**Solar Position Calculator**

This project provides a Python-based tool to calculate the **solar elevation angle** and **solar azimuth angle** for a given location and time. These angles help determine the position of the sun in the sky, which is essential for applications such as solar panel alignment and solar energy optimization.

**Features**

* **Calculate Solar Position:** Compute the sun's elevation and azimuth angles based on user-provided latitude, longitude, date, time, and timezone.
* **Interactive Input:** The script allows users to input location and time details dynamically.
* **Timezone Support:** Handles timezone-aware datetime objects for accurate solar position calculations.

**How It Works**

1. **Solar Elevation Angle:** Represents the sun's height above the horizon.
   * 90° indicates the sun is directly overhead.
2. **Solar Azimuth Angle:** Represents the sun's compass direction.
   * 0° points to the North, 90° to the East, 180° to the South, and 270° to the West.

**Example:**

* At sunrise:
  + Elevation Angle ≈ 2° (just above the horizon)
  + Azimuth Angle ≈ 90° (East)
* At noon:
  + Elevation Angle ≈ 70° (almost overhead)
  + Azimuth Angle ≈ 180° (South for the Northern Hemisphere)

**Code Explanation**

**Functions**

1. **calculate\_solar\_position(latitude, longitude, date\_time)**
   * Inputs:
     + latitude (float): Latitude of the location in degrees.
     + longitude (float): Longitude of the location in degrees.
     + date\_time (datetime): Local timezone-aware datetime object.
   * Outputs:
     + Dictionary containing:
       - elevation\_angle (float): Solar elevation angle in degrees.
       - azimuth\_angle (float): Solar azimuth angle in degrees.
2. **main()**
   * Prompts the user for location and time details.
   * Calculates solar position using the calculate\_solar\_position function.
   * Prints the results in a user-friendly format.

**Usage**

**1. Prerequisites**

* **Python 3.7+**
* Install the required library:
* pip install pytz

**2. Run the Script**

1. Clone or download the repository.
2. Run the script using:
3. python solar\_position\_calculator.py
4. Provide the following inputs when prompted:
   * Latitude and Longitude of the location.
   * Timezone (e.g., Asia/Kolkata).
   * Date and time details (year, month, day, hour, minute).

**3. Example Input**

Enter your location details:

Latitude (in degrees): 28.6139

Longitude (in degrees): 77.209

Timezone (e.g., 'Asia/Kolkata'): Asia/Kolkata

Enter the date and time for the calculation:

Year (e.g., 2024): 2024

Month (e.g., 3 for March): 3

Day (e.g., 21): 21

Hour (24-hour format, e.g., 9): 12

Minute (e.g., 30): 0

**4. Example Output**

Solar Position Results:

Solar Elevation Angle: 60.32°

Solar Azimuth Angle: 180.45°

**Code**

<Insert full script here>

**Contributing**

Feel free to contribute by submitting issues or pull requests for improvements.

**References**

* Solar Position Calculations: [NOAA Solar Calculator](https://www.esrl.noaa.gov/gmd/grad/solcalc/)
* Python datetime module and pytz for timezone handling.