SolarMax

Group 9

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Mobile Networks and Internet of Things

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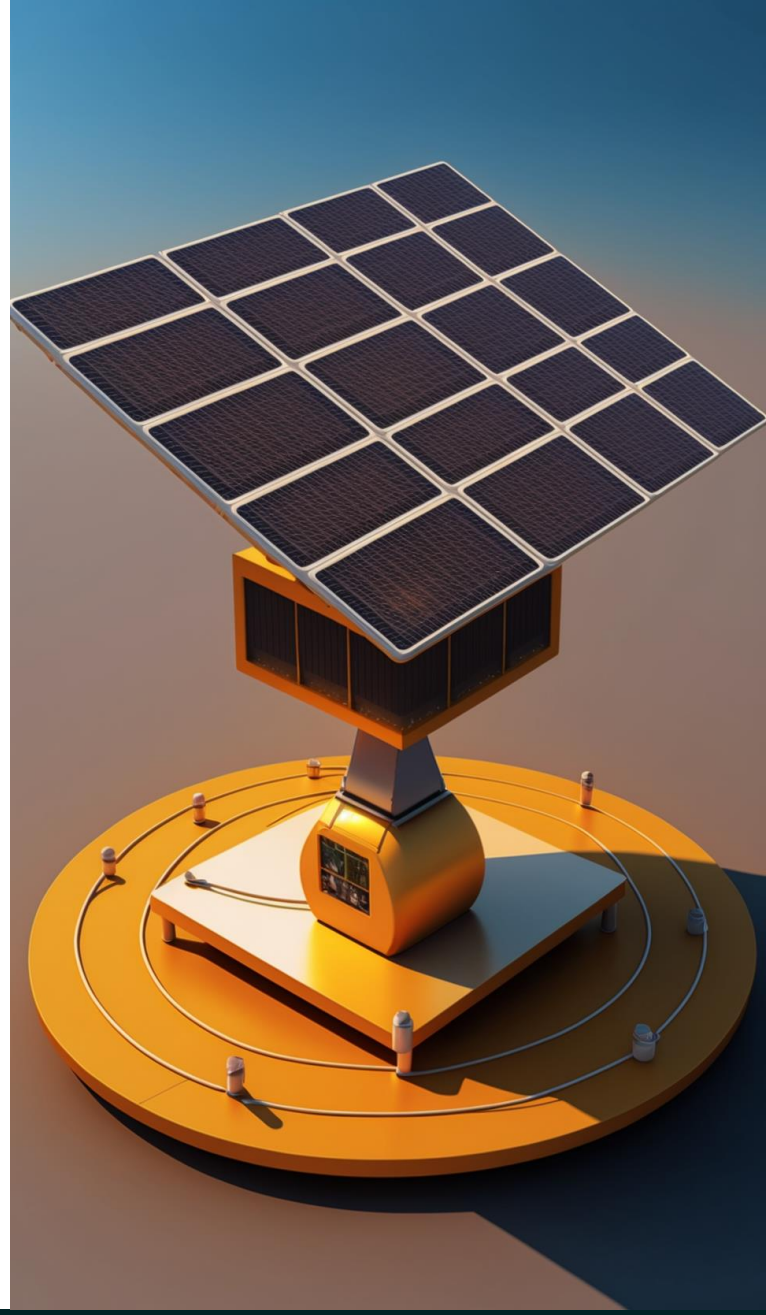
Project description

- This project consists of a **12V solar cell** implemented in a rotatory platform, which allows the system to maximize the power generation efficiency by alligning it with the direction of incident light.

Solar tracker with Arduino UNO WiFi Rev2

Connections between Android app, Google Firebase and hardware

The angular position of the rotating parts can be monitored and controlled using an Android application, which also allows the user to track the voltage and power generation in real time.

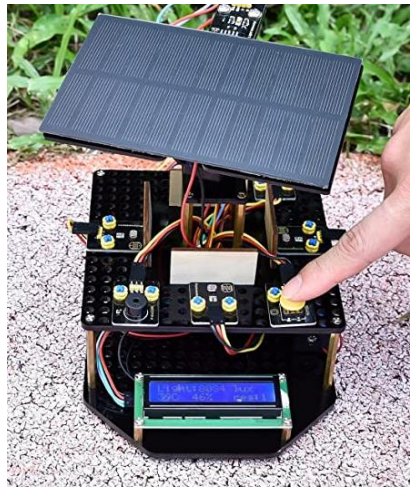


Commercial products

No Cloud nor App integration

Abundance corroborates relevance

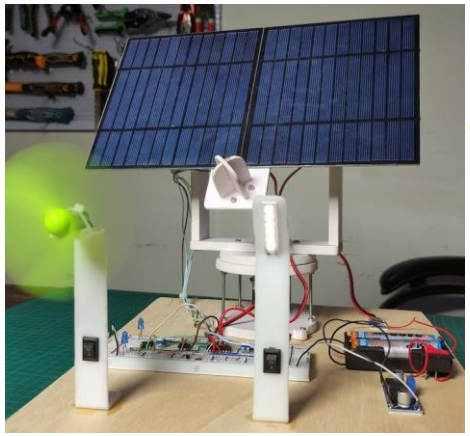
High price tags and/or large scale



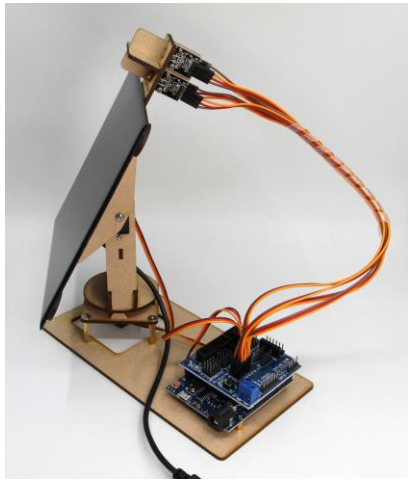
76.36€

amazon

84.17€

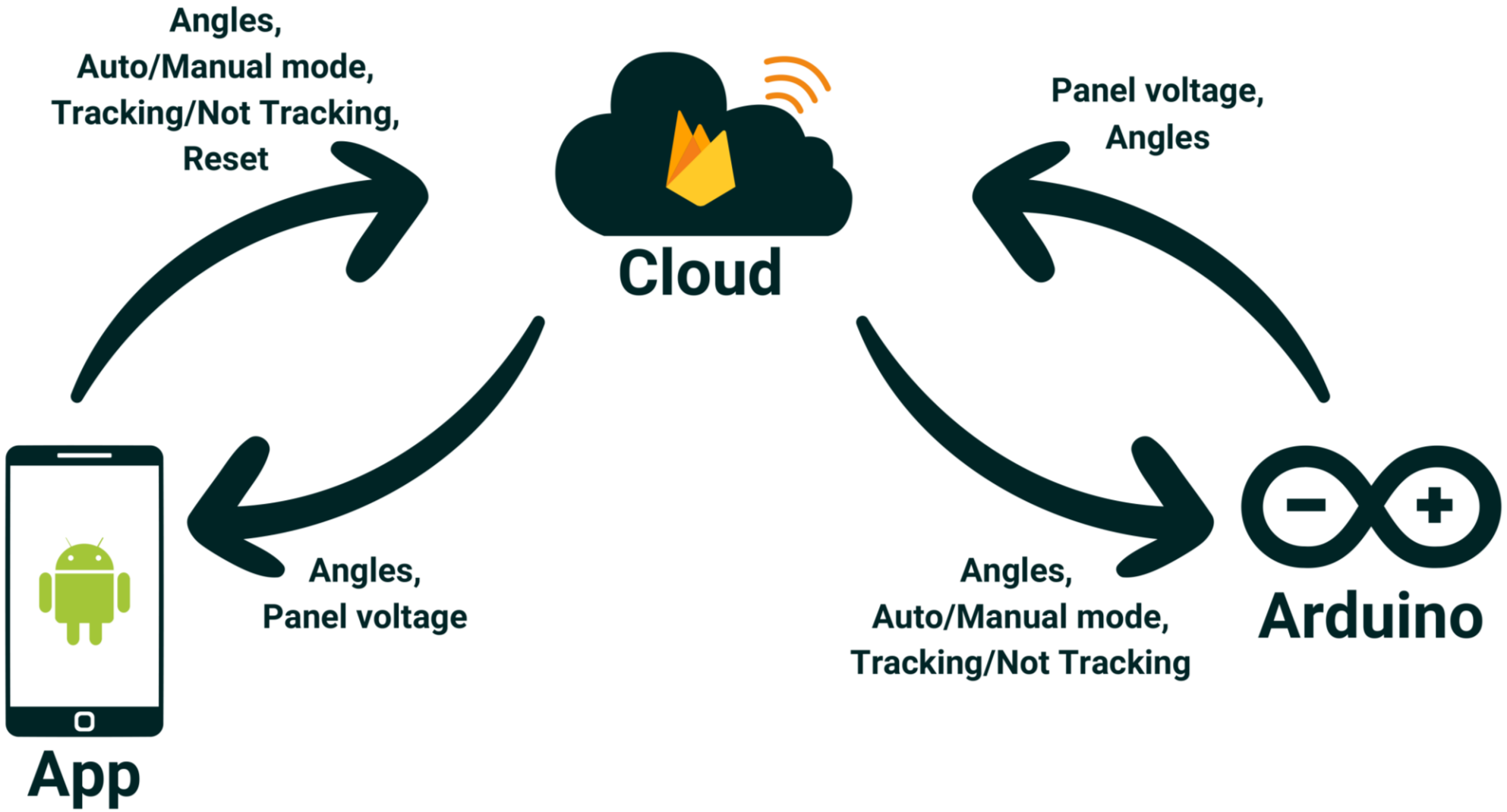


Homemade projects

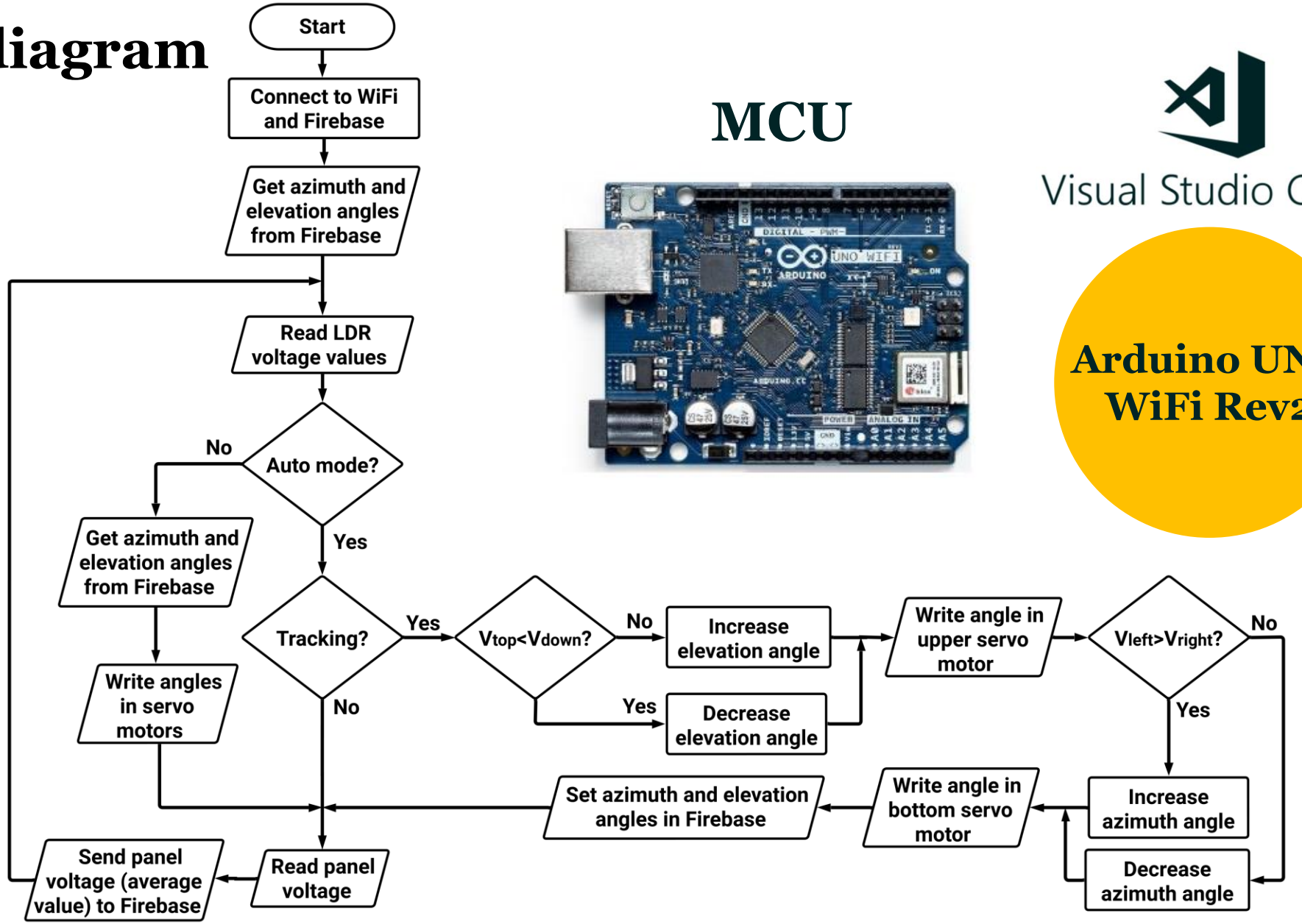


Alibaba.com

Architecture



Flow diagram



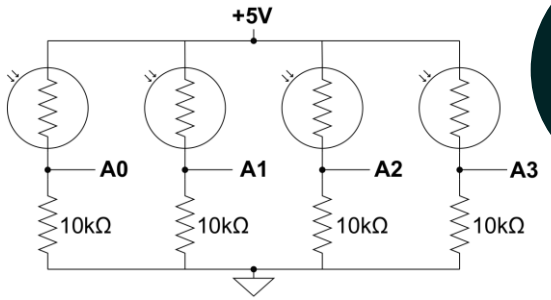
MCU

Visual Studio Code

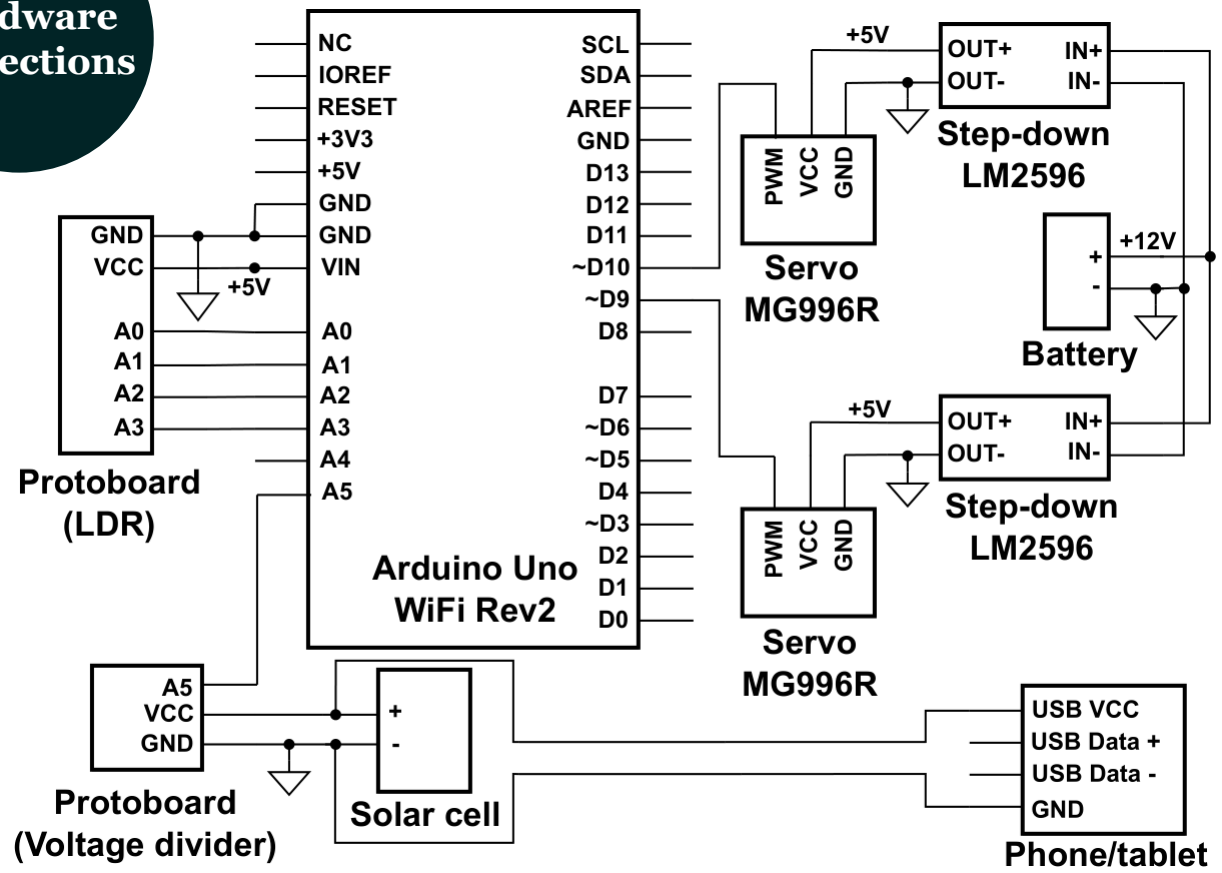
Arduino UNO WiFi Rev2

Hardware assembly

Circuit with LDR sensors



Hardware connections



Database platform

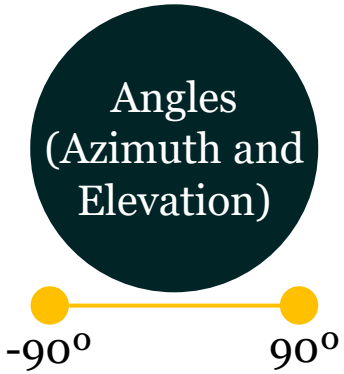
Google Firebase

Realtime Database

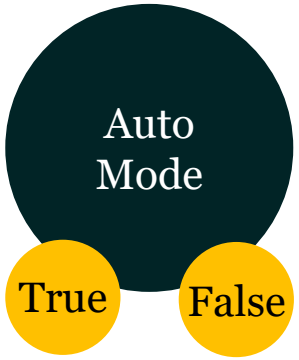
https://iot-alarm-app-group9-default-rtdb.europe-west1.firebasedatabase.app

```
https://iot-alarm-app-group9-default-rtdb.europe-west1.firebasedatabase.app/
angles
    azimuth: 15
    elevation: -15
auto_mode: false
tracking: true
voltage_values
```

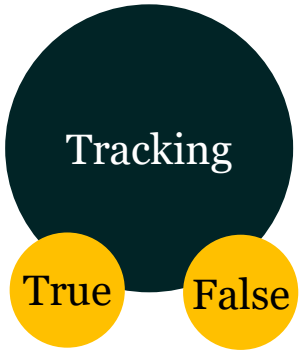
Firebase



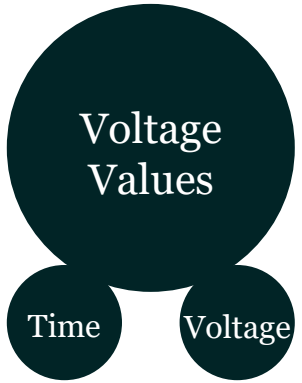
Shown in Manual mode



True in Auto mode



True when tracking light



Used to plot voltage over time

App funcionalities

Monitor

Voltage and nominal power values

Local weather and temperature

Change in panel voltage over time

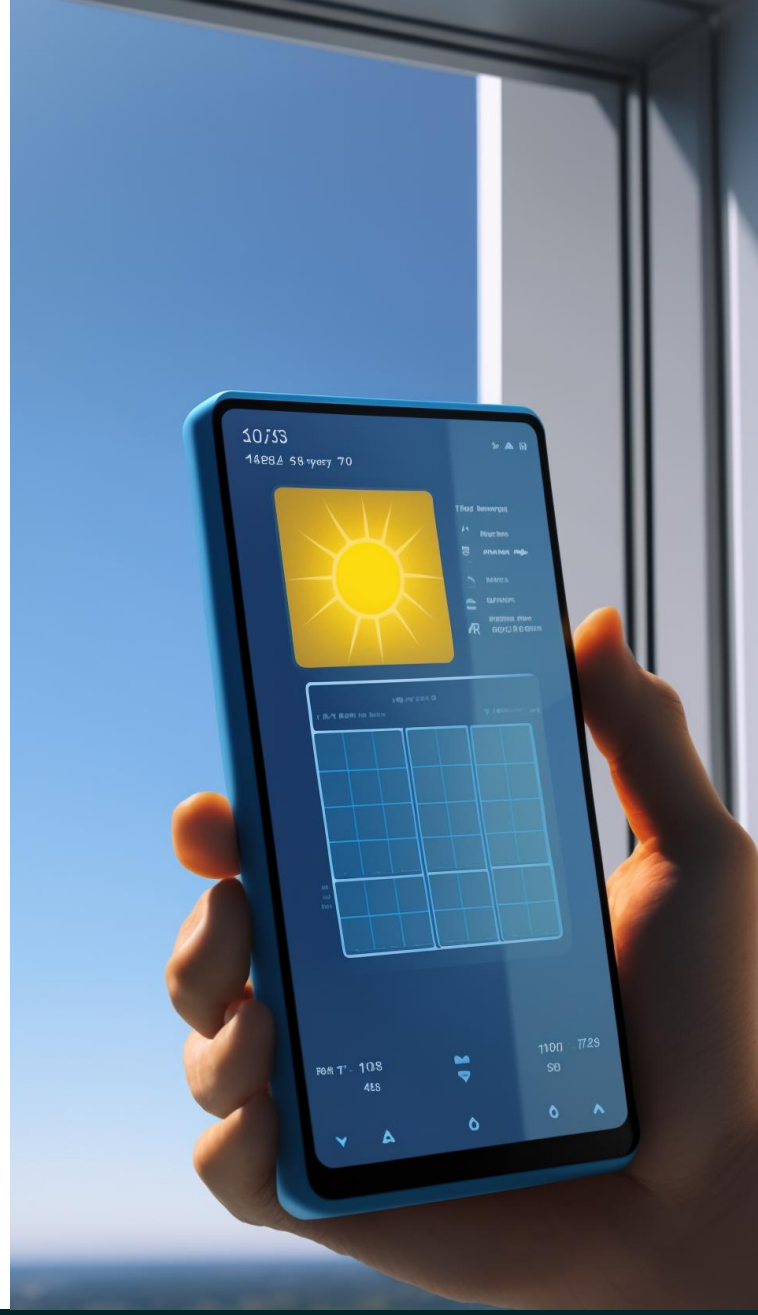
Date

Control

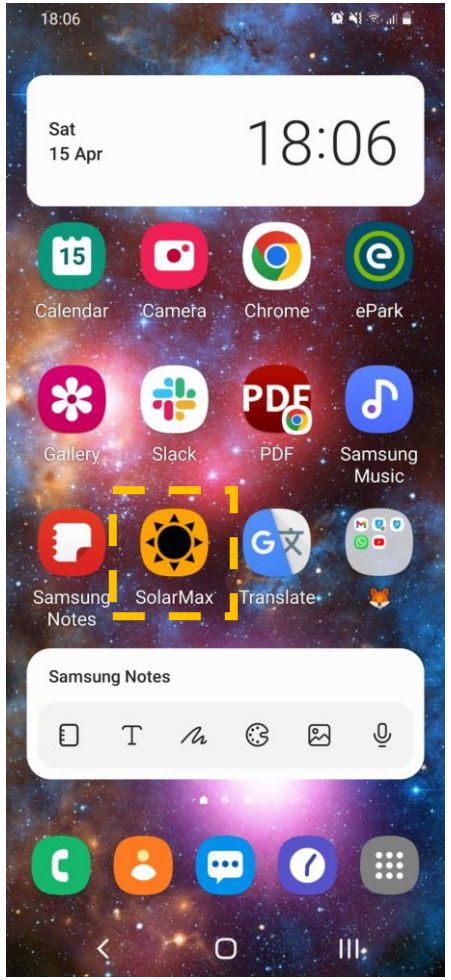
Angles defined by sun tracking, current position or manual sliders

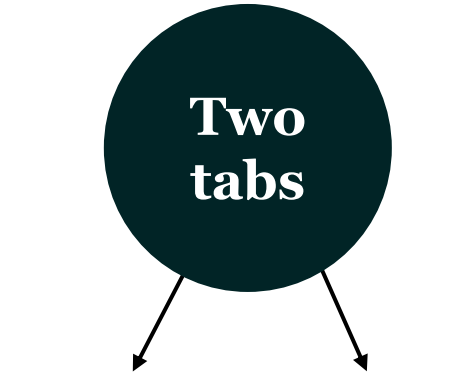
Change azimuth and elevation angles

Reset values in voltage plot

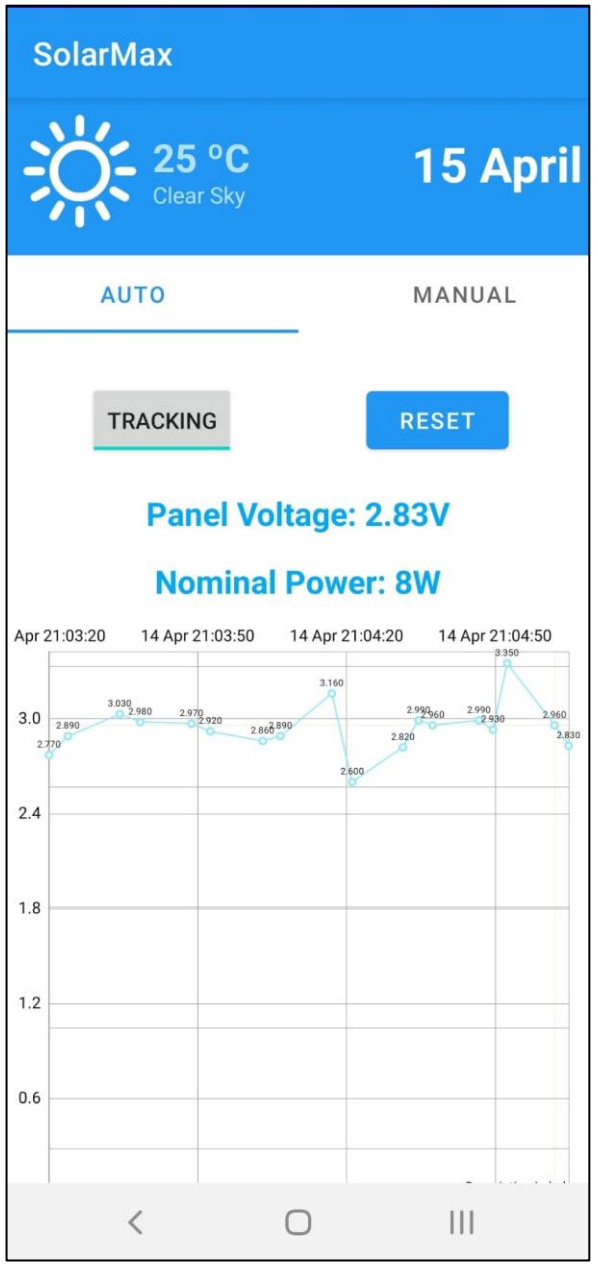


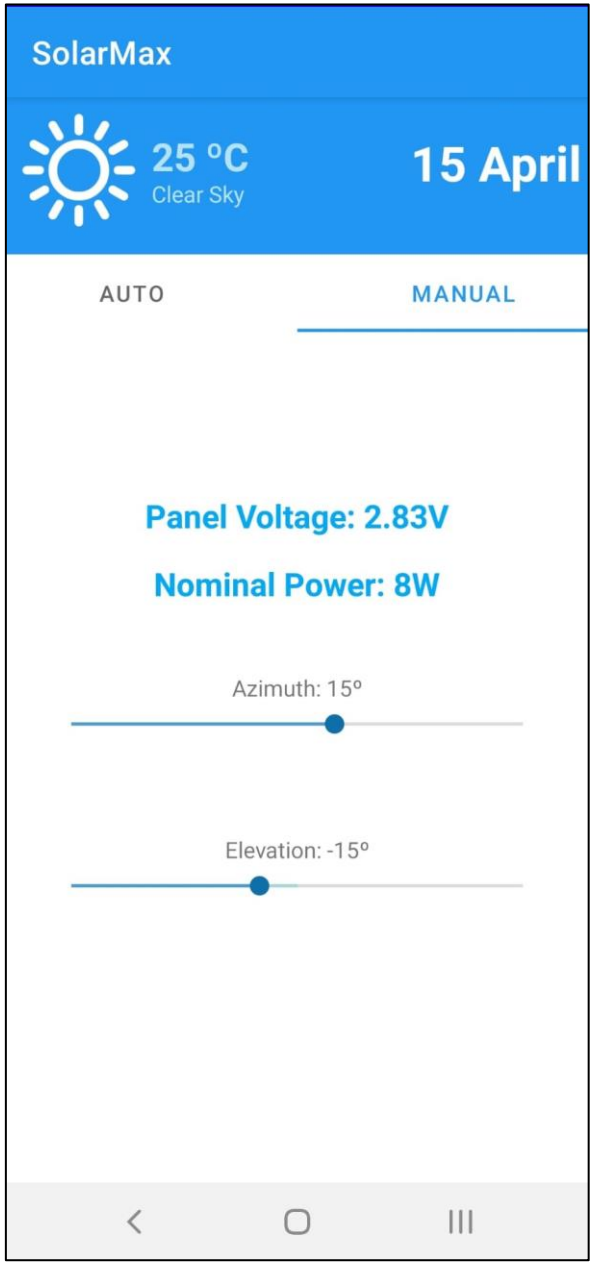
Main activities of the App





SolarMax





Conclusion

IoT project

- Solar tracking device
- Android app to control hardware and monitor power generation
- Solar power can be used to recharge batteries

Future work

- Refine hardware assembly
- Accomplish cellphone charging with solar power
- More app functionalities (energy accumulated over time, added power by sun tracking, monitor battery voltage)
- ...