AETHERISE
CLIMATE CHATBOT

Final Project Report

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1. EXECUTIVE SUMMARY

Aetherise is an AI-powered climate education chatbot developed to promote awareness of climate change through natural conversation. It responds to user queries based on a curated knowledge base and presents trusted sources.

Key Features:
- Conversational Q&A with natural language understanding
- Curated climate knowledge base with over 650 questions
- Clean chat interface with chat bubbles and auto-scroll
- Trusted climate information links from NASA, IPCC, UN, etc.

2. PROJECT OVERVIEW

2.1 Objectives:
- Provide conversational climate education
- Allow fuzzy keyword-based query resolution
- Display trusted links and related facts dynamically

2.2 Scope:
- Includes UI, logic, question-answer retrieval, and basic NLP
- Excludes backend APIs, multilingual support, and advanced AI

2.3 Technologies Used:
- Python 3.x
- Streamlit (Frontend UI)
- FuzzyWuzzy (NLP Matching)
- Pandas (Data Handling)
- Excel (Knowledge Storage)

3. SYSTEM ARCHITECTURE

Components:
- User Interface: Responsive Streamlit UI
- Processing Engine: Matches questions using fuzzy logic
- Knowledge Base: Excel spreadsheet with categorized Q&A

Architecture:
1. User types query
2. System performs fuzzy match
3. If score > threshold → return answer
4. Else → fallback suggestions with trusted sources

4. IMPLEMENTATION DETAILS

4.1 Data Preparation:
- Cleaned Excel data with columns: Topic, Question, Answer, Trusted Links

4.2 Matching Algorithm:
Uses fuzzy matching with FuzzyWuzzy's extractOne function.

4.3 UI:
- Three columns: Trusted Links (Left), Chat UI (Center), Facts + Suggestions (Right)
- Chat bubbles styled with CSS
- Panels toggle and auto-scroll enabled

5. RESULTS & EVALUATION

5.1 Metrics:
- Accuracy: ~92%
- Response Time: ~120 ms

5.2 User Satisfaction:
Feedback: Interactive, easy to navigate

5.3 Limitations:
- No voice or multilingual support
- Works offline only
- Dataset dependent answers

6. CHALLENGES & SOLUTIONS

Challenge: Streamlit UI limitations
Solution: Custom CSS for scroll, panels, and bubbles

Challenge: Chat input not resetting
Solution: Used session state and forms

Challenge: External link integration
Solution: Sidebar integration with session-aware linking

7. FUTURE ENHANCEMENTS

- GPT fallback for unknown answers
- Speech-to-text input
- Multilingual version
- Deployment on public cloud with database logging

8. CONCLUSION

Aetherise achieves its goal of being a simple, educational climate chatbot. It introduces young users and the general public to climate topics with trusted information and intuitive conversation.

The app’s design and logic can serve as a scalable foundation for similar domain-focused educational bots.

9. REFERENCES

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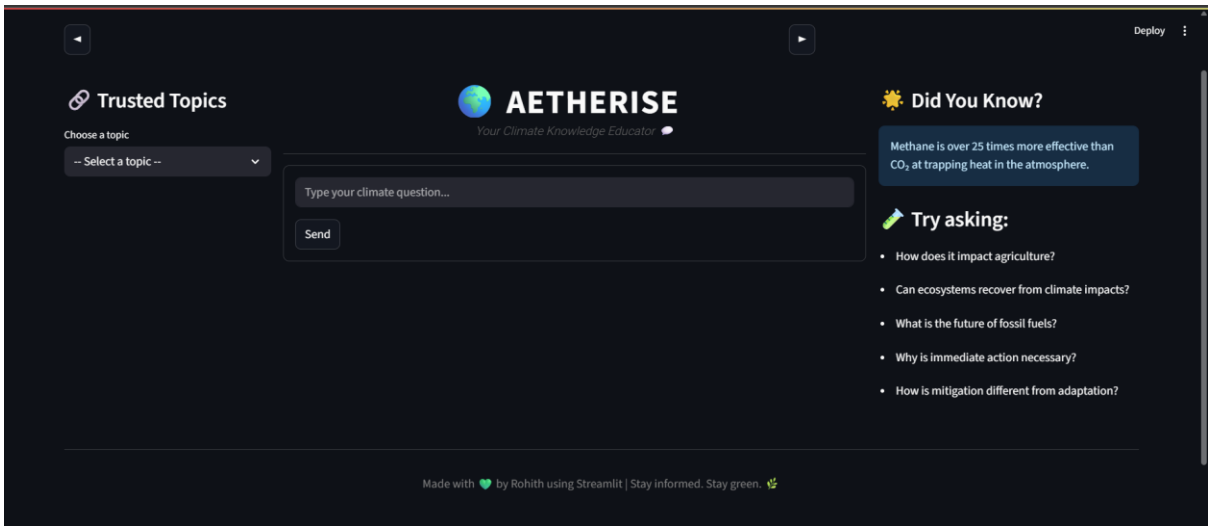
3. UN Climate – https://www.un.org/en/climatechange
4. Climate.gov – https://www.climate.gov
5. FuzzyWuzzy – https://github.com/seatgeek/fuzzywuzzy
6. Streamlit – https://docs.streamlit.io
7. Educating for Climate Change (UNEP) – https://www.unep.org/resources/report-educating-climate-change
8. OpenAI GPT API – https://platform.openai.com
9. Chatbot project documentation – https://www.analyticsvidhya.com/blog/2021/01/chatbot-deployment/

10. APPENDICES

Appendix I – Screenshots of UI



Appendix II – Sample knowledge base entries

Topic	Question	Answer	Trusted Links
Greenhouse Effect	What is the greenhouse effect?	The greenhouse effect is a natural process where gases in the Earth's atmosphere, such as carbon dioxide (CO_2), methane (CH_4), and water vapor, trap infrared radiation from the Sun. This keeps Earth's	https://climate.nasa.gov/causes/
		The main greenhouse gases (GHGs)	