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TECHNOLOGY PROJECT NAME:IBM-FE-Live Weather Dashboard

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1. Problem Statement

Weather information has become a critical need in people's daily lives, influencing decisions in areas such as travel, agriculture, health, and disaster preparedness. While weather reports are readily available through television or radio, they are often not real-time, not location-specific, or cluttered with unnecessary data. Many existing platforms lack personalization, intuitive interfaces, and integration with APIs that provide live, accurate data.

For example:

- A farmer needs precise rainfall predictions for his village.
- A commuter wants to know if it will rain in the next hour.
- An event organizer needs weather updates to plan outdoor activities.

Currently, users face challenges such as:

- Delayed updates: Forecasts are often outdated.
- Over-complex dashboards: Overloaded with data that ordinary users cannot interpret.
- No personalization: Users cannot filter weather data by their specific interests (e.g., AQI, wind speed, UV index).

A Live Weather Dashboard solves these issues by providing real-time, location-specific, and visually appealing weather updates that are accessible from web and mobile platforms.

2. Users & Stakeholders

Primary Users

- General Public – Everyday users who want quick and reliable forecasts (temperature, rainfall, humidity).
- Commuters/Travelers – People who need to plan daily commutes or long journeys. Farmers – Need rainfall and temperature insights to manage crops effectively.
- Outdoor Enthusiasts – Runners, cyclists, hikers, and event organizers who rely heavily on weather forecasts.

Secondary Users

- Government Authorities – To broadcast alerts for floods, storms, or extreme weather.
- Businesses – E.g., airlines, logistics companies, and tourism operators who depend on accurate weather.
- Educational Institutions – For projects, teaching meteorology, and research.

Stakeholders

- Developers – Responsible for building the application and integrating APIs.
- Weather Data Providers – API providers like OpenWeatherMap, WeatherAPI, or AccuWeather.
- UI/UX Designers – To ensure the dashboard is user-friendly and visually appealing.
- Investors/Organizations – Who sponsor or fund the project.

3. User Stories

- As a user, I want to enter my location so that I can view live weather updates specific to my city.
- As a commuter, I want to see a quick forecast for the next 6–12 hours so that I can plan my travel accordingly.
- As a farmer, I want rainfall and temperature trends over the next week so that I can schedule irrigation and crop management.
- As a traveller, I want alerts about storms or extreme weather conditions so that I can stay safe.
- As a business owner (logistics/tourism), I want weekly and monthly forecasts so that I can adjust operations.
- As a user, I want a clean and simple interface with visual icons (sunny, cloudy, rainy) so that I can quickly understand weather conditions.
- As a government authority, I want to broadcast alerts to dashboard users during natural calamities so that people are aware in time.

4. MVP Features

*The **Minimum Viable Product (MVP)** of the Live Weather Dashboard should include the following:*

1.Location-based Weather

- Detect user's location using GPS or manual input.
- Display current weather (temperature, condition, humidity, wind speed).

2. Hourly & Weekly Forecast
   - Show weather predictions for the next 12 hours.
   - Provide 7-day forecast with temperature highs and lows.

3. Real-time Weather Alerts
   - Notifications for storms, heavy rainfall, heatwaves, or floods.

4. User-Friendly Dashboard
   - Simple interface with graphs, charts, and icons. Mobile-first responsive design.

5. Basic Personalization
   - Users can choose between Celsius/Fahrenheit. Option to select favourite cities and save them.

5. Wireframes / API Endpoint List

Wireframes (Conceptual)

- **Home Screen:** Search bar + Current location weather + Weather icon + Temperature.
- **Dashboard:** Tabs for "Today", "Hourly Forecast", and "Weekly Forecast".
- **Alerts Section:** Pop-up or banner showing weather warnings.
- **Saved Locations Page:** Quick access to user's favourite cities.

API Endpoints (Example using OpenWeatherMap API)

1.Current Weather Data

- Endpoint: /data/2.5/weather?q={city_name}&appid={API_key}
  Response: Current temperature, humidity, wind, condition.

2. 5-Day/3-Hour Forecast

- Endpoint: /data/2.5/forecast?q={city_name}&appid={API_key}
  Response: Hourly weather forecast for 5 days.

3. One Call API (Detailed Forecast + Alerts)

- Endpoint: /data/2.5/onecall?lat={lat}&lon={lon}&appid={API_key}
  Response: Current weather, hourly forecast, daily forecast, alerts.

6. Acceptance Criteria

1.Location Detection

- [ ] The dashboard should auto-detect user location within 5 seconds.
- [ ] Users can manually search for other cities.

2. Weather Updates

- [ ] The system should display accurate temperature, humidity, and condition.
- [ ] Weather data must refresh every 10 minutes.

3. Forecast

- [ ] Users can see at least 12-hour forecasts and a 7-day forecast.
- [ ] Forecast should be visualized with graphs and weather icons.

4. Alerts

- [ ] Severe weather alerts should pop up in real-time.
- [ ] Alerts must be clearly visible on dashboard.

5. UI/UX

- [ ] Dashboard should load within 3 seconds.
- [ ] The interface should be responsive across devices (desktop, tablet, mobile)