

Solar Panel Sun Tracker - Battery Charger

Abstract

Due to the nature of renewable energy sources, they are one of our planet's most abundant and freely available energy sources. The biggest and most intuitive example is the Sun. The amount of solar energy that reaches the earth's surface in one hour is more than the planet's total energy consumption for a whole year. Therefore it seems like the perfect renewable energy source. Using this renewable energy in an efficient way to convert sunlight into electric energy can be done via the installation and usage of solar panels.

Introduction

Solar energy is the most abundant of all energy resources and can even be harnessed in cloudy weather. The rate at which earth intercepts solar energy is about 10,000 times greater than the rate at which humanity consumes energy.

Solar technologies can provide heat, cooling, natural lighting, electricity and fuel for a range of applications. Solar energy technologies convert sunlight into electrical energy either through photovoltaic panels or through mirrors that concentrate solar radiation.

Although not all countries are equally fit to harness solar energy, a significant contribution to the energy mix from direct solar energy is possible for each country.

The cost of manufacturing solar panels has dropped dramatically in the past decade, making them affordable and often the cheapest form of electricity. Solar panels have a lifespan of about 30 years and come in different grades depending on the type of material used in manufacturing.

Solution

Using certain sensors, solar panels, alongside the fitting hardware, and in addition to corresponding software, the implementation of a solar battery charger can be done. Using IoT to gather any external data. This allows for accurate information gathering from multiple steady sources of data streams. This also creates a wider set of variables to be studied. Resulting in very accurate reporting.

UML Flowchart :

Flow chart describing the process of a Solar Panel Sun Tracker - Battery Charger with a data monitor implemented on Thing Speak Web Application.

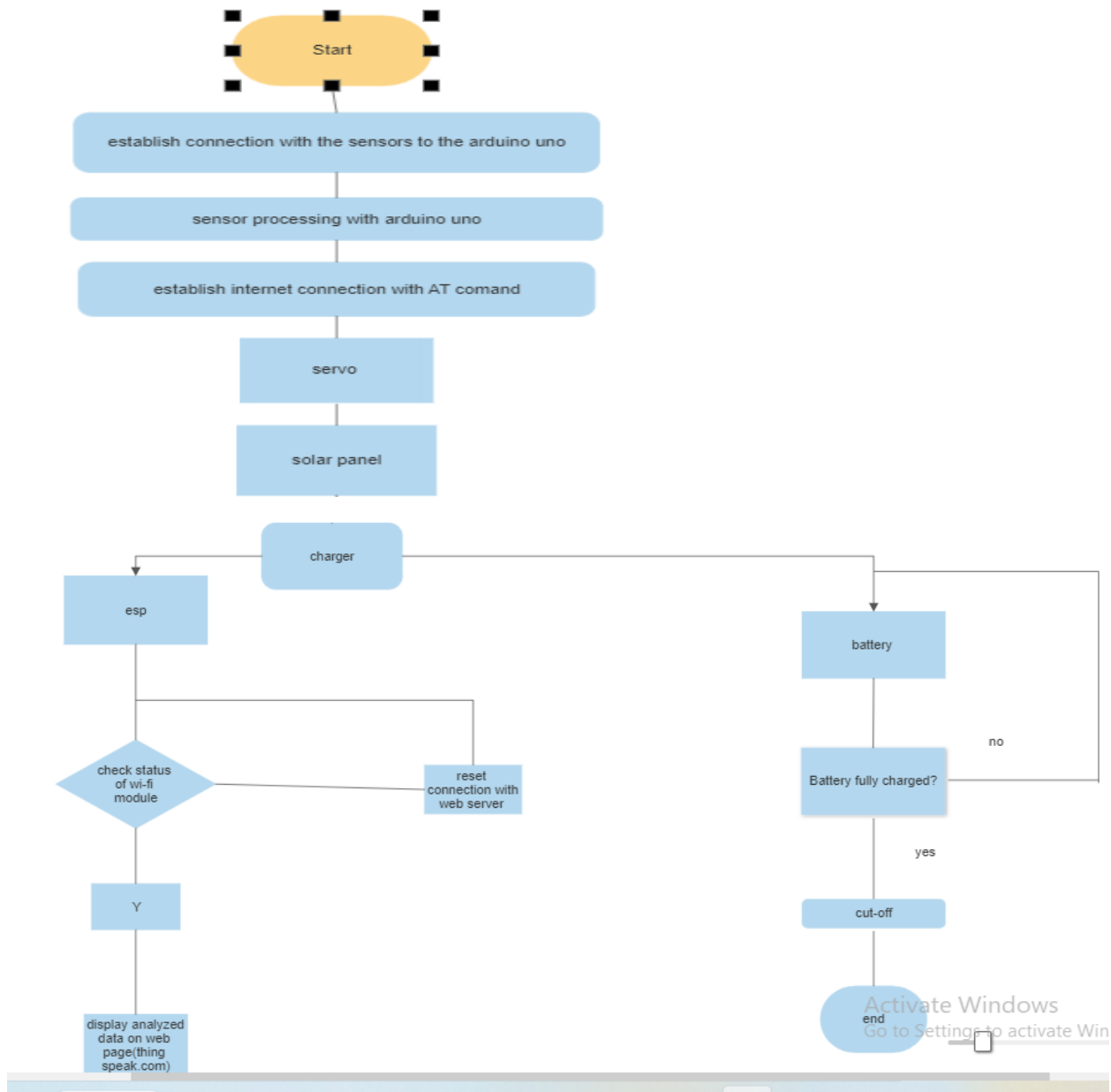


Image (1) Flowchart Solar Panel Sun Tracker - Battery Charger

UML Sequence Diagram :

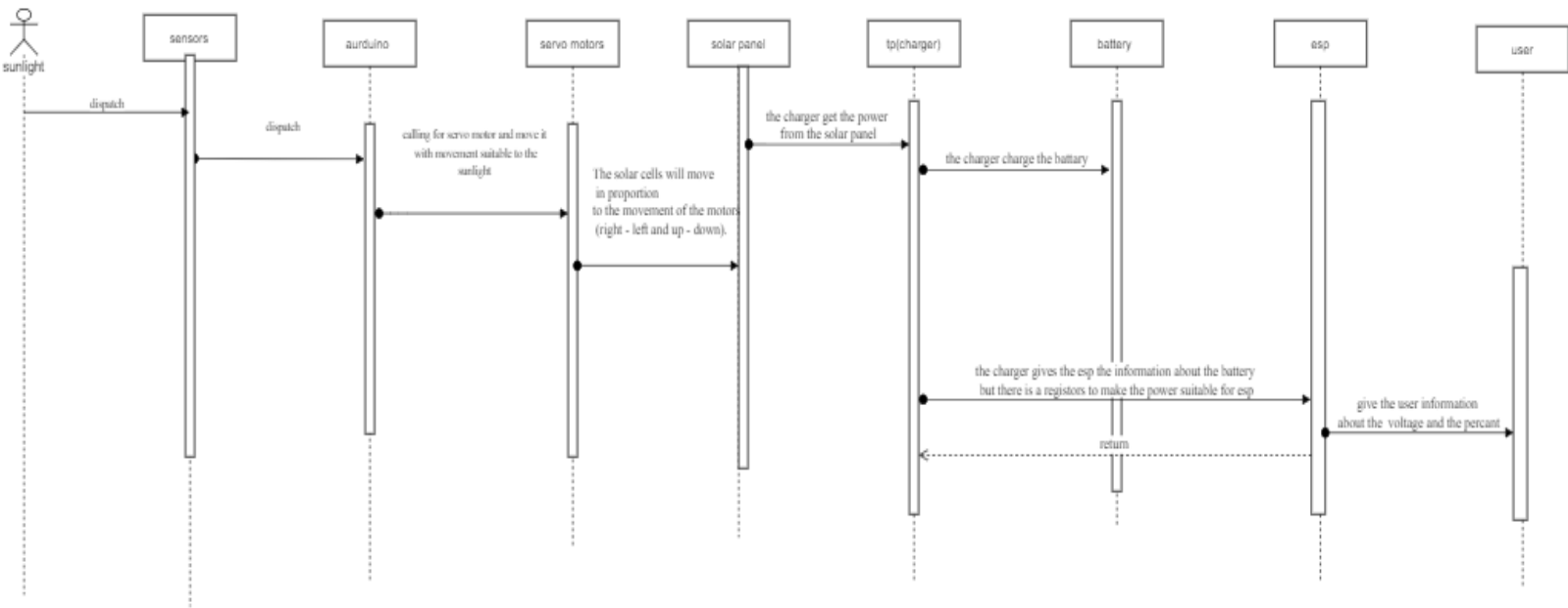


Image (2) Sequence Diagram - Solar Panel Sun Tracker - Battery Charger

System Blueprint:

The following diagram illustrates the schematic of how a solar system integrated with an arduino should look like. The wiring, the motors, and the arduino itself are shown in the following wiring diagram.

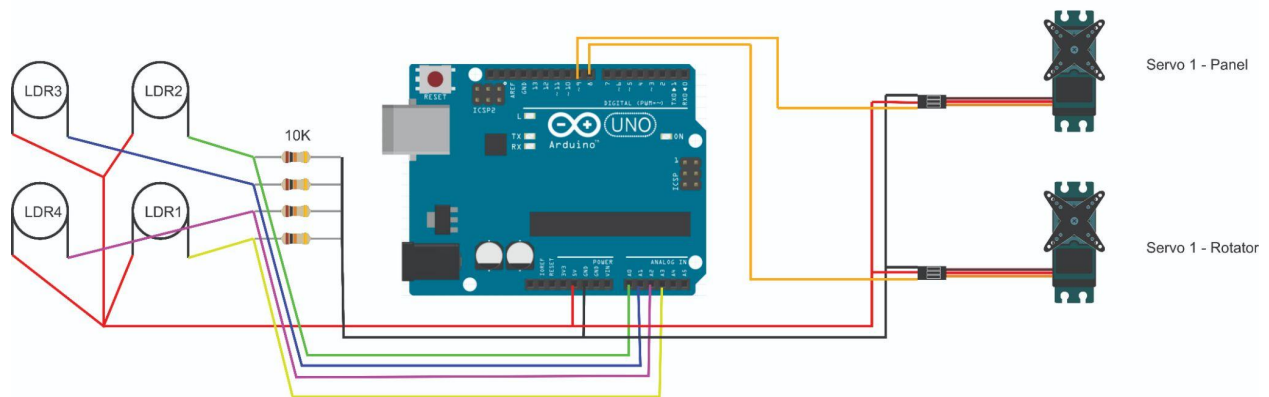


Image (3) Solar Tracking System Blueprint

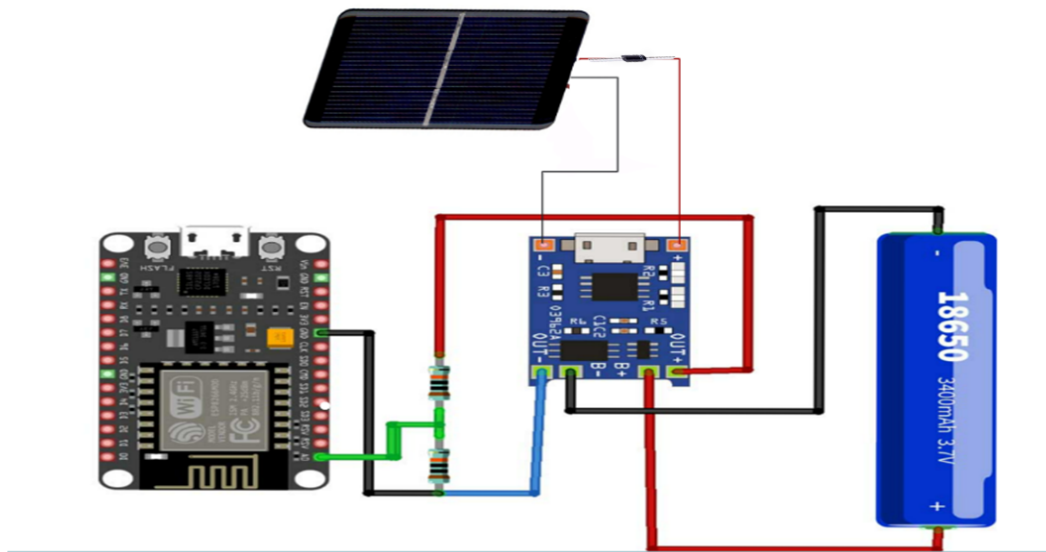
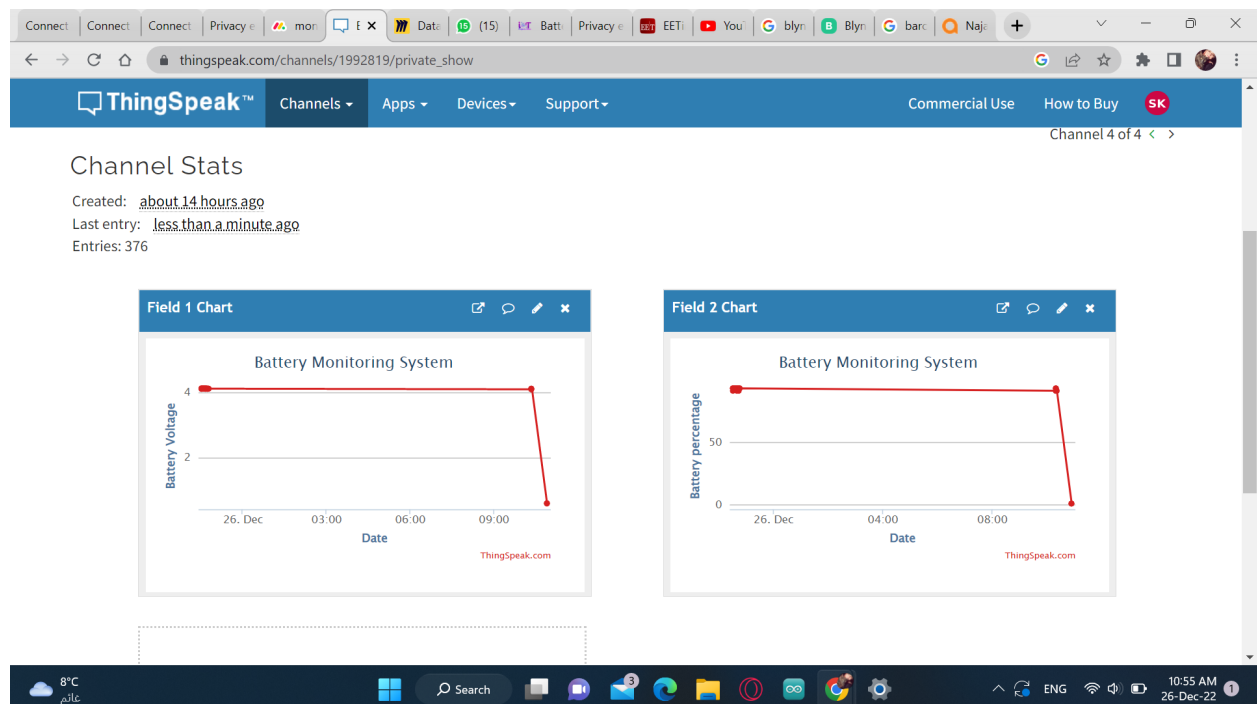


Image (4) Solar Tracking System Blueprint

Monitor using thing speak



Implementation

<https://youtu.be/kP7fnl7Nms4>

Conclusion

Creating such a device, equipped with the newest sensors and solar panels, technology wise, in addition to the collection of multiple data streams over the internet, can benefit the improvement of weather prediction technologies using renewable energy in ways that have never been seen before. This concludes that the importance of IoT, in any general area that requires the collection of data, will always result in the most accurate, safest, and most precise reports and findings.

- (1) AT command : Test ,read ,set and execution .
- (2) UML : **U**nified **M**odeling **L**anguage .