

# **CS/SSW 555 Agile Methods**

Group 22 LitHub  
Sprint #1  
2/16/2024

## Project Background Information

**Selected Project Option Number:** Option 1

### **Main Objective of Project:**

Our objective of this project is to create a 3D visual rendering of a model of a brain using EEG/MEG that surgeons can study and locate areas of interest. We do this by first intaking EEG/MEG data and storing it in the cloud. Then next we want to use Source Localization Algorithms to pinpoint the sources of brain activity. After that we plan to make a 3D visualization system that generates a reconstruction of the brain. With the model, we also want to allow surgeons to enhance visuals provided by the reconstruction to pinpoint and study areas of interest. We also plan to add real-time rendering to the program.

### **Team Members and Roles:**

Name	Role
Jake Gebeline	Product Owner
Michael Savino	Scrum Master
Grant Shufelt	Developer
Dave Frost	Tester
Alexander Bakos	Developer

### **List & Description of Each Sprint:**

Sprint #	Objective
Sprint 1	Data Integration and Storage <ul style="list-style-type: none"><li>• Setup cloud infrastructure</li><li>• Prepare preprocessed data</li><li>• Implement manipulation scripts</li></ul>
Sprint 2	Source Localization Algorithms Implementation <ul style="list-style-type: none"><li>• Integrate Algorithms to process data</li><li>• Thoroughly Test and adjust algorithms</li></ul>
Sprint 3	3D Visualization System Development

	<ul style="list-style-type: none"> <li>• Design and Develop a 3D visualization system</li> <li>• Implement ability to enhance visualization/view regions of interest</li> <li>• Mockup UI</li> </ul>
Sprint 4	Integrate UI Additional Functionalities and Enhancements <ul style="list-style-type: none"> <li>• Brainstorm additional functions to aid surgeons</li> <li>• Develop chosen functions</li> <li>• Conduct thorough testing</li> </ul>

**Project Links:**

Type	URL
GitHub/GitLab/Etc	<a href="https://github.com/msavino16/SSW555-Group22">https://github.com/msavino16/SSW555-Group22</a>
Jira	<a href="https://stevens-msavino.atlassian.net/jira/software/projects/KAN/boards/1">https://stevens-msavino.atlassian.net/jira/software/projects/KAN/boards/1</a>
Live Demo (if applicable)	

**Technology Stack Used:**

Type	Technology
User Interface	JavaScript, CSS, HTML
Backend	Python
Database	Pandas, Numpy

## Sprint Progress Update: Current Status

### Summary of Work Completed

- Completed issues on Jira Backlog
- Generated a 3D visualization model of the brain
- Ran test cases to ensure working code
- Made Figma mockups for future UI integration

### Screenshot of Jira Backlog

Sprint 3

28 Mar – 9 Apr (8 issues)

0

0

3

Complete sprint

...

<input checked="" type="checkbox"/> KAN-39	Source Localization Algorithm Integration to accurately pinpoint sources of brain activity based on the EEG/MEG data.	DONE	MS
<input checked="" type="checkbox"/> KAN-29	Integration of EEG/MEG Data and store it securely for the visualization system.	DONE	MS
<input checked="" type="checkbox"/> KAN-32	Design and implement enhancements to the user interface of the 3D visualization.	DONE	JS
<input checked="" type="checkbox"/> KAN-34	Optimize rendering performance to achieve real-time performance.	DONE	AB
<input checked="" type="checkbox"/> KAN-31	Develop a prototype 3D brain model using the stored EEG/MEG data.	DONE	JS
<input checked="" type="checkbox"/> KAN-36	Create comprehensive documentation and user guides to assist surgeons in effectively using the visualization system.	DONE	DF
<input checked="" type="checkbox"/> KAN-35	Conduct thorough testing to ensure compatibility of the visualization system across different devices and platforms.	DONE	DF
<input checked="" type="checkbox"/> KAN-33	Add features to the visualization system to improve and enhance the visuals.	DONE	DF

+ Create issue

### Screenshot of Burndown Chart



### Screenshot of QA Results

```

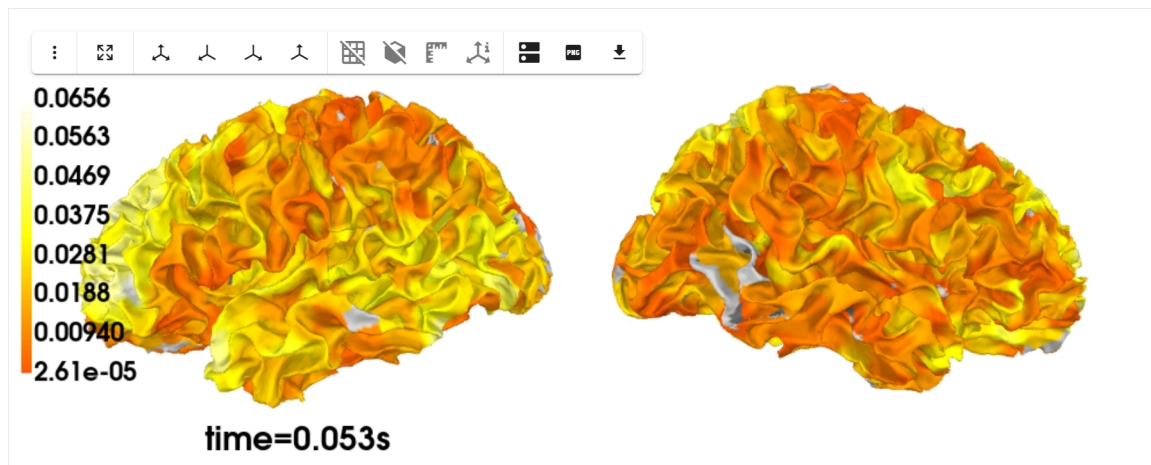
MikeNormalizeTestSmelly.py  MikeNormalizeTestClean.py X
MikeNormalizeTestClean.py > TestNormalizeNegative > test_positive_values
1  import numpy as np
2  import unittest
3
4  def normalize(data):
5
6      #Use keepdims=True to reduce excess code
7      data_min = np.min(data, axis=1, keepdims=True)
8      data_max = np.max(data, axis=1, keepdims=True)
9
10     # data_normalized = (data - data_min) / (data_max - data_min)
11     data_normalized = (data - data_min) / (data_max - data_min)
12     return data_normalized
13
14
15 class TestNormalizePositive(unittest.TestCase):
16
17     def test_positive_values(self):
18         data = np.array([[1, 2, 3],[4, 5, 6],[7, 8, 9]])
19         expected_result = np.array([[0.0, 0.5, 1.0],[0.0, 0.5, 1.0],[0.0, 0.5, 1.0]])
20         result = normalize(data)
21         self.assertTrue(np.allclose(result, expected_result), "Normalization failed for positive values")
22
23 class TestNormalizeNegative(unittest.TestCase):
24     def test_positive_values(self):
25         data = np.array([[-1, -2, -3],[-4, -5, -6],[-7, -8, -9]])
26         expected_result = np.array([[1.0, 0.5, 0],[1.0, 0.5, 0],[1.0, .5, 0]])
27         result = normalize(data)
28         self.assertTrue(np.allclose(result, expected_result), "Normalization failed for negative values")
29
30 if __name__ == '__main__':
31     unittest.main()
32
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS
PS C:\Users\iceki\Desktop\Refactor Homework> & C:/Users/iceki/AppData/Local/Microsoft/WindowsApps/python3.11.exe "c:/Users/ice
..
-----
Ran 2 tests in 0.000s

OK
PS C:\Users\iceki\Desktop\Refactor Homework>

```

Example of Test case being ran + Refactored code

**Screenshot(s) of Interface (Lo-Fi, Mid-Fi, or Hi-Fi)**



**Video of Project at Current State:**

*It does not need to be one edited video. If there are multiple videos, please link all of them below:*

Public Video URL (Google Drive, Loom, Etc)
No URL yet, mockups have been made

## Sprint Progress Update: Current Blockers

### Timeline Impacts:

Type	Impact
Create websites and programs to start working	Adds 1 week

### Looking Ahead: Next Sprint

- We want to fully integrate the 3D brain visualization with the UI
- We want to meet and brainstorm additional functions within the UI that could aid surgeons
- We want to test each new feature
- Continue practicing pair programming and Continuous integration

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