AI Usage Report

This report documents the integration and utilization of Artificial Intelligence (AI) technologies in the Carbon Footprint Calculator & Tracker web application. The project leverages AI to provide personalized, actionable recommendations for reducing carbon emissions based on individual user activity patterns.

1. AI Technologies Used

1.1 Hugging Face Inference API

Purpose: Generate personalized carbon reduction recommendations

Implementation Details:

- API Endpoint:`https://api-inference.huggingface.co/models/mistralai/Mistral-7B-Instruct-v0.2`
- Model:Mistral-7B-Instruct-v0.2 (Large Language Model)
- Access:Free tier with API token authentication
- Integration Location: `backend/services/ai_service.py`

Key Features:

- Real-time text generation for personalized suggestions
- Context-aware recommendations based on user emission patterns
- Fallback to rule-based recommendations when API is unavailable

Use Case:

When a user views their dashboard, the system:

1. Analyzes their emission data (total, category breakdown, trends)

2. Creates a contextual prompt for the AI model

3. Sends the prompt to Hugging Face API

4. Receives AI-generated recommendations

5. Displays personalized suggestions to reduce emissions

Example AI Output:

- "Your transportation emissions are 45% of your total footprint. Consider carpooling or using public transit 2-3 times per week."

- "Switching to plant-based meals 3 days a week could reduce your food emissions by 30%."

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