🌥 Weather Forecast Web Application

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Table of Contents

1. Project Overview

This project is a full-featured web application for real-time weather forecasting using Python, Streamlit, and OpenWeatherMap API. It allows users to view current weather, a 5-day forecast, voice alerts, and download detailed reports.

2. Roadmap / Development Steps

1. Requirement Analysis & Feature Planning
2. API Integration with OpenWeatherMap
3. Data Handling & Forecast Processing using Pandas
4. Frontend Design with Streamlit
5. Voice Feature Integration using pyttsx3 & gTTS
6. Adding Maps with Folium
7. Report Generation (Downloadable text)
8. Deployment on Streamlit Cloud / GitHub Pages
9. Testing & Optimization

3. Libraries Used & Justification

Library	Purpose
Streamlit	Frontend framework to create interactive web UI quickly
Requests	To fetch weather data from OpenWeatherMap API
Geocoder	Auto-detect user location via IP
Pandas	Data processing and creation of forecast tables
Folium	Interactive maps to display user location and weather
Streamlit-Folium	Integrate Folium maps into Streamlit app
pyttsx3 & gTTS	Text-to-speech voice alerts for weather
Base64 & OS	Embedding logo in HTML

4. GitHub & Streamlit Usage

GitHub was used to maintain version control and host the project repository. Streamlit was chosen for its simplicity in creating an interactive dashboard with minimal code. This combination allows for rapid prototyping, collaborative development, and cloud deployment.

5. Coding Pattern & Structure

- Functions: Each feature (weather fetch, forecast, TTS, map) is modularized in functions.

- Streamlit App Layout: Sidebar for inputs, main page for metrics, charts, and map.
- HTML/CSS: Used for embedding logo and styling title.
- Error Handling: API requests are wrapped in try-except for robustness.
- Downloadable Reports: StringIO used to create text reports dynamically.

6. Key Features

- Real-time weather update for current location or manually entered city
- 5-day forecast visualization (line chart for temperature, bar chart for humidity)
- Voice alerts using offline (pyttsx3) and online (gTTS)
- Interactive location map with Folium
- Downloadable weather report
- Multilingual support (English + Chinese)
- Responsive professional layout with project logo

7. Deployment

Deployed on Streamlit Cloud for public access. GitHub repository used for code versioning and collaboration. All assets like logo and requirements.txt included for easy setup.

8. Challenges & Solutions

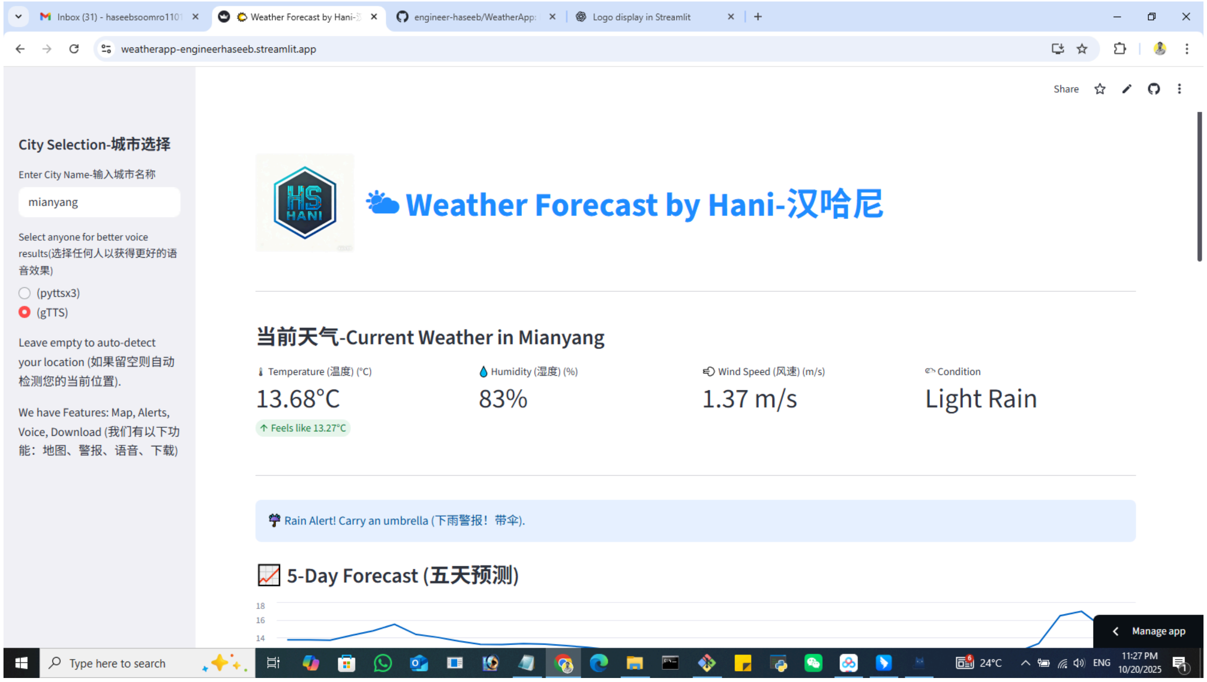
- Transparent Logo: Solved using Base64 embedding and CSS styling
- API Latency: Added try-except blocks and timeout handling
- Voice Feature Conflicts: Provided option between pyttsx3 (offline) and gTTS (online)
- Responsive Layout: Used CSS and Streamlit columns for alignment and sizing

9. Conclusion

This project demonstrates a professional, interactive weather forecasting web application with modern Python tools. It combines APIs, visualization, voice alerts, and report generation in a clean, maintainable, and deployable format.

10. Appendix

Include screenshots of the running Streamlit app, charts, and maps.


Inbox (31) - haseebsoomro110
Weather Forecast by Hani-
engineer-haseeb/WeatherApp:
Logo display in Streamlit
weatherapp-engineerhaseeb.streamlit.app
Share
HS HANI
18
16
14
Manage app
Type here to search
24°C
ENG
11:27 PM
10/20/2025

City Selection-城市选择

Enter City Name-输入城市名称

mianyang

Select anyone for better voice results(选择任何人以获得更好的语音效果)

○ (pyttsx3)

● (gTTS)

Leave empty to auto-detect your location (如果留空则自动检测您的当前位置).

We have Features: Map, Alerts, Voice, Download (我们有以下功能：地图、警报、语音、下载)

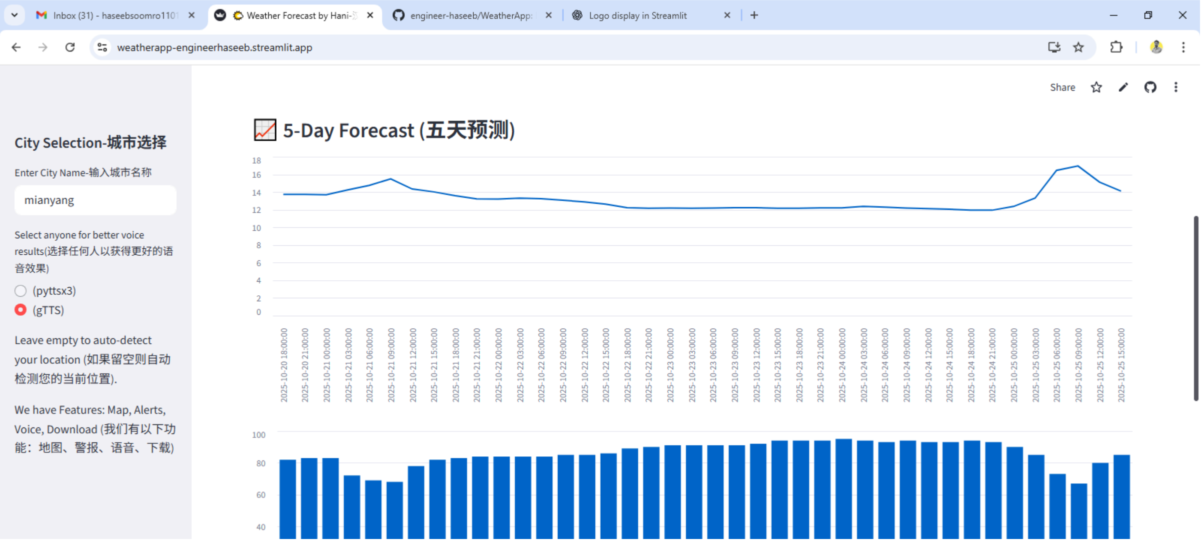
🌥 Weather Forecast by Hani-汉哈尼

当前天气-Current Weather in Mianyang

🌡 Temperature (温度) (°C)	💧 Humidity (湿度) (%)	Wind Speed (风速) (m/s)	Condition
13.68°C ↑ Feels like 13.27°C	83%	1.37 m/s	Light Rain

☔ Rain Alert! Carry an umbrella (下雨警报！ 带伞).

📈 5-Day Forecast (五天预测)



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Enter City Name-输入城市名称

mianyang

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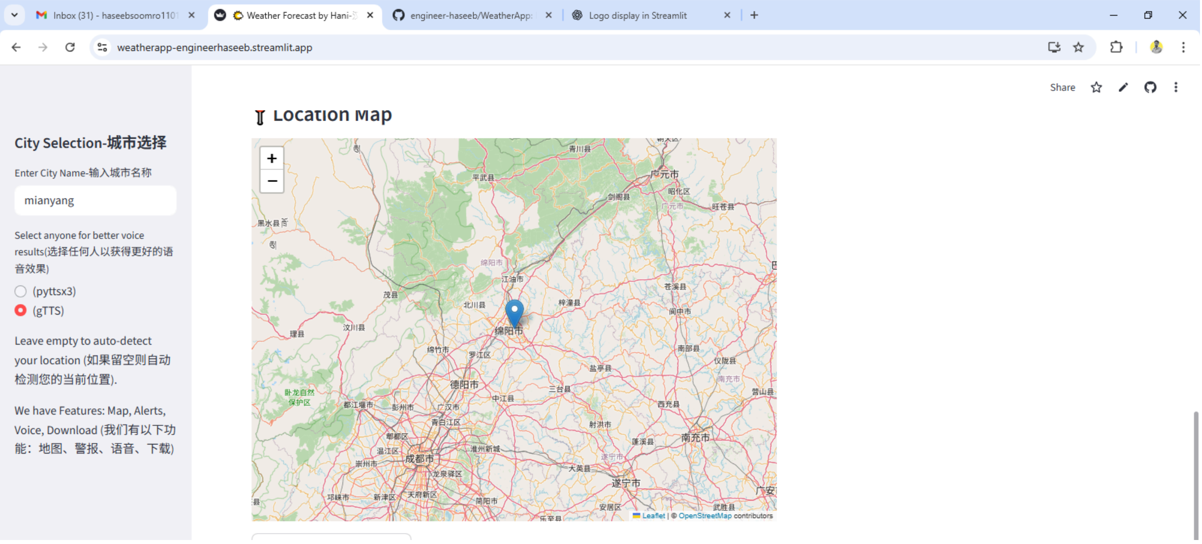

Location Map

City Selection-城市选择

Enter City Name-输入城市名称

mianyang

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