Sprint 2 Retrospective
TEAM 5
WPEAR

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1. **What Went Well**

In this sprint, we have been successful on working on all of the individual user stories and completing almost all of them. We were successful in getting interpolation to work for both RTMA and HRRR files. Furthermore, we created an intelligent system that would download, convert, compare and visualize data in real-time as required for WPEAR to run in an enterprise setting. Though we successfully implemented functionality for every user story, few of these were partially completed and did not make it to the demo.

a. User Story 1 is completed. It downloads enables the program to list and download files from observation file repositories (RTMA products) using the provided HTTPS links.
b. User Story 2 is partially completed, interpolation is now working but we are not currently at 1km.
c. User Story 3 is completed. It enables extraction of individual or multiple messages from a grib2 file into a new file.
d. User Story 4 is completed. We were able to extract a given region from an observation file (RTMA) given 4 points (latitudes and longitudes) in a way that can scale.

e. User Story 5 is completed. We were able to extract a given region from an observation file (HRRR) given 4 points (latitudes and longitudes) in a way that can scale.
f. User Story 6 is completed. We are now able to calculate the mean temperature for a given region over several forecasts. We need to display this on the website.
g. User Story 7 is completed. We are able to generate static visualization of data comparison done by square root difference.
h. User Story 8 is completed. We are able to generate a decent animated GIF file based on a day's forecast hour data.
i. User Story 9 is completed. We could generate a decent animated GIF file based on a day's observational data.
j. User Story 10 is completed. We can store the all of the model data into files for later user, separated by forecast and observation. In addition there is intelligence built in to easily find where the files are located programmatically.
k. User Story 11 is completed. Everything has been orchestrated well in a organized fashion.
l. User Story 12 is completed. We are now able to dynamically add sections and visualizations on the website. We can also display gifs on the website.
m. User Story 13 is partially completed. We are able to produce a trend graph of temperature at a fixed point over multiple forecasts. However, we still need to find a way to take the coordinates as input from the user via the website. We also need to integrate the functionality with the WPEARController.

2. What Did Not Go Well

While we did manage to implement the functionality for all user stories, few of these were either completed too late to be integrated into our controller or were partially completed. As a result, these functionalities could not be presented in the demo even though they had been implemented. However, these were not the core functionalities and could easily be integrated in future sprints.

a. User Story 2: We have interpolation working but on the wrong grid size.
    i. Interpolation was incredibly hard to get working and we were not able to get it working until very close to the end of the sprint.
    ii. Now that it is working changing the grids should be relatively easy.

b. User Story 13: We still need to integrate this feature with the Controller and the website.
    i. This user story was added towards the end of this sprint. We have completed the backend implementation but did not have enough time to modify the Controller and the Website to get the desired inputs and display the results. This should be fairly quickly in Sprint 3.

3. How we can improve

In Sprint 3, we hope to refine more of our current product since each member is mostly comfortable with their responsible area after Sprint 2. More importantly we want to make our product could achieve more than basic functioning on the server side, become more user friendly on the website, and at the same time we will also spend more time on testing to make sure that our product is stubborn enough.

a. Since we developed an intelligent controller to handle the system actions, integrating individual components/features into the controller caused some scaling issues. Some components failed or exhibited unusual behavior and time needed to be spent to fix these. By testing the components on the intelligent controller as they are being developed, such issues could be minimized and solved earlier.

b. We spent significant time learning, using and understanding how wgrib2 library calls worked. Wgrib2 is the official library for performing changes/computations on grib2 files provided by NOAA. We had to migrate to running Ubuntu server in order to run it and then we had to find a way to scale wgrib2 operations to run multiple instances at the same time. This would not be an issue in future sprints.

c. We need to improve the layout of the website. Currently all the visualizations are displayed in a sequential order. This needs to be organized into distinct sections using CSS.

d. We will try understanding each other's parts in order to spend less time integrating our individual parts together. This would save us a lot of time.

e. We will look to have a clearer set of requirements and goals for each class and method so that there is a better understanding of what is being provided and what is the expected result (both in terms of format as well as content).

f. We will be finishing up a few of the user stories from the last sprint and adding new stories that are yet to be completed from the product backlog.