want the system to provide general preventive measures I should follow based on the predicted disease.

- Verify that a comprehensive collection of preventive measures related to various diseases has been obtained from reliable sources and integrated into the system.
- Confirm that there is a user-friendly and accessible page or interface for displaying preventive measures

User Story 10: As a user, I want to provide feedback based on the information provided by the DiagnoSym system

- Verify that a user-friendly feedback form has been designed and integrated into the system, allowing
  users to provide comments, suggestions, or ratings.
- Confirm that a backend functionality has been developed to securely store and manage user feedback data.

- **Issue Tracking**
  The team is using GitHub for storing and managing project code. The team tries its best to keep the repository updated as often as possible. The Github link is provided below.
  https://github.com/SindhujaReddy-VT/DiagnoSym/issues?q=is%3Aissue+is%3Aclosed