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Clients: Jim Clark and Lowell Observatory
 College of Informatics, Computing and Cyber Systems



Motivation

This project is sponsored by Jim Clark from the Navy Precision Optical Interferometer Naval Research Laboratory, Remote Sensing Division, as well as Lowell Observatory. Currently at NPOI, the site gathers data but is difficult for observers and researchers to use. The dashboard will enable these users to utilize a web application in which they would be able to interact with graphs of star data relevant to building a better understanding of the space we seek to explore and travel through in the future.

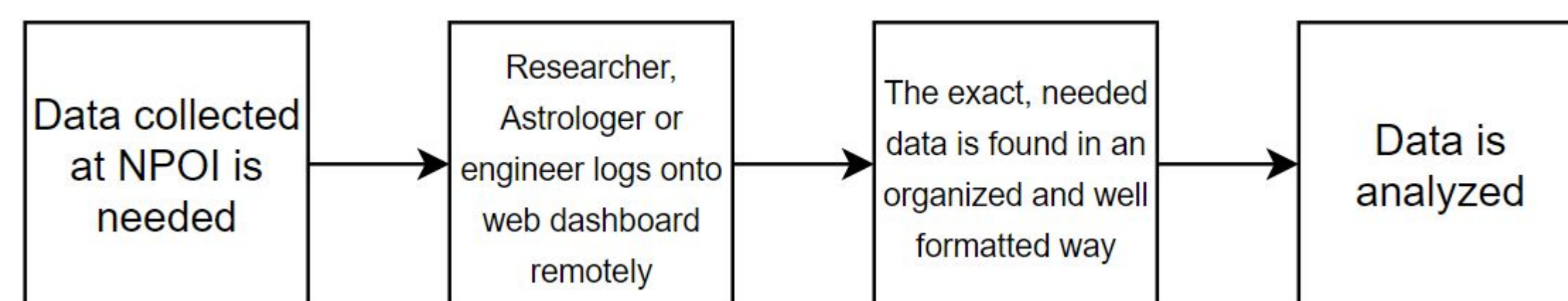
Problem Statement:

- Data
 - Instrument health and performance data not utilized to its full potential
 - Inconvenient to access
- Inefficiency
 - No efficient way to parse the dense data
 - Difficult to analyze

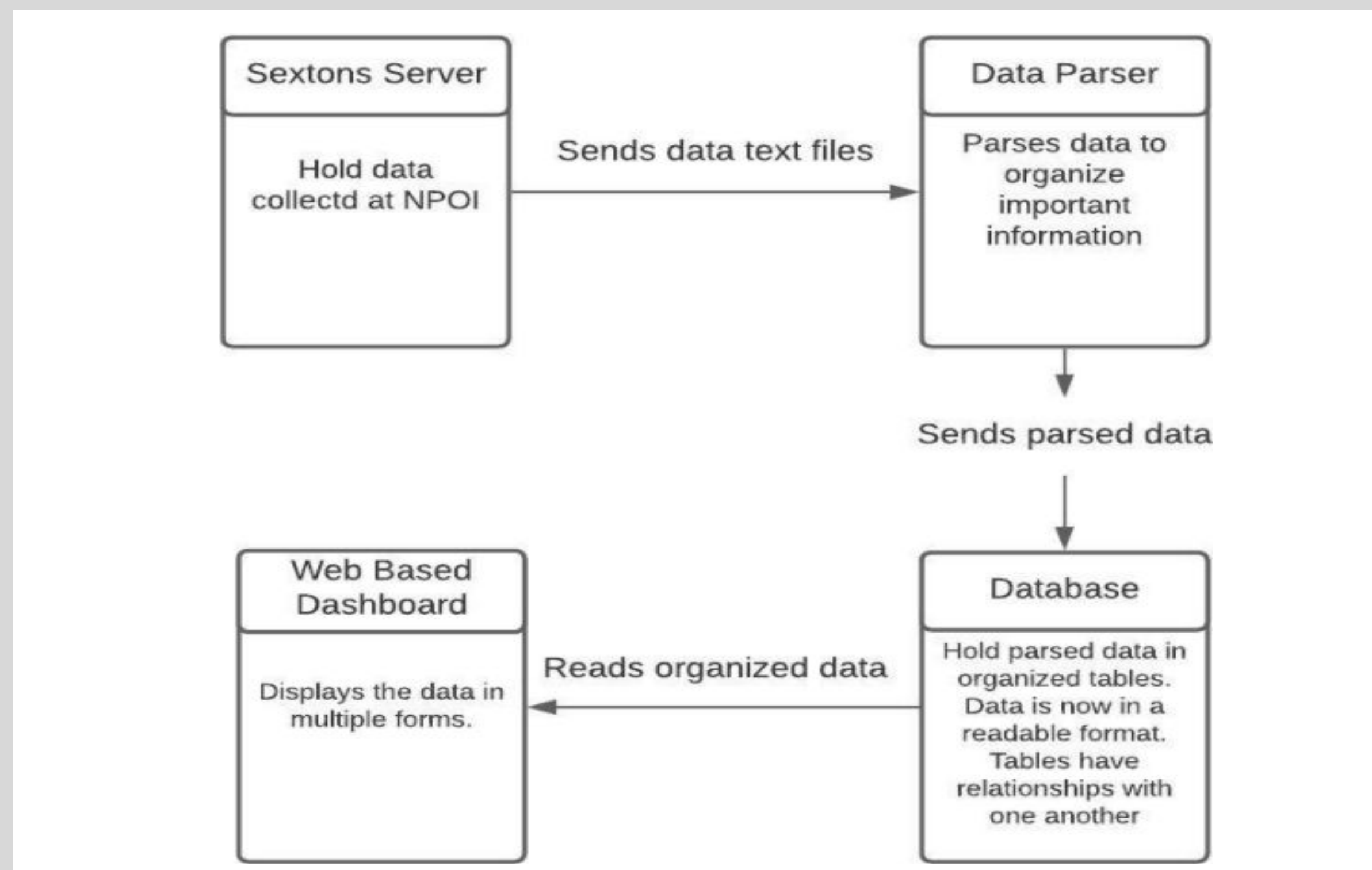
Solution

The solution to our client's problem is to create a web application that will be deployed to the local server at NPOI. This application will display interactive graphs of the instrument data, a information array station map and all of the collected observational data collected. All of these features will allow the user to more quickly and easily digest data gathered at NPOI.

- Project Requirements:
 - Instrument Graphs
 - User Based Privileges
 - Array Status
 - starLog Download



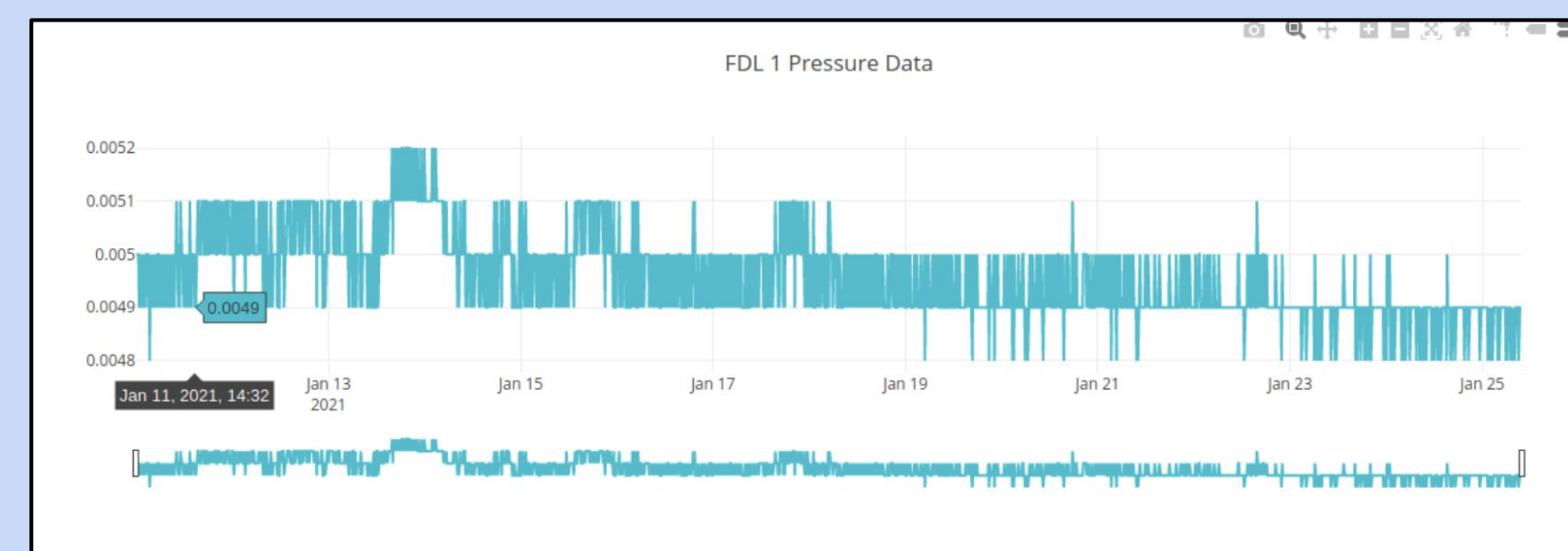
Architecture



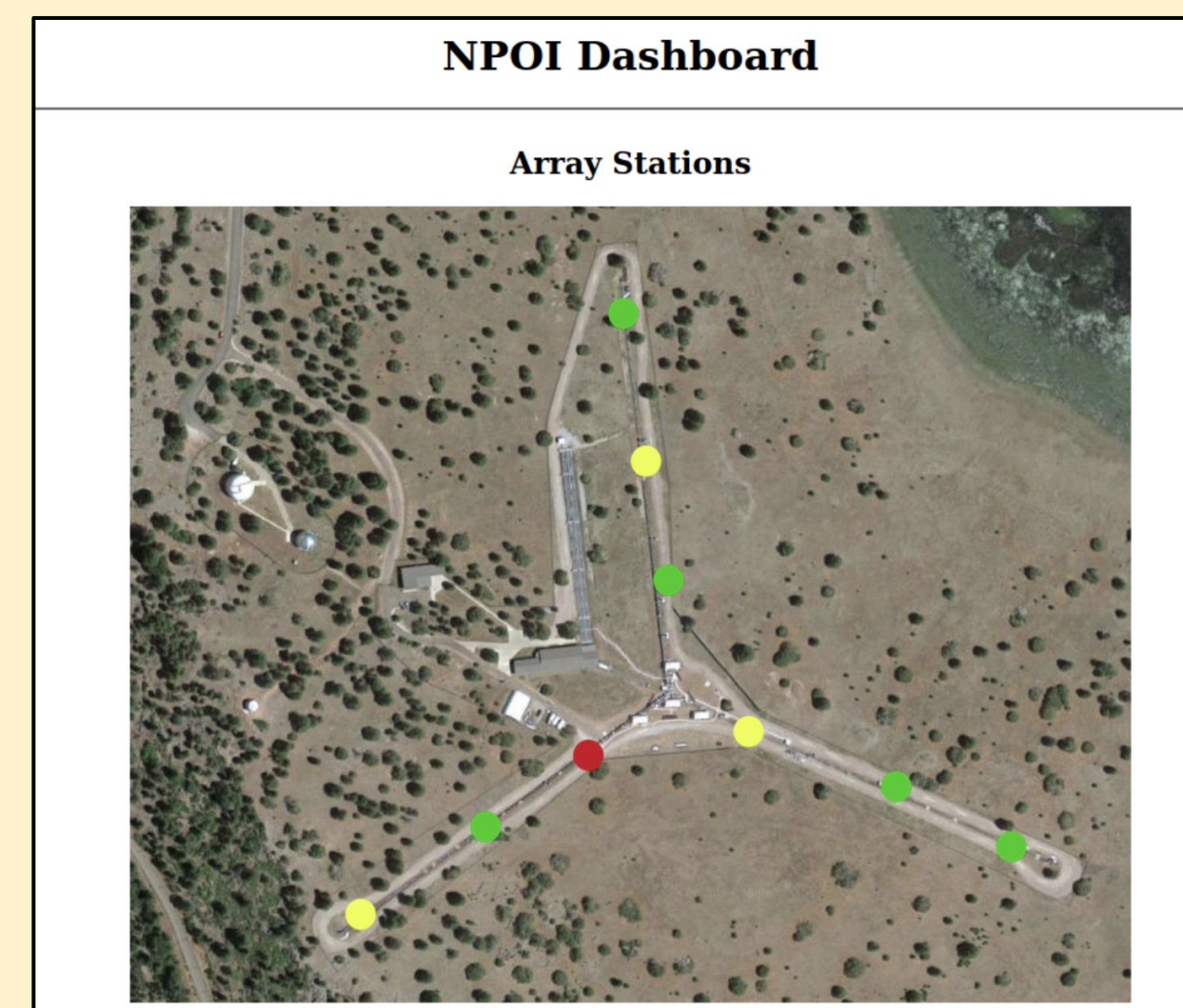
Key Features

Data Graphing

For the data graphing module of our project, we handled the collected instrument data by grabbing it from the database and then graphing it. When you hover over points, the individual value of the data point will be displayed. The graph can also be resized to display a window of a specific domain.



Array Graph



The array graph module enables the user with the ability to monitor the configuration of the array and its stations. In order to accomplish this, the dashboard contains a map of the overall NPOI array with some identifier at the different stations along the array.

Technologies

Front End

- HTML
- CSS
- Bootstrap
- Plotly



Back End

- Django
- MySQL
- JavaScript



Testing

Unit

Using Django as the platform for building our dashboard application empowered the team with unique unit testing tools included in Tox which allows us to test the different modules of our project easily.

Integration

Development occurred on virtual machines that match that native environment of the client's machine. The team will be assisting the client to integrate the product on to their Apache web server.

Usability

The team conducted weekly meetings with the client showing updates to the product and conducting a live demo to receive feedback. This testing helped tweak the product to the client's specifications.

Challenges

Graphing Library Issues

Worked through a number of different solutions to see what worked and our solution in the end was a simple JavaScript implementation.

Django Learning Curve

The majority of the team was new to Django. However with the help of a team expert, we worked together to learn the new language.

Cross Platform Development

All team members set up their VMs on different computers and this introduced unique bugs. We worked as a team to troubleshoot.

Future Work

Expansion of starLog functionality:

- Adding a graphic display for which stars are being observed more often
- Linking into the database to track the statistics of observers

Further Development of Array Graph:

- Adding the ability to create more station points on the graph as NPOI expands
- Allowing the repositioning of current points on the graph
- Creating more fields to be able to display more information about each given station

Expand the Data Graphing:

- Adding more graphs into sub pages as NPOI begins collecting more data
- Adjusting the data being viewed should the engineers change what data they need to observe

Acknowledgements

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Finally, the team would like to thank our team mentor David Failing and Capstone Director Eck Doerry for motivating and guiding us to success in this project.