Sprint 1 Planning Document
TEAM 5
WPEAR

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1. Sprint Overview

This sprint will be focused on getting a bare-bones working prototype that performs different core functionalities in a simplified manner. It will need us to spend time understanding the data files storing the weather observation and forecasts. By the end of the sprint, we will have a command-line tool that can download files for forecast and observation data, compare forecasts with an observation and be able to visualize a forecast, observation and the temperature difference between forecasts and an observation.

Scrum Master: Stephen Harrell
Scrum Meeting Time: Monday at 3:00pm and Thursday at 4:00pm
Risks/Challenges:
- Downloading data files from MRMS MultiI-Radar/Multi-Sensor System Products
- Downloading data files from The High-Resolution Rapid Refresh (HRRR)
- Learning the GRIB2 file format
- Learning to perform static visualization from a GRIB2 format
- Learning to visualize weather in the GRIB2 format

2. Current Sprint Details

1) **User Story:** As a user, I would like to obtain latest observation and forecast data from the given sources.

Task Description	Estimated Hours	Owner
Get the latest forecast files from NOAA using HTTP/FTP	5	Lala
Get the latest observational data files from NSSL using HTTP/FTP	2	Stephen

Data Source: http://www.nssl.noaa.gov/projects/mrms/

Acceptance Criteria:
1. Given the files are available on the respective sites I to be able to download and save the latest files

2) **User Story:** As a developer, I would like for forecast data to be in a common format (grid spacing, variables and domain)

Task Description	Estimated Hours	Owner
Convert the collected data of different ranges into same range	20	Lala
Pull the target variables from the format data	10	Lala
Save the variables filtered out into local files	5	Lala

Acceptance Criteria:
1. Given the forecast data is formatted properly I expect all the data of different ranges are of same range scale.
2. Given target variables get filtered out properly, I expect to get the correct variables.
3. Given the data conversion gets done successfully, I expect to have the generated file saved with correct data.

3) **User Story:** As a developer, I would like for observation data to be in a common format (grid spacing and variables).

Task Description	Estimated Hours	Owner
Convert the collected data of different ranges into same range	15	Stephen
Pull the target variables from the format data	3	Stephen
Save the variables filtered out into local files	10	Stephen

Acceptance Criteria:
1. Given the observation data is formatted properly I expect all the data of different ranges are of same range scale.
2. Given target variables get filtered out properly, I expect to get the correct variables.
3. Given the data conversion gets done successfully, I expect to have the generated file with correct data.

4) **User Story:** As a user, I would like to be be able to generate visualizations based on observation and forecast data specifically for a certain region.

Task Description	Estimated Hours	Owner
Access the relevant files that we have stored	4	Mengxue
Generate the static visualizations based on the observational data	10	Mengxue
Generate the static visualizations based on the forecast data	10	Mengxue

Acceptance Criteria:
1. Given the relevant files available I expect to be able to access the right files
2. Given I can get the right files I expect to be able to use it to generate static visualizations for each hour for the given region

5) **User Story:** As a user, I would like to do the comparison between forecast data and observational data by difference.

Task Description	Estimated Hours	Owner
Verify that both the observational and forecast data are in the correct format	8	Dhairya
Compare the two sets of data by performing a difference analysis on the forecasted and observed temperatures	15	Dhairya

Acceptance Criteria:

Given the files are in the correct format I expect to be able to compare the data and calculate the difference between the forecasted and observed temperatures.

6) **User Story:** As a user, I would like to view a static visualization of the comparison done using difference.

Task Description	Estimated Hours	Owner
Generate a scale and reference colors to display the difference in the form of a visualization	6	Mengxue
Create the visualizations for the difference and display it on a map of the region.	8	Mengxue

Acceptance Criteria:
1. Given that I can calculate the difference I expect to be able to generate a heatmap to display the difference

7) **User Story:** As a user, I would like to view the visualizations and access the archived data files via a website

Task Description	Estimated Hours	Owner
Create a website layout using HTML and CSS	12	Dhairya
Display the generated visualizations on the website	10	Dhairya

Acceptance Criteria:
1. Given the correct layout I expect to be able to generate the website in the correct layout and format from the program itself.
2. Given the correct HTML format I expect to be able to see the correct visualizations.

8) **User Story:** As a developer I would like a class that orchestrates the downloading, conversion, comparison and visualization of the data.

Task Description	Estimated Hours	Owner
Create class that understands what needs to be downloaded and what work is missing	10	Stephen
Interface with all other pieces of code to run them	4	Stephen

Acceptance Criteria:
1. Given a historical archive I expect to be able to see what files are missing and what needs to be downloaded and visualized.
2. Given that the other classes work I expect to be able to run the application to completion with web page and visualization generated from data downloaded from NOAA.

3. Remaining Backlog

(a) Include all the other user stories from your Product Backlog document.

Functional Requirements:

1	As a user, I would like to choose between different variables (for instance reflectivity or temperature) for a particular visualization.
2	As a developer, I would like to be able to calculate the mean of a particular variable over time or over a specific region.
3	As a developer, I would like to be able to calculate the root square mean difference of a particular variable over time or over a specific region.
4	As a user, I would like to view a static visualization of the comparison done using mean .
5	As a user, I would like to view a static visualization of the comparison done using root mean square difference.
6	As a user, I would like to view a moving heatmap of the forecasted weather.
7	As a user, I would like to view a moving heatmap of the observed weather.
8	As a user, I would like to view a moving visualization of the comparison done using mean. (if time permits)
9	As a user, I would like to view a moving visualization of the comparison done using root mean square difference. (if time permits)
10	As a user, I would like to view a graph showing the accuracy of a specific variable over a time period (if time permits).
11	As a user, I would like to view a graph showing the accuracy of a specific variable based on how far out have they been forecasted (if time permits).
12	As a developer, I would like to perform evaluation calculations on the observation and forecast and compare the models.
13	As a user, I would like to see historical trends and visualizations

14	As a user, I would like to see the difference between the results from top accurate weather forecast and the worst accurate weather forecast. (if time permits)
15	As a user, I would like to see which model is better at predicting extreme weather. (if time permits)
16	As a user, I would like to see if there exist visible trends in the data that help better predict weather disturbances. (if time permits)
17	As a user, I would like to be able to store the models for each observation and forecast in separate files.

Non-Functional Requirements:

1. **Web Enabled:** Visualizations must be available over the web. Webpages must be autogenerated based on the visualizations that are to be displayed using type of visualization, date/time, location and variable as parameters.

2. **Intermediate Data Archival:** Interpolated intermediate data must be available historically for reanalysis of visualizations. Archived data must be clearly marked with location, time/date and variable parameters. Archived data must be available via the web and linked to the visualizations that are created from it.

3. **Operational Weather:** Every hour this tool should retrieve the observations and forecasts, convert them to a common grid spacing and format and create visualizations based on an evaluation of the observation and forecast for specific points in time.

4. **Web access must be fast:** Webpages should be static HTML/CSS and not include any server side programing.

5. **Modular:** Code must be modularized in a way that adding new types of observations and forecasts is trivial.