CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

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Project Number

J0208

Project Title

Designing a Data-Driven Dual-Axis Solar Tracker

Abstract

Objectives/Goals

The objective of this study is to design and build a Data-Driven Dual-Axis solar tracker and to test its output relative to that of a fixed panel.

Methods/Materials

Plywood, Raspberry Pi, Stepper Motors and Drivers. Programmed the apparatus to track the sun using longitude and time. Built a model to test the output of a Dual-Axis tracker relative to a fixed panel.

Results

A yearlong model was built to predict the output of a Data-Driven Dual-Axis relative to a fixed panel. It showed that the Dual-Axis solar tracker would generate 1.9 times more electricity over the course of 2018 in San Mateo County, CA. Results gathered on two 2018 days were consistent with the model's predictions.

Conclusions/Discussion

A Data-Driven Dual-Axis solar tracker was designed and built. In a model consistent with observations, it was predicted a Dual-Axis solar tracker would generate 90% more electricity than a fixed panel. Due to the reduced cost of a tracker without sensors, Data-Driven Dual-Axis solar trackers could reduce the payback period of solar by up to 40%.

Summary Statement

I designed a Data-Driven Dual-Axis solar tracker capable of reducing the payback period of solar by 40%..

Help Received

I programmed the sun-tracking code using a solar-position equation. Parts of my apparatus were printed by a CNC router at a local workshop.