Project Documentation — Will It Rain?

1. High-Level Project Summary

Our project, **"Will It Rain?"**, is an interactive weather prediction platform designed to make NASA climate data accessible and usable for accurate rainfall forecasting.
We developed a data pipeline and interactive dashboard that uses NASA climate datasets and advanced predictive models to forecast rain likelihood and storm intensity.
This addresses the challenge by providing an easy-to-use tool that translates complex climate data into actionable insights, supporting weather safety and environmental planning.
It is important because climate change and unpredictable weather events require accessible and reliable forecasting tools to help communities adapt and respond efficiently.

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2. Project Details

What it does:

The project predicts rainfall and provides visual climate analysis using historical NASA datasets and machine learning models.

How it works:

- Data is pulled from NASA climate datasets.
- The data is processed and cleaned using data engineering tools.
- Machine learning models are trained to predict rainfall events.
- Interactive visualizations are created using Plotly and displayed in a Streamlit dashboard.

Benefits:

- Provides accurate weather predictions and visual climate analysis.
- Makes complex NASA climate data accessible.
- Supports decision-making for agriculture, disaster preparedness, and climate awareness.

Tools & Technologies:

- **Data Storage & Orchestration:** Snowflake, Dagster Cloud.
- **Development & Version Control:** Visual Studio Code, GitHub.
- **Model Development:** Google Colab.
- **Visualization:** Plotly.
- **AI Tools:** ChatGPT, DeepSea AI, Gemini AI.

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3. NASA Data

We used the NASA POWER Project climate datasets for our project, focusing on T2M (2-meter temperature) and other weather variables such as:
QV2M, T2MDEW, U10M, V10M, PS, SLP, T2MWET, TQI, TQL, OMEGA500, DISPH, PBLTOP, TOX.
These datasets were used to train predictive models and generate climate visualizations, enabling accurate rainfall predictions.

NASA Data Link:

https://power.larc.nasa.gov/

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4. Space Agency Partner & Other Data

Data & Resources Used:

- NASA POWER Project datasets.
- Bahrain Space Agency datasets.
- European Space Agency (ESA) climate data.
- JAXA Earth Observation datasets.

Tools:

Snowflake, Dagster Cloud, Visual Studio Code, GitHub, Google Colab, Plotly.

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5. Use of Artificial Intelligence (AI)
We utilized AI tools to enhance development and accelerate innovation:

- **ChatGPT:** Assisted in code optimization, documentation, and project structuring.
- **DeepSea AI:** Suggested preprocessing techniques and improved data visualization.
- **Gemini AI:** Provided recommendations for improving model accuracy and efficiency.

All AI-generated content was clearly acknowledged in the project documentation.

📌 **Project Link:** Will It Rain? Streamlit App
📌 **GitHub Link:** Project Repository