Team 6 – Predicting Potential Patient Issue – Iteration 2 Report

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Timothy Kelley, Amanda McGuire, Robert McKay

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Summary of what was completed by the team during the last iteration

- ### What stories were planned? Completed? Are still in progress?

The team made significant progress on the frontend of our application during this iteration. We delivered a prototype of the frontend with some dummy data to the customer and have deployed the app at http://04.csc.tntech.edu . In addition to the frontend, we were able to successfully build an LSTM model in Tensorflow for the machine learning aspect of our project. Next steps will include using actual patient data in the Mimic IV dataset that we have to build a classification model, Story details listed below:

Planned (76 story points)

- **Save session token in accessible format to use for requests:** As a developer, I need to save the user id token in an accessible format in the browser's local storage so that it can be read in and used as a header in requests requiring authentication.
    o Jacob Hill

- **Configure server for docker:** As a developer, I want the server to have docker configured so that I can deploy the application with docker.
    o Robert McKay

- **Material design app bar on home page:** As a user, I want the home page to have a material design app bar so that I can easily access features of the application.
    o Timothy Kelley, Joseph Doonis

- **Notification panel on home screen:** As a medical provider, I want the home screen of the application to have a notification panel so I can quickly see urgent issues with patients.
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- **React table for patient information:** As user of the application, I want the home page to display a table of patients so that I can easily view patient information.
    o Robert McKay, Amanda McGuire

- **Docker compose file for application development:** As a developer, I want to create a docker compose file to run the application so that I can develop within docker containers.

o   Robert McKay

- **Set up docker environment:** As a developer, I want to set up a docker environment so that I can develop the application in a containerized environment.
  o   Joseph Doonis, Jonas Fornehed, Jacob Hill, Timothy Kelley, Amanda McGuire, Robert McKay

- **FastAPI router for patient table:** As a developer, I want a FastAPI router for the patient table in the userinfo database so that the frontend can interact with the table.
  o   Robert Mckay

- **CRUD for patient table:** As a developer, I want a CRUD for the patient table in the userinfo database so that the fastapi can interact with the table.
  o   Robert McKay

- **Create database for patient information:** As a developer, I want a database on the server for patient information so that I can store information from the frontend.
  o   Robert McKay

- **Create a homepage for the app:** As a user of the app, I want the application to have a home screen so that I can view access the features of the app.
  o   Jacob Hill

- **Reading from database in chunks:** As a developer, I want to learn how to get data from the database in smaller chunks so I can more efficiently train our model.
  o   Jacob Hill, Jonas Fornehed

- **Research LSMT ML model in tensorflow:** As a developer, I want to learn how to create an LSMT ML model in tensorflow so I can create an accurate model for predicting critical patient events.
  o   Jacob Hill, Jonas Fornehed

- **Research recurrent neural networks:** As a developer, I want to learn more about recurrent neural networks so I can implement one in tensorflow.
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- **Preprocess eICU data for machine learning:** As a developer, I want to preprocess data from the eICU dataset so that I can effectively train a machine learning model to predict patient events.
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- **API Route for machine learning model:** As a developer, I want an api route to the machine learning model that predicts patient issue so that the frontend can interact with the model.

- o   Robert McKay, Jacob Hill

- **Train Python Machine Learning Model:** As a software developer, I need to train a python machine learning model that can accurately (>90%) predict if a patient is going to code/crash and make it accessible to the python webserver.
  - o   Jacob Hill, Jonas Fornehed, Joseph Doonis

- **Severity Indicator Patient List:** As a medical professional, I need to be able to see a list of patients with a severity indicator ranging from low to high so that I know which patients a priority are to see first.
  - o   Robert McKay, Amanda McGuire

- **Improve PostgreSQL skills:** As a developer, I want to learn more about PostgreSQL so I can use the test databases more efficiently.
  - o   Joseph Doonis, Jonas Fornehed, Jacob Hill, Timothy Kelley, Amanda McGuire, Robert McKay

- **Learn python machine learning libraries:** As a developer, I want to learn how to use python for machine learning libraries so I can help with the creation of the machine learning model.
  - o   Joseph Doonis, Jonas Fornehed, Jacob Hill, Timothy Kelley, Amanda McGuire, Robert McKay

- **Encrypt patient data:** As a developer, I want to learn how to encrypt patient data so I can make sure patient data is secure.
  - o   Joseph Doonis, Jonas Fornehed, Jacob Hill, Timothy Kelley, Amanda McGuire, Robert McKay

- **HIPAA Compliance:** As a developer, I want to learn more about HIPAA compliance, so the software stays HIPAA compliant.
  - o   Joseph Doonis, Jonas Fornehed, Jacob Hill, Timothy Kelley, Amanda McGuire, Robert McKay

- **Enter patient data into UI:** As a medical provider, I want to be able to enter patient data into the UI so the system can predict patent events.
  - o   Robert McKay, Amanda McGuire

- **Tie together Table, AppBar, and Notification Center:** As a developer, I want to tie together the Table, AppBar, and Notification Center so I can set a foundation for the frontend.
  - o   Timothy Kelley, Robert McKay

- **Automatic updating for display data:** As a medical professional, I want the display data to update automatically so I can receive critical notifications without having to refresh.
  - o   Timothy Kelley

<u>Completed</u> (53 story points)

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Still in progress (23 story points)

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• New stories and story points added since beginning of iteration

Stories added (26 story points)

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    - o Jacob Hill

What stories are in the iteration backlog for the next iteration? How has this changed for what was originally planned? Include the number of points to be attempted.

- • Iteration backlog for next iteration:

    Planned (14 story points)

- **Add refresh button to AppBar:** As a nurse, I want to refresh the data so I can have the latest patient information.
    - o No one is assigned to this story at this time.

- **Integrate usernames:** As an user, I want to see my username so I can identify my username.
  o No one is assigned to this story at this time.

- **Parse live patient data into Notification center:** As a patient, I want to see live notifications on patient data so I can react to adverse events when needed.
  o No one is assigned to this story at this time.

- **Add new patient to the table:** As a medical provider, I want to be able to add patients to the table so that I can keep an update list of patients.
  o No one is assigned to this story at this time.

- **Delete a patient from the table:** As a medical provider, I want to be able to delete a patient from the table so that I can keep the list of patients up to date.
  o No one is assigned to this story at this time.

- **Maintain global state for app:** As a developer, I want to maintain a global state for the frontend app so that I can easily access data.
  o No one is assigned to this story at this time.

- **Refactor code:** As developer, I want to refactor the code so that the project does not accumulate technical debt.
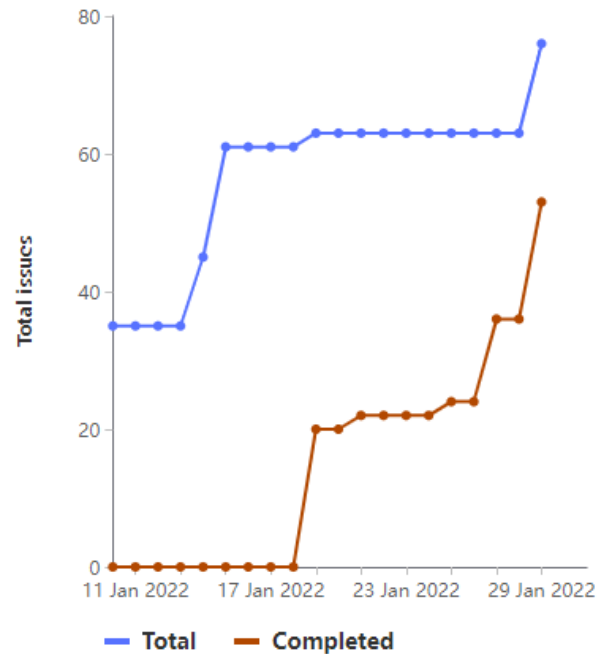 o No one is assigned to this story at this time.

Burndown / Burnup Chart
Note: Burndown/Burnup chart is showing story points (issue weight) -- not # issues.

Burndown chart
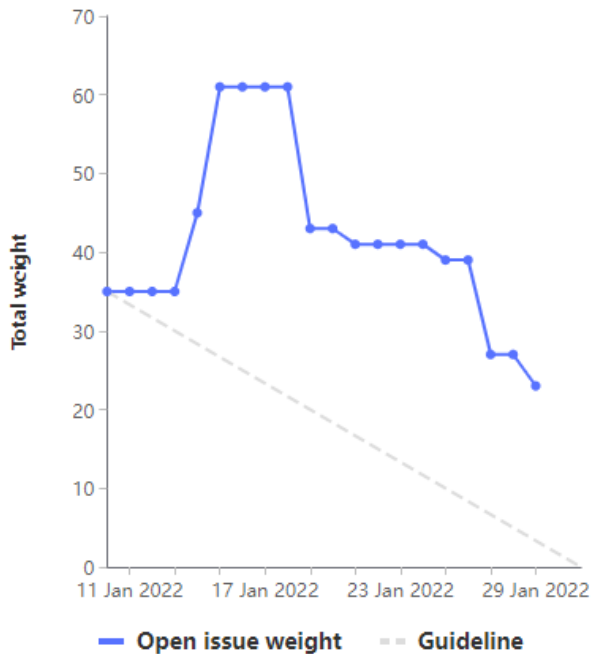
Burnup chart

The burndown and burnup charts show our progress over the entirety of iteration 2. The beginning of the iteration proved to be a struggle for our team, but when we finally planned on how to complete the work we knew we had to get done, stories slowly started to get completed. Overall, we were a bit more behind on schedule than previous iterations, but we managed to push through and complete even more stories in terms of weight than last iteration.

Retrospective

- **What has gone well?**
  - At the beginning of the iteration, we decided to break into teams of three. This worked well and allowed us to both split efforts more efficiently while also ensuring that we always had someone to help us and vice versa.
  - Substantial progress has been made. We now have a basic frontend for the app.
- **What could be improved?**
  - While splitting into teams of three was primarily a net positive, communication was lacking between the six of us as a whole.
  - We had a slow start to the iteration. Most of the work was done towards the end instead of maintaining a consistent pace.
  - As the burndown chart shows, we could do a better job of planning instead of adding stories during the middle of the iteration.
- **What questions do you have about the project or process?**
  - What do we need to request for Megan and others at NavSEA to have access to our GitLab?

- **What action items (with responsible party) need to be addressed?**
  - o The team needs to have a sprint planning meeting within the first few days of the next iteration to facilitate maintaining a consistent pace (responsible party: entire team).
  - o The pairs working on frontend features need to post regular updates in Slack to effectively communicate important design decisions (responsible parties: Robert McKay, Amanda McGuire, Timothy Kelley, Joseph Doonis).

Team Temperature
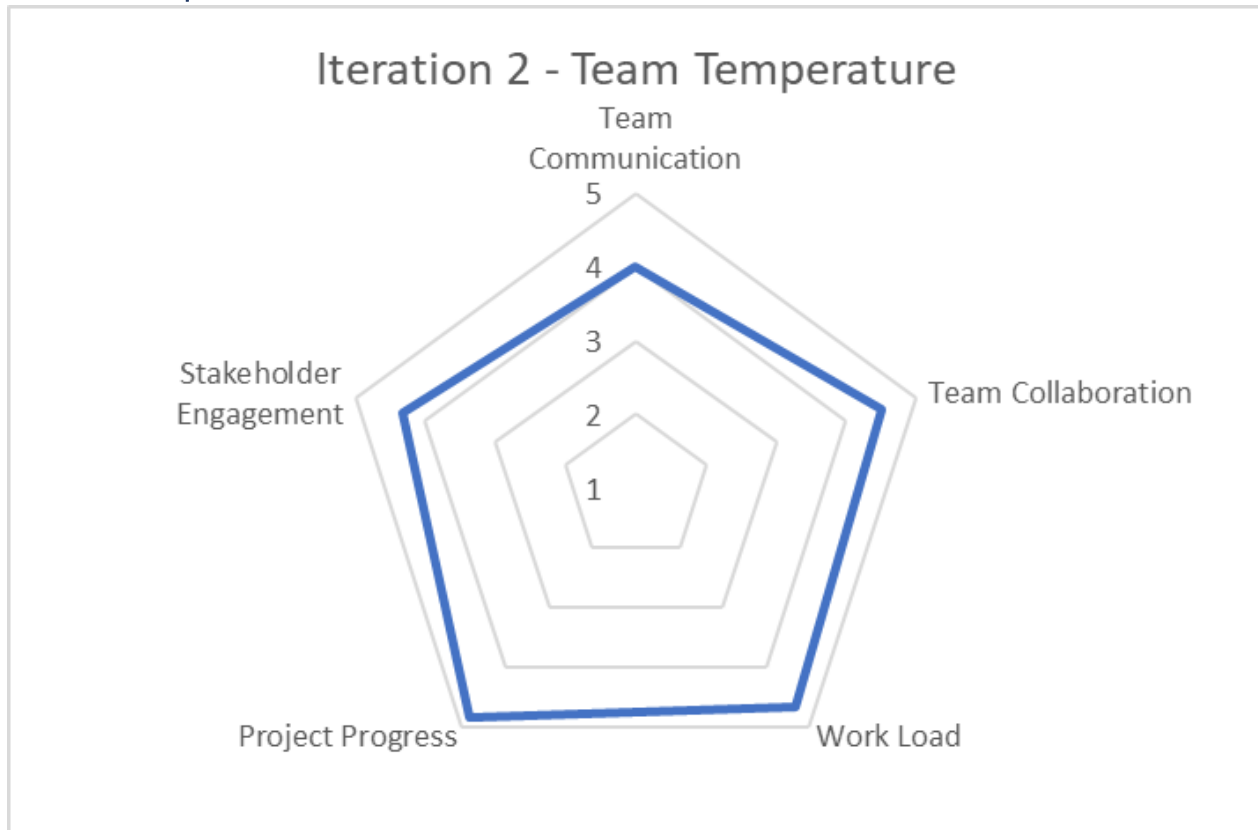
Results:

- Team Communication: **4.0**
- Team Collaboration: **4.5**
- Work Load: **4.67**
- Project Progress: **4.83**
- Stakeholder Engagement: **4.33**

Overall, the spider chart shows that we, as a group, feel that the project has progressed significantly during this iteration along with our collaboration efforts. Team communication slightly decreased from last iteration. This could be due to us not continuously checking Slack for updates and getting back into the groove of school after break. The team feels that our stakeholders have remained engaged, and the workload is staying consistent with past iterations.

Showcase:

https://www.youtube.com/watch?v=nxiauAXPDaU