M2: Project Description and Requirements

https://www.weatherapi.com/

Weather - or - Not

Project Description:

Our team is creating a system that will utilize the Internet of Things and artificial intelligence to create weather information, broadcasting, and forecasting experiences for a variety of users. Our product looks to display information in a user-friendly, easily digestible manner taking advantage of charts, maps, graphs, locations, existing weather data, and artificial intelligence to provide users with a complete personalized weather surveying experience. Our product will be up to industry standards for reliable accurate weather data and forecasting systems, allowing standard users and professionals to easily navigate and gather the weather information they require.

We are going to offer a personalized weather experience by allowing users to filter the desired weather content by location. A log-in system will be used to store individual users' data, allowing for more customizable features, such as location, and filter preferences allowing the ai to further assist the user thus adding further product differentiation. Taking inspiration from popular weather services such as Apple, Google, and AccuWeather to provide customers with an ergonomic user interface and software design. Our mission is to add value to online application weather services by incorporating new innovative technologies.

System Specifications:

1. Alerting system (Twilio free credits): Push-app notification through email that includes different weather alerts such as heavy rainfall, drought, hurricanes, etc.
2. Visualizations (at least three different types): weather map in different locations, weather chart for different days and a sliding timeline containing temperature/climate for each hour as well as today’s sunrise and sunset times
3. Filtering: let users add multiple locations and set various time zone
4. Predictions: Weather forecast for up to 10 days including temperature/rainfall/wind speed/air quality etc…

5. Dashboards: a main screen including the climate/temperature/location for current time, a weather map containing current temperature/climate in different areas and a weather chart containing the local temperature/climate for the next 10 days
6. Login/Registration system
7. Database

User Requirements:

1. The system should allow members to receive email notifications on weather alerts, emergencies, and forecasts
2. The system should allow members to view different weather visualizations such as weather maps to see current radar and Satellite images for different regions
3. The system should allow guests to create an account by providing necessary information such as username, email address, and password. It should also include a verification process to ensure the security of member accounts.
4. The system should enable users to search for weather forecasts based on region, city, and province. It should also provide filtering options to narrow search results based on specific attributes or preferences.
5. The system should allow for users to view predicted future weather forecasts for different regions. These forecasts should include temperature, rainfall, wind speed, and air quality
6. The system should allow for members to have a personalized dashboard that includes the weather forecasts for their location, future weather forecasts for their location, weather updates, and weather news based on their location
7. Admins should be able to view the daily activity for up to the past year on the website to make sure the activity level is high and people are happily engaging with our site
8. Admins should have their own customizable dashboard where they can view site activity, manage forecast data, and manage the site's visual content (maps and charts) quickly and efficiently
9. Admins should be able to access a full list of users limited to their name, username, and email to keep track of how many people have registered for our site

Functional requirements:

1. Real-time Weather Updates
    a. The application should provide real-time weather information for the user's current location.
    b. Real-time data should include temperature, humidity, wind speed, wind direction, and weather condition (sunny, cloudy, rainy, snowy, etc.).
2. Weather Forecasting
    a. The application should display weather forecasts for at least the next 7 days.
    b. Forecasts should include daily high and low temperatures, precipitation probability, wind speed, and weather conditions.
3. Location Management
    a. Users should be able to add, delete, and select different locations to view their weather information.
    b. The application should automatically detect and display the weather information for the user's current location.
4. Alerts and Notifications
    a. The application should send alerts and notifications to users based on extreme weather conditions (e.g., heavy rain, storms, high temperatures).
    b. Users should be able to customize the types of alerts and the conditions for receiving alerts.
5. Weather Trends and Statistics
    a. The application should provide statistics and trend analysis of past weather (e.g., average monthly temperature, precipitation).
    b. Charts and graphs should be provided to display weather trends.
6. User Interface and Interaction
    a. The application should have an intuitive, user-friendly interface that allows easy access to all features.
    b. A night mode should be supported to reduce eye strain during nighttime use.
7. Multi-language Support
    a. The application should support multiple languages to accommodate users who speak different languages.
8. Customization and Personalization Settings
    a. Users should be able to customize application settings according to personal preferences, such as temperature unit (Celsius/Fahrenheit), wind speed unit (km/h, mph), etc.

9. Data Source and Accuracy
    a. The application should obtain data from reliable meteorological data sources and ensure the information provided is accurate.
    b. Data sources should be regularly updated to maintain the accuracy and timeliness of the information.
10. Responsive Design
    a. The application should be compatible with various devices and screen sizes, including mobile phones, tablets, and desktop computers.

Non-Functional Requirments:

1. **Product requirements**:
    a. **Usability requirements:**
        i. Should have a user-friendly interface that is easily navigatable for all demographics.
        ii. Design should be consistent across platforms, web, IOS, Android, etc..
    b. **Efficiency requirements:**
        i. **Performance requirements:**
            1. The app must retrieve and deliver the user-requested filtered data promptly, no longer than 3 seconds.
            2. The app must be able to handle high volumes of users simultaneously, showing no slow in performance while handling 10,000 users.
        ii. **Dependability requirements:**
            1. The weather app should be operational and usable 99.99% of the time after launch.
            2. Must accurately display weather forecasts and notifications without error.
            3. The system must be designed to ensure it is easily updatable for bug fixes and improvements.
        iii. **Security requirements:**
            1. Must comply with Canadian legal regulations on consumer data protection and cyber security.

2. User data must be secure, and encrypted, and the system will have limited access to user data.

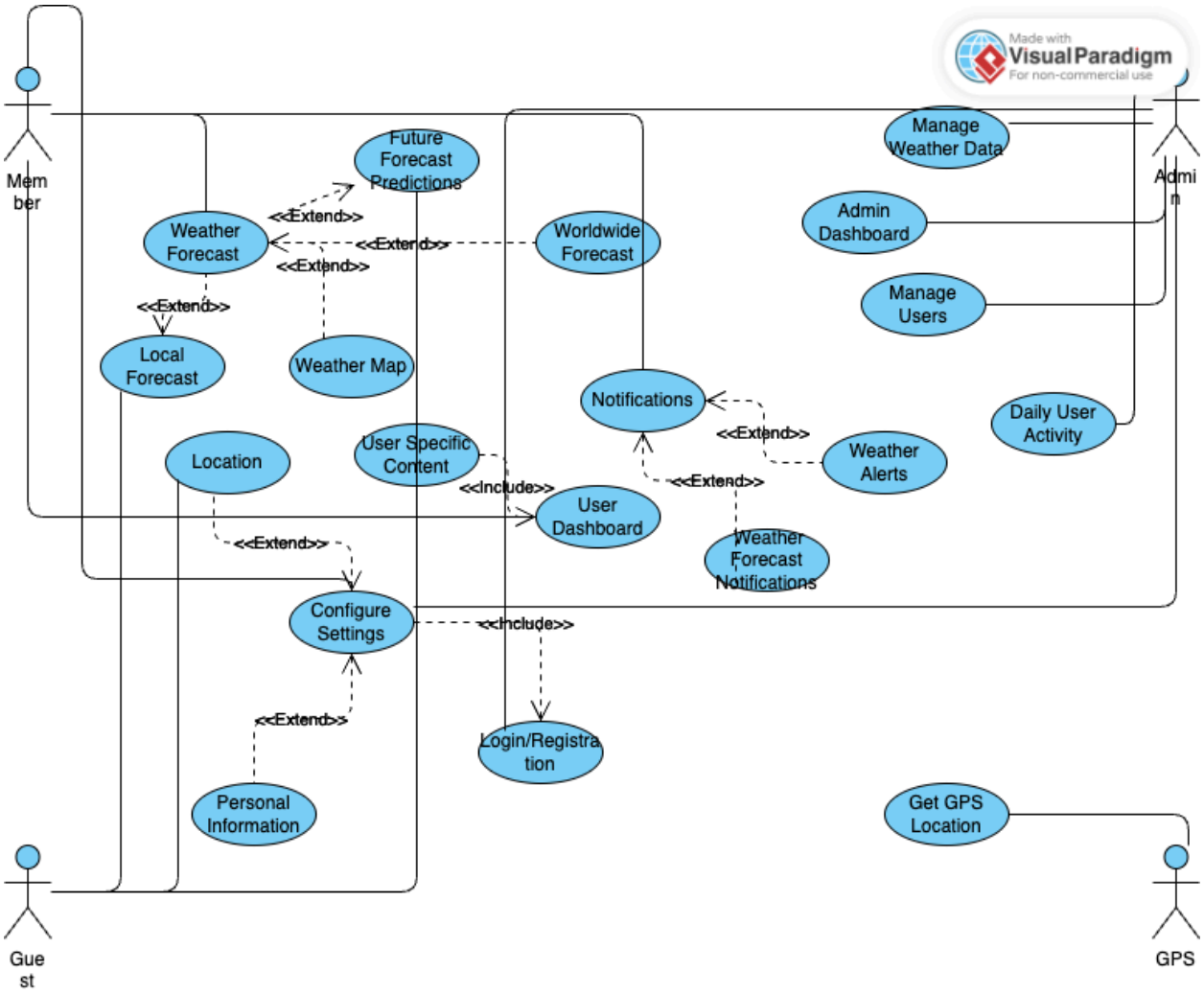
c. **Organizational requirements:**
    i. **Environmental requirements:**
        1. The software must be coded using sustainable practices.
        2. Energy-efficient alternatives must be considered where applicable.
    ii. **Operational requirements:**
        1. The application must be easily connectable and integrable with pre-existing services, API, and GIS systems.
        2. The application design will allow for easy scalability as user numbers increase and more features are added.
    iii. **Development requirements:**
        1. An agile Scrum method will be used to develop the application.
        2. intensive system testing methods must be integrated to ensure quality control and that the app is meeting performance restrictions.
d. **External requirements:**
    i. **Regulatory requirements:**
        1. Ensure the application complies with Canadian data protection laws and regulations
    ii. **Ethical requirements:**
        1. Ensure the app is operating in a lawful and trusting from a transparent lens to the customer.
        2. The app must be designed in a way where it will not discriminate against any group.
        3. Only open sources of software and data will be used in development.
e. **Legislative requirements:**
    i. **Accounting requirements:**

1. Lawful financial reporting on transactions between the service and customers will be documented and accounted for according to Canadian regulations.
2. Provincial and federal tax regulations must be followed.

ii. **Safety/security requirements:**

1. Cybersecurity systems will be implemented to protect user data.
2. The system must be capable of accurately displaying emergency weather notifications to users.

Use Case Diagram:



Use case descriptions:

1. Daily Guest/Membership Activity: Administrators have access to the number of users who have used the website for the past day/week/month/year. They also have access to the most searched region, and most used feature.
2. Local Forecast: A user is only interested in checking the forecast for their specific location
3. Get User Locations: An external data provider can get the location of a user with permission automatically
4. Weather Alerts: Sends out notifications to the user on upcoming drastic changes in the weather (tornado, hurricane, flood, etc.)
5. Future Forecast Predictions: Displays the forecast predictions for the next week to users
6. Worldwide Forecast: Users will be able to search and view forecasts for different regions across the globe
7. Local Forecasts: Receive the forecast for your local timezone
8. Manage Users: Admins will be able to see how many users are registered with the website along with their name, username, and email
9. Manage Weather Data: Admins will be able to manage weather data. This can include updating outdated data, updating charts, updating forecasts, and using these data to make summary reports

Use Case 1: Check the weather

Primary Actor: Member

Description: Member is interested in checking the weather map

Precondition: Member must have an account

Postcondition: If member has an account, they have access to a dashboard where they can select different weather chart options

Main Scenario:

1. Member opens website and logs in to their account
2. Upon successful login, member is greeted with their own dashboard full of different content

2. The member clicks on the weather charts option on their dashboard
3. The member is redirected to a different webpage full of weather chart options
4. The member clicks on weather maps option
5. The member is redirected to a different webpage where they can view different weather maps
6. The member views different weather maps and logs out the website

Extensions:

1. If the member cannot login to the website
    a. The member makes a new account
    b. The member clicks “I forgot” option and resets their login credentials

Use Case 2: Admin Report

Primary Actor: Admin Interested in the performance of the website

Description: Describes the process of an admin viewing the Guest activity for the past week

Precondition: Admin must login with admin credentials

Postcondition: Admin will have access to privileged content

Main Scenario:

1. An Admin is interested in viewing the number of members and guests who have visited the website over the past week
2. The admin opens the website and logs in using their Administrator credentials
3. After logging in, the admin is greeted with the admin dashboard which contains admin specific content
4. The admin clicks on the site activity link on the dashboard and is redirected to a different webpage on the website
5. After being redirected, the website display’s the member and guest activity for that current day
6. The admin adjusts the filters to display the Member and Guest activity for the past week
7. The website displays the member and Guest activity for the past week
8. The admin is pleased, records the data, logs out, and leaves the website

Extensions:

1. The Admin wants to filter to view only how many new Guests have used the site
    a. The admin uses the filter option on the screen to filter only Guests and is now able to see how many new guests the site has in the past week

Use Case 3: Guest Checks Local Weather

Primary Actor: Guest Interested in knowing the local weather forecast

Description: Describes the process of a Guest checking the local weather forecast

Precondition: Guest use the guest option at the login/registration page

Postcondition: Once the guest option is clicked they will be redirected to the main webpage

Main Scenario:

1. A Guest is interested in checking the local forecast, so they know what to wear for the day
2. Guest opens the Website and is asked to login
3. The Guest enters picks the Guest option at the login/registration page
4. Upon successful login, the Guest is greeted by the guest dashboard
5. The Guest's dashboard contains the weather forecast for their time zone after their location is tracked by the GPS provider
6. The Guest checks the forecast and exits the webpage

Use Case Stories:

User Story: Emergency Notifications

As a user, I would like to receive notifications on my phone so I can be alerted of emergency weather conditions.

Acceptance criteria: The user creates accounts, and enters information such as email, phone, name, etc.. The user clicks confirm and receives and then will be subscribed to receive notifications.

User Story: Weather Forecast

As a user, I would like to view the forecast 7 days in advance so I can plan my week.

Acceptance Criteria: All users will be able to view a 7-day weather forecast for their filtered location.

User Story: Admin Wants to Make a Report

As an Admin, I want to be able to have access to member data so I can see how many new members our site has accumulated in the past week. Acceptance Criteria: Admin's will have the option in their dashboard to click and view member data. After clicking on this option, they will be able to view how many new members have joined the site for up to the past year

User Story: Guest

As a guest, I want to be able to view the local forecast for my timezone/region quickly so that I can prepare for the day. Acceptance criteria: Guests will be able to use a guest login credentials and will be redirected to a basic dashboard where their location will be tracked by a separate data provider. After their location is tracked the dashboard will be updated with the forecast for the guest's region

User Story: Guest 2

As a guest, I will use the application occasionally, without creating a login, I understand that I will have access to limited features however still use the app for a reliable forecast.

Acceptance criteria: The user will have access to the website with limited features, they will not receive the benefits of creating an account.

User Stories: Member wants to view a weather map

As a member I want to be able to view weather maps so that I can view weather patterns and movements. Acceptance Criteria: User logs into the website and is greeted with their dashboard. They click the weather maps option and is granted access to different weather maps for different regions

User Stories: Guest wants to create an account

As a guest I want to create an account so I can have more exclusive access.

Acceptance Criteria: The webpage provides a login/register link in the header users/guests can access while viewing any page in the website. Once you click on the link, you will be redirected to a login/register page where you can choose the option to register if you don’t already have an account. Once you click on the register option and fill out your information, you will now own an account with the website!

User Stories: Admin Needs to update a forecast data

As an admin, I want to be able to update weather forecasts so that our data is always up to date and consistent.
Acceptance Criteria: Admins will have the option in their dashboards to update any weather data they need to. Once an admin logs in and accesses their admin dashboard they will see a link that says update weather data. Once they click on that link they will than have the option to access all the weather data on the site and make any changes they need to