Solar Potential Analysis Project Summary

Project Summary

GitHub Submission Summary

Repository Name: solar-challenge-week1

Link: https://github.com/zeyede21/solar-challenge-week1

Author Contributions

Prepared by: Zeyede21

Week 1 Challenge - 10Academy Solar Potential Analysis Project

I completed the following end-to-end tasks for the project:

Task 1: Git & Project Setup

- Initialized Git repository and added .gitignore to exclude data files.
- Set up clean folder structure:
  - data/ for cleaned CSVs
  - notebooks/ for EDA work
  - app/ for Streamlit dashboard
  - scripts/ for future extensions

Task 2: Data Profiling, Cleaning & EDA (Country-Level)

Performed in separate branches:

- eda-benin: Cleaned and analyzed solar data for Benin
- eda-togo: Cleaned and analyzed solar data for Togo
- eda-sierraleone: Cleaned and analyzed solar data for Sierra Leone

Each notebook (<country>_eda.ipynb) includes:

- Summary statistics, missing values
- Outlier detection with Z-score
- Time series visualizations

Solar Potential Analysis Project Summary

- Sensor cleaning impact analysis
- Wind and temperature trends
- Correlation heatmaps and scatter plots
- Export of cleaned datasets (*_clean.csv)

Task 3: Cross-Country Comparison

Branch: compare-countries

Notebook: compare_countries.ipynb

- Combined and analyzed cleaned datasets
- Boxplots and bar charts for GHI, DNI, DHI
- Summary tables (mean, median, std)
- One-way ANOVA test for statistical significance
- Highlighted top countries by solar potential

Bonus Task: Interactive Dashboard with Streamlit

Branch: dashboard-dev

Path: app/main.py

- Built interactive dashboard with:
  - Country selector
  - Metric boxplot visualizations
  - GHI ranking
- Organized logic in utils.py for clean design
- Configured .gitignore to keep data local
- Ready for deployment to Streamlit Community Cloud

Project Implementation Summary

Technologies Used:

- Python (Pandas, NumPy, Seaborn, Matplotlib, Plotly)
- Streamlit for dashboard
- Git & GitHub for version control

Solar Potential Analysis Project Summary

Workflow:

1. Cleaned and analyzed each dataset independently.
2. Synthesized all three datasets for comparative insights.
3. Visualized patterns in a fully interactive Streamlit dashboard.
4. Maintained Git best practices with clear branches and commits.

Deliverables Summary

- EDA Notebooks (Benin, Togo, SL): Done
- Cleaned CSVs (ignored in Git): Done
- Cross-country analysis notebook: Done
- Interactive Streamlit app: Done
- Project documentation: Done
- GitHub repo with structured code: Done