Team 6 – Predicting Potential Patient Issue – Iteration 3 Report

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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?

Like last iteration, the team made considerable progress on the frontend of our application during this iteration. The application now implements features to add/delete patients, enter vital records, and responsive layouts for small screen size. In addition to this, we also made strides in the machine learning aspect of this project. The backend now contains functioning models that can predict a patient's status based on vitals. An API route provides access to the model, though eventually, an automated process for making predictions will replace the manual route in place for now. Story details listed below:

Planned (54 story points)

- Perform exploratory data analysis: As a software developer, I need to perform exploratory data analysis on the MIMIC training data by using K-Means to cluster my data into representative groups so that my training data for the machine learning models will be generalizable enough.
    - Jacob Hill

- Create wrapper class for LSTM model: As a software developer, I need to create a wrapper class that can be called from the backend API, accept a patient's heartrate, oxygen saturation, and respiration, and return a prediction so that the frontend can reflect the patient's critical status.
    - Jacob Hill, Jonas Fornehed

- Bucket patient data: As a developer, I want to split our training set into buckets so our model can make predictions more accurately and efficiently
    - Jacob Hill, Jonas Fornehed

- Gather appropriate patients for training set: As a developer, I want to build a dataset of patients who have an appropriate amount of events and time-stamped data so that our model can be trained on cleaner data

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- Create a model for respiration prediction: As a software developer, I need to create a LSTM model in TensorFlow that can predict a patient's future respiration based on past data.
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- Create a model for SaO2 prediction: As a software developer, I need to create a LSTM model in TensorFlow that can predict a patient's future oxygen saturation based on past data.
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- Create a model for HR prediction: As a software developer, I need to create a LSTM model in TensorFlow that can predict a patient's future heartrate based on past data.
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- 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.
    - Jacob Hill, Jonas Fornehed

- Patient Profile: As a doctor, I want to be able to access a patient profile in order to see current vital information, insert new vital information, and delete a patient.
    - Robert McKay, Amanda McGuire

- Responsive layout for notification pane: As a user of the application, I want the notification pane to respond to the window size so that the app presents a user friendly interface.
    - Timothy Kelly, Joseph Doonis

- Refactor code: As developer, I want to refactor the code so that the project does not accumulate technical debt.
    - Robert McKay

- 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.
    - Robert McKay

- 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.
    - Robert McKay, Amanda McGuire

- 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.
    - Robert McKay, Amanda McGuire

- Parse live patient data into Frontend: As a nurse, I want to see live notifications and patient data in the patient information table so I can react to adverse events when needed
    - Timothy Kelly, Joseph Doonis

- Integrate usernames: As an user, I want to see my username so I can identify my username.
    - Timothy Kelly, Joseph Doonis

- Add refresh button to AppBar: As a nurse, I want to refresh the data so I can have the latest patient information.
    - Timothy Kelly, Joseph Doonis

- 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.
    - Jacob Hill, Jonas Fornehed

- 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.
    - Jacob Hill, Robert McKay

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- Edit user profile: As a user of the app, I want to be able to edit my user profile so that I can make changes to my profile.
    - Timothy Kelly, Joseph Doonis

- 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.
    - Robert McKay, Amanda McGuire

Completed (46 story points)

- Perform exploratory data analysis: As a software developer, I need to perform exploratory data analysis on the MIMIC training data by using K-Means to cluster my data into representative groups so that my training data for the machine learning models will be generalizable enough.
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Still in progress (8 story points)

- Bucket patient data: As a developer, I want to split our training set into buckets so our model can make predictions more accurately and efficiently
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- Gather appropriate patients for training set: As a developer, I want to build a dataset of patients who have an appropriate amount of events and time-stamped data so that our model can be trained on cleaner data
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- 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.
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- New stories and story points added since beginning of iteration

Stories added (23 story points)

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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.

The team plans to continue adding features to the frontend of the application and advancing the sophistication of the machine learning models in the backend. No major changes to the original plan. Minor changes will continue to be made as necessary.

- Iteration backlog for next iteration:

  Planned (40 story points)

- Add Notification popup in Mobile/Small Desktop view: As a nurse, I want popups for notifications so I can be ready for any critical event.

- Add Notification page when in Mobile/Small Desktop view: As a nurse, I want to access a notifications page on my phone so I can see any critical events.

- View user profile information: As a user, I want to be able to view my profile information so that I can verify that it is correct.

- Edit user profile information: As a user, I want to be able to edit my profile information so that I can update/correct any necessary information.

- Schedule recurring prediction calls to the machine learning model: As a developer, I want the backend to issue recurring calls to the machine learning model so that the predictions do not become stale.

- Delete a user from the application: As an admin, I want to be able to delete a user from the application so that I can remove someone that no longer needs access to the app.

- Add a user to the application: As an admin, I want to be able to add a user to the application so that my team members can access the app.

- Admin portal for users with administrative privileges: As a administrator, I want the application to have an admin portal so that I can perform privileged operations.

- Reduced app bar for small screen size: As a user, I want the application to have a reduced app bar with an overflow menu for smaller screen sizes so that the icons are not all bunched together.

- Add reports to repo: As a software developer, I need to add the team charter, project charter, and team reports (iteration 0-3) to the project repository in /docs so that there is a history of the project's documentation and work completed.

- Edit patient profile: As a medical provider, I want to be able to edit a patient's information so that I can update/correct a patient's profile.

- Archive patient data on delete: As a medical provider, I want to keep patient data archived so that I am in compliance with HIPAA.

- Bucket patient data: As a developer, I want to split our training set into buckets so our model can make predictions more accurately and efficiently.

- Gather appropriate patients for training set: As a developer, I want to build a dataset of patients who have an appropriate amount of events and time-stamped data so that our model can be trained on cleaner data.

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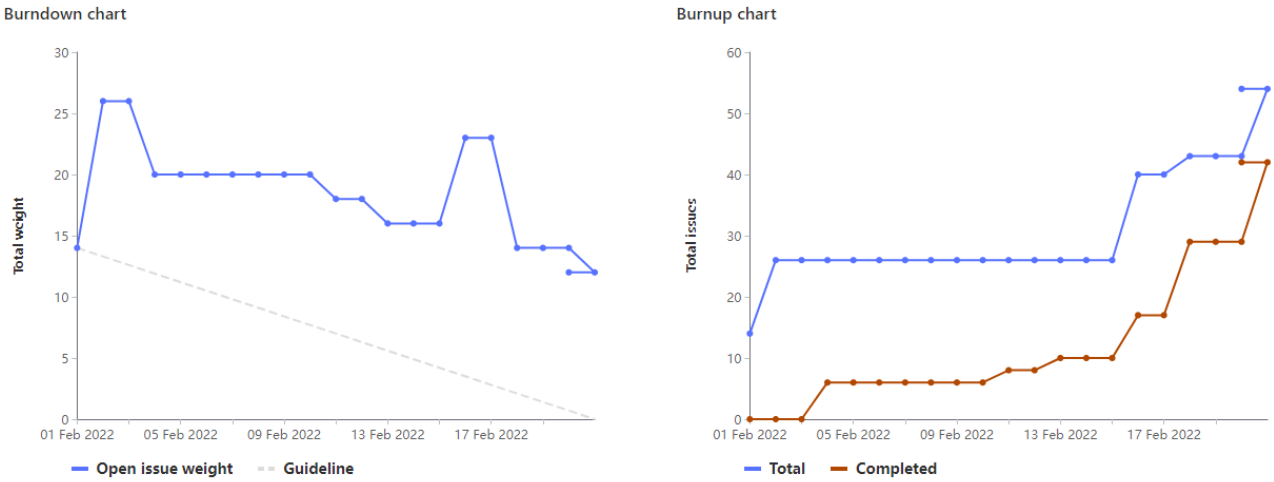
Burndown / Burnup Chart

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



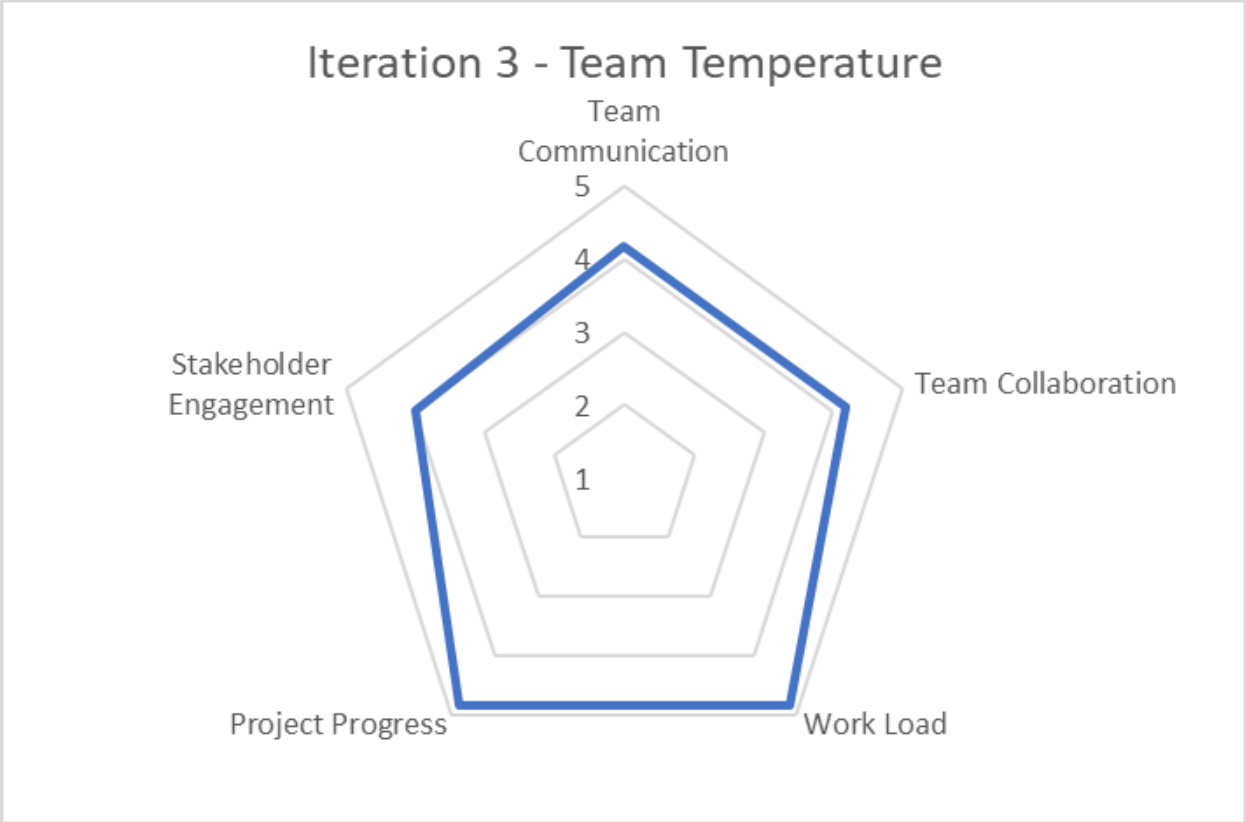
The burndown and burnup charts show our progress over the entirety of iteration 3. Unlike previous iterations, we were consistent in our work effort and completed stories efficiently over time. These charts show that we are beginning to get a grasp on completing assigned stories in a timely manner. We also added fewer stories during the middle of the iteration, which is an improvement in planning in general.

Retrospective

- What has gone well?
    - As mentioned in the section above, our work ethic has improved in comparison to previous iterations.

    - Separating into smaller teams, like the last iteration, has proven to be an effective way to complete stories.
- What could be improved?
    - Sprint planning could be improved. The team added quite a few story points during the iteration.
- What questions do you have about the project or process?
    - At the moment we all have a shared vision of what the project is supposed to be and what we need to do for the next iteration
- What action items (with responsible party) need to be addressed?
    - The 'delete patient' button in the patient profile needs to be changed by Robert McKay and Amanda McGuire to archive patient data instead of deleting it.

Team Temperature



Results:

- Team Communication: **4.17**
- Team Collaboration: **4.17**
- Work Load: **4.83**
- Project Progress: **4.83**
- Stakeholder Engagement: **4.00**

Overall, the spider chart shows that we, as a group, feel that the project workload has stayed consistent along with the progress that we are making. During this iteration, our team collaboration and stakeholder engagement slightly decreased. This could be due to slight burnout from both members of the team and our customer. However, our team communication increased from last iteration. This could be due to utilizing slack more to keep everyone on the same page. We feel that our project is coming together at a solid rate.

Showcase:

https://www.youtube.com/watch?v=fo2SNli4Beg