AGB1211 – DESIGN THINKING

Department of Artificial Intelligence and Data Science
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Semester :III
Section :A
Date :5/12/24

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WEATHER FORECASTING

Problem Identification

Challenges with weather prediction:

- Limited accuracy due to fragmented data sources.
- Difficulty in real-time processing of diverse inputs (satellites, sensors).
- Lack of accessible platforms for various user needs.

Proposed solution:

- Develop a machine learning-based system for enhanced forecast accuracy.
- Integrate data sources into a unified, user-friendly platform.

Objective

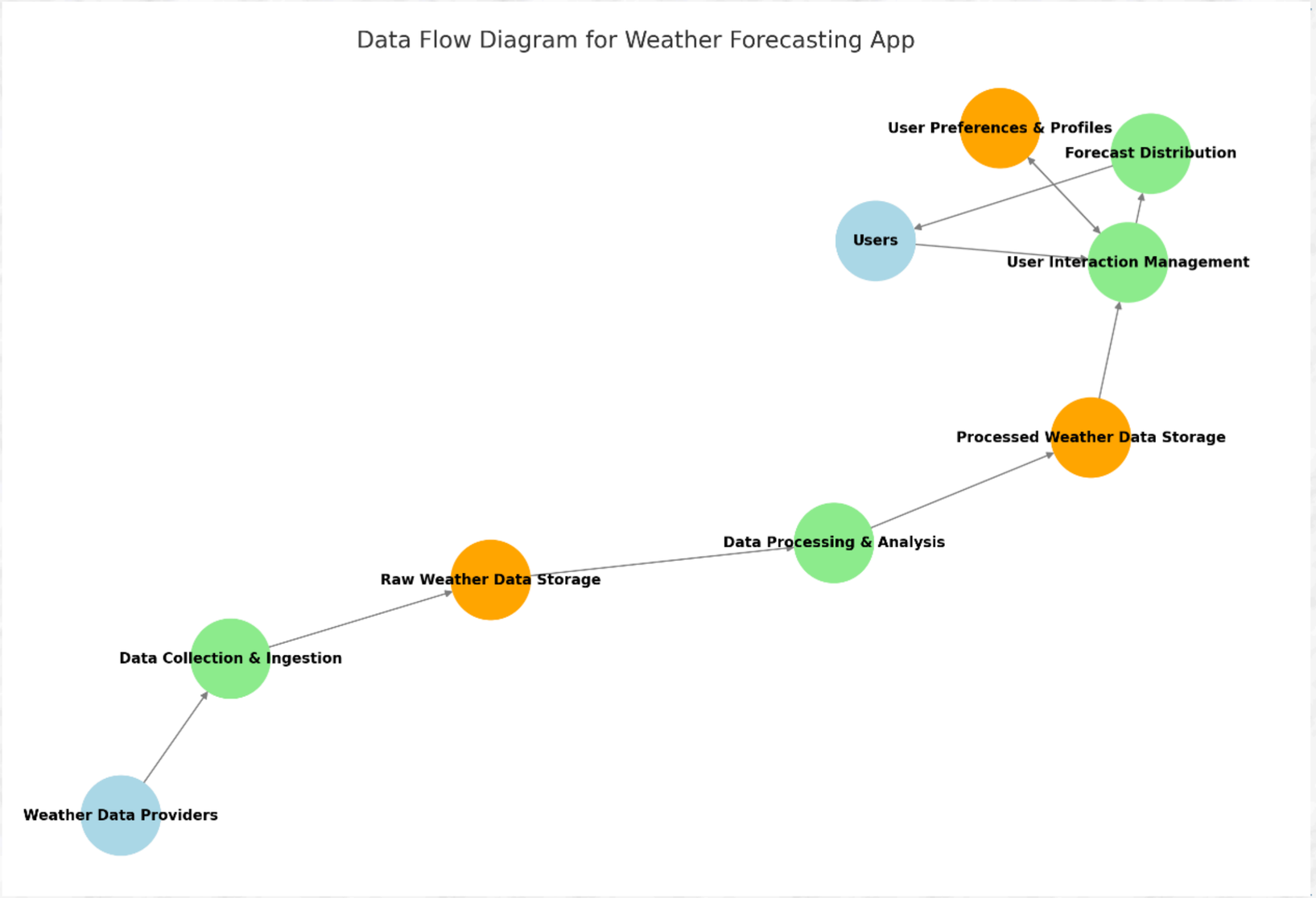
The primary objectives of this project are:

- To develop a machine learning-based system that improves weather prediction accuracy by integrating diverse data sources.
- To create an intuitive, cross-platform application that provides real-time weather updates, tailored forecasts, and offline access.
- To enable features such as dynamic visualizations, severe weather alerts, and modular updates, enhancing user engagement and decision-making capabilities.

BrainStorming

1.weather
2.forecasting
3.temperature
4.rainfall
5.humidity
6.windspeed
7.storm
8.thunderstorm
9.cloud cover
10.precipitation
11.visibility
12.weather map
13.satelite data
14.meteorlogy
15.climate change
16.weather patterns
17.seasonal forcast
18.real-time data
19.weather stations
20.predictive models
21.radar
22.doppler radar
23.severe weather
24.tornado

Mind Map


Data Flow Diagram for Weather Forecasting App
User Preferences & Profiles
Forecast Distribution
Users
User Interaction Management
Processed Weather Data Storage
Data Processing & Analysis
Raw Weather Data Storage
Data Collection & Ingestion
Weather Data Providers

Primary Research

- Primary Research:
  - Conducted user interviews and contextual inquiries to understand needs.
  - Insights:
    - Meteorologists demand reliable, real-time forecasting models.
    - Farmers, event planners, and outdoor professionals need tailored, long-term forecasts.
  - Surveys revealed user preferences for features like mobile alerts and hourly updates.

Secondary Research

Secondary Research:

- Analyzed data from satellites, radar, and historical trends.
- Leveraged studies on climate change and predictive modeling.
- Identified advancements in APIs and real-time alert systems for better user engagement.

Proposed Work

Utilized machine learning for:

- Analyzing weather patterns.
- Enhancing predictive capabilities.

Tools employed:

- Real-time data feeds from satellites and weather stations.
- Predictive analytics to model temperature, precipitation, and wind.

Deliverables:

- Mobile-friendly applications with intuitive user interfaces.
- Platforms supporting cross-device compatibility.

List of Modules

- Data Collection and Processing
- Predictive Model Development
- User Communication and Alerts

Module 1 Description

- Purpose:
  - Gather data from multiple sources such as satellites, weather stations, and sensors.
  - Ensure the raw data is accurate and complete for further analysis.
- Implementation:
  - Use APIs and IoT networks for real-time data fetching.
  - Clean and preprocess raw data to eliminate noise or errors.
- Innovations:
  - Automated data validation to reduce errors in input.
  - Real-time integration of multi-source data streams for consistency.

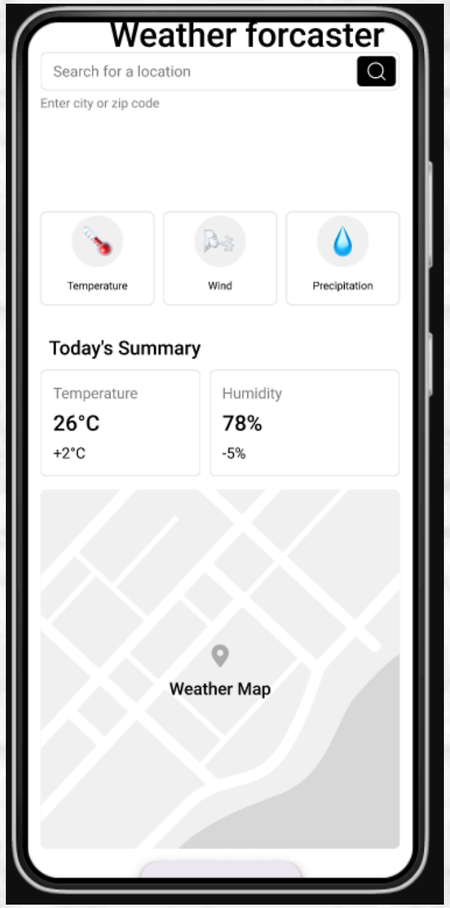
Module 2 Description

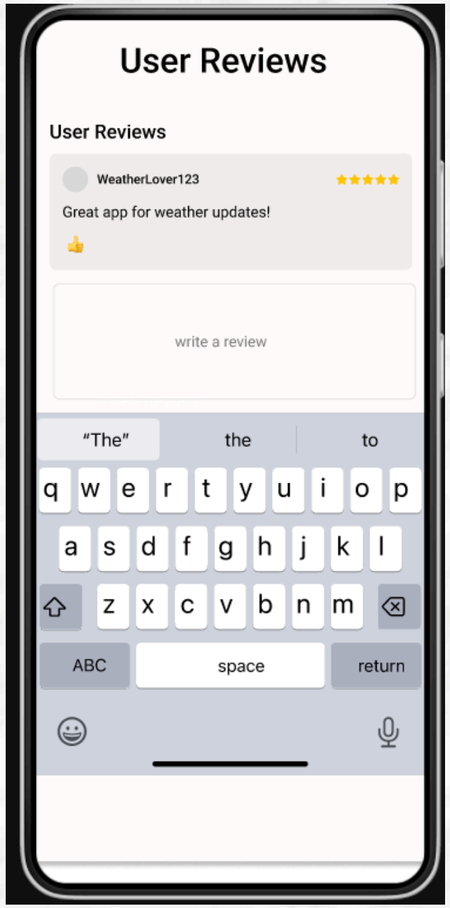
- Purpose:
  - Create accurate predictions for weather elements like temperature, precipitation, and storms.
- Implementation:
  - Use machine learning models for prediction.
  - Train models on historical and real-time data.
- Innovations:
  - Enhanced algorithm design to adapt to evolving weather trends.
  - Modular structure allowing easy updates and integration of new parameters.

Module 3 Description

- Purpose:
  - Provide real-time alerts and easy-to-understand weather information to users.
- Implementation:
  - Develop cross-platform apps for weather updates.
  - Push notifications for severe weather events.
- Innovations:
  - Interactive visualizations for weather trends (e.g., dynamic graphs).
  - Offline access to forecasts in low-connectivity areas.

Results


Weather forcaster
Search for a location
Enter city or zip code
Temperature
Wind
Precipitation
Today's Summary
Temperature
26°C
+2°C
Humidity
78%
-5%
Weather Map


User Reviews
User Reviews
WeatherLover123
Great app for weather updates!
write a review
"The"
the
to
q w e r t y u i o p
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z x c v b n m
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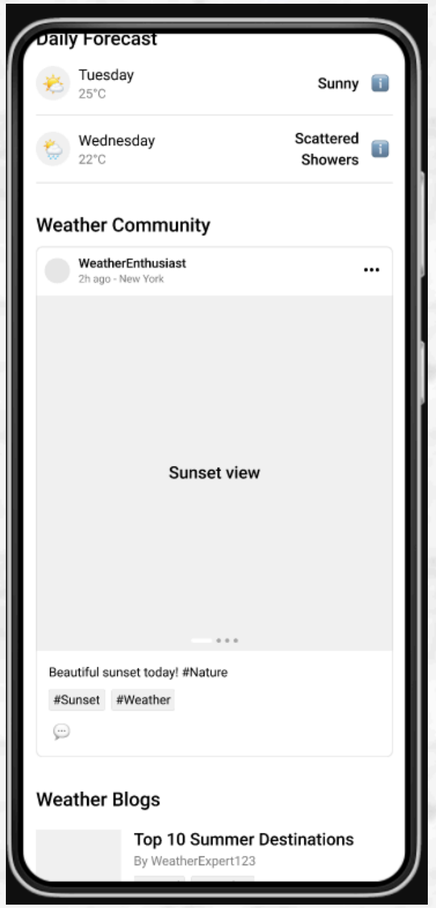
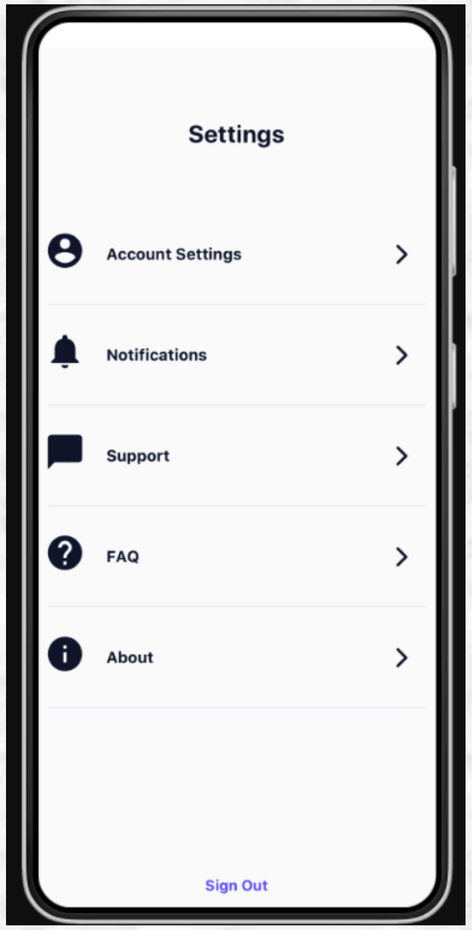
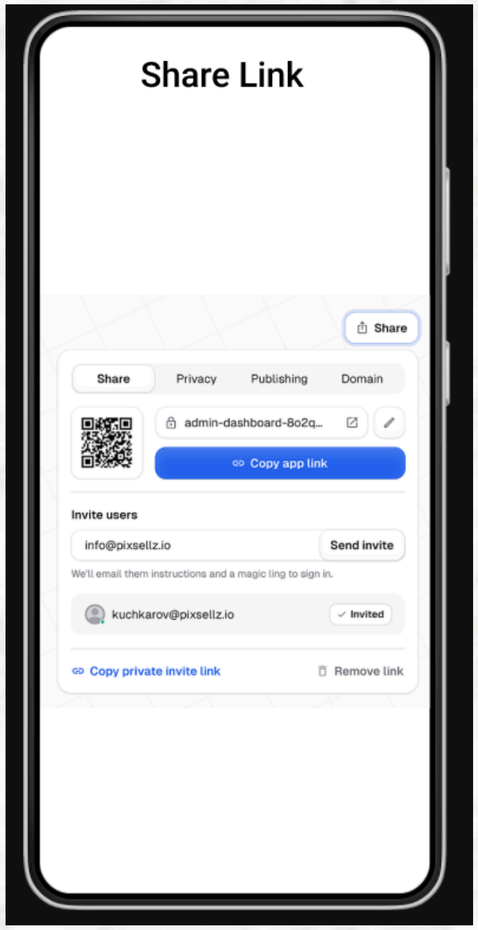
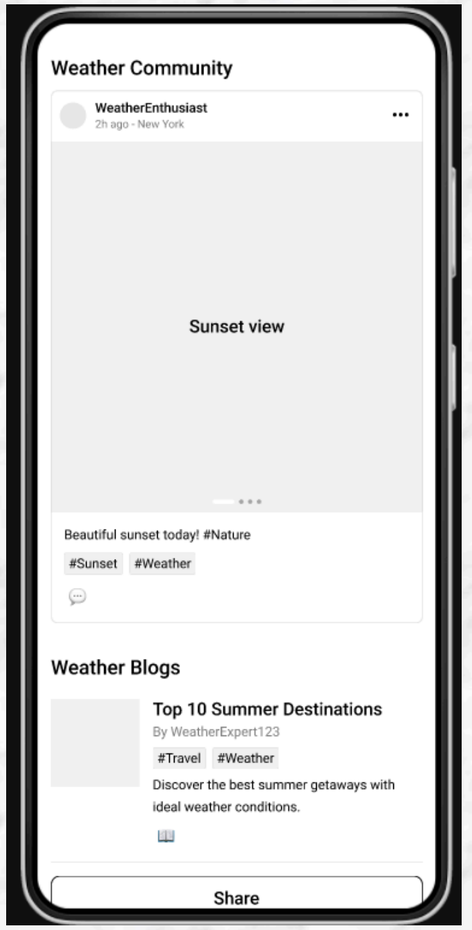

Daily Forecast
Tuesday
25°C
Sunny
Wednesday
22°C
Scattered Showers
Weather Community
WeatherEnthusiast
2h ago - New York
Sunset view
Beautiful sunset today! #Nature
#Sunset
#Weather
Weather Blogs
Top 10 Summer Destinations
By WeatherExpert123

Results


Settings
Account Settings
Notifications
Support
FAQ
About
Sign Out


Share Link
Share
Share
Privacy
Publishing
Domain
admin-dashboard-8o2q...
Copy app link
Invite users
info@pixsellz.io
Send invite
We'll email them instructions and a magic ling to sign in.
kuchkarov@pixsellz.io
Invited
Copy private invite link
Remove link


Weather Community
WeatherEnthusiast
2h ago - New York
Sunset view
Beautiful sunset today! #Nature
#Sunset
#Weather
Weather Blogs
Top 10 Summer Destinations
By WeatherExpert123
#Travel
#Weather
Discover the best summer getaways with ideal weather conditions.
Share

Conclusion

This project successfully addresses the challenges in weather forecasting by leveraging the power of machine learning and real-time data integration. Through the development of a user-friendly, cross-platform application, the project enhances prediction accuracy and accessibility for diverse user groups, including meteorologists, farmers, and outdoor professionals.

The modular design of the predictive models, coupled with features like dynamic visualizations, real-time alerts, and offline access, ensures adaptability and reliability. By combining advanced technologies with user-centric design, the project not only bridges existing gaps in weather prediction but also sets a foundation for future innovations in forecasting systems.

This solution exemplifies how technology can be harnessed to improve decision-making, mitigate risks, and support industries dependent on accurate weather information.

Thank You

Any queries???