

## PROJECT BACKGROUND

- Solar renewable energies projects which derived from renewable resources are greatly utilised over the years.
- The emergence of solar panels has greatly reduced the supply of oil and gasoline power generation.
- The solar tracking system is useful in a variety of solar energy applications, with advantages not just in terms of power and efficiency increases over fixed systems, but also in large-scale solar energy economic studies.

## Objectives

1. To design an automatically (active-based) azimuth-altitude dual axis solar tracking system
2. To investigate the efficiency of azimuth-altitude dual axis solar tracker system.
3. To maximize the solar panel output power efficiency

## Methodology

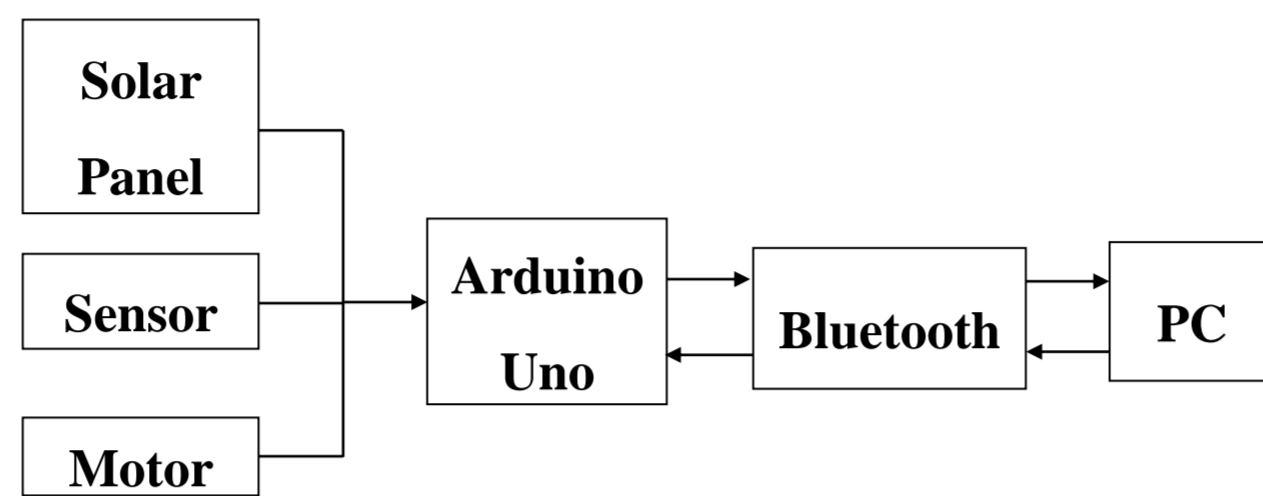


Figure 3: Components Block Diagram

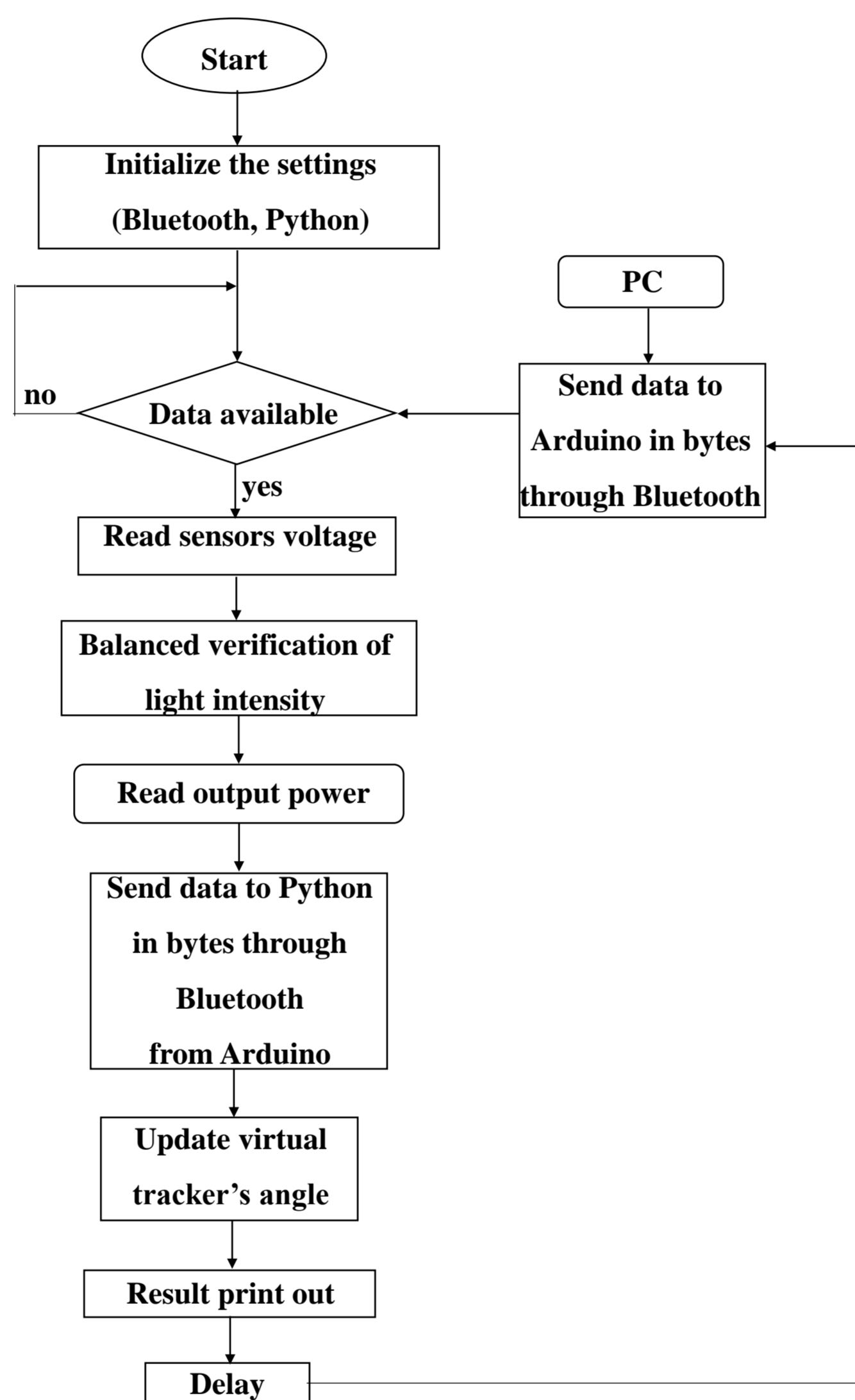


Figure 4: Flowchart of solar tracking system

## Problem Statements

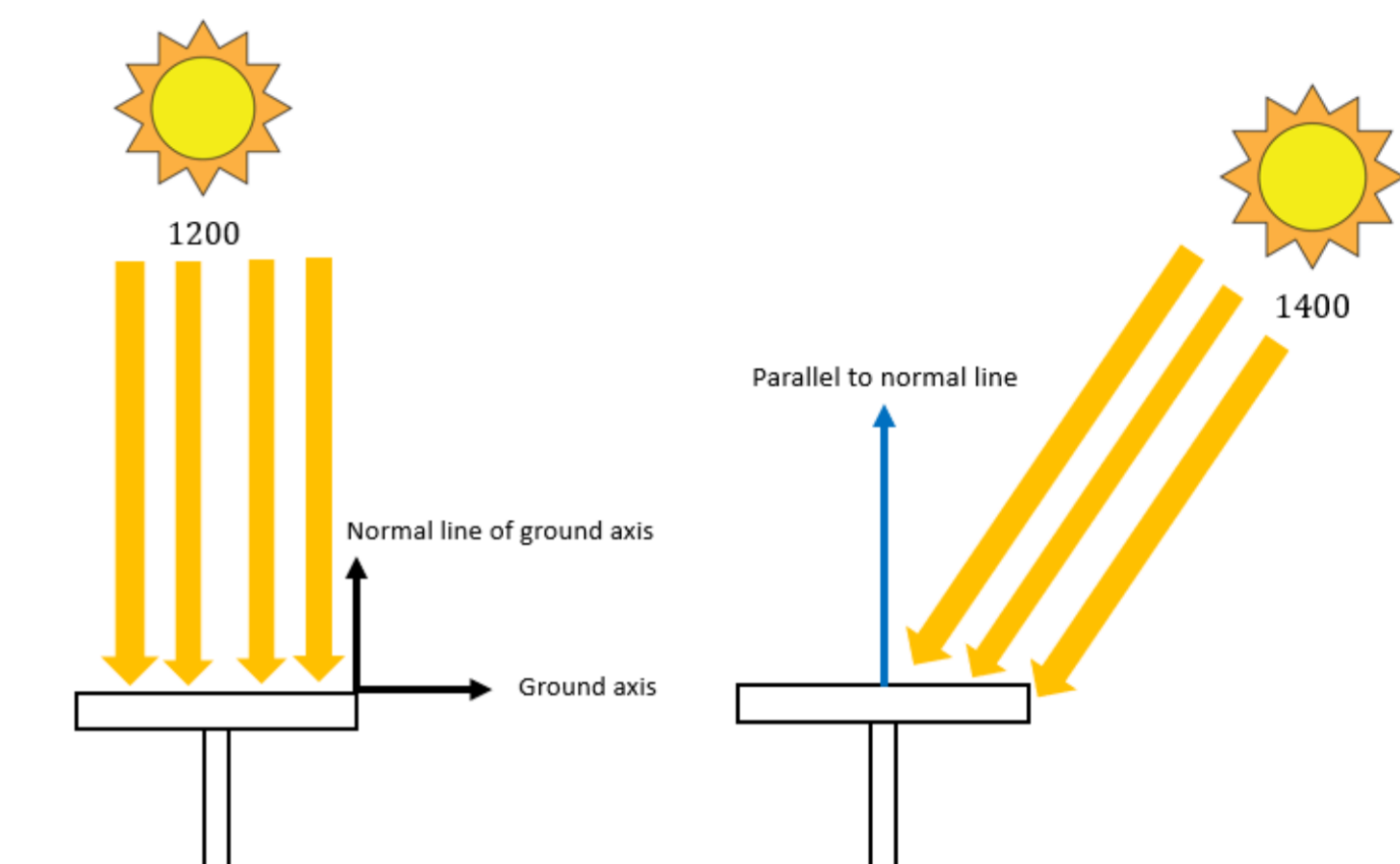


Figure 1: Fixed Solar Panel under different condition.

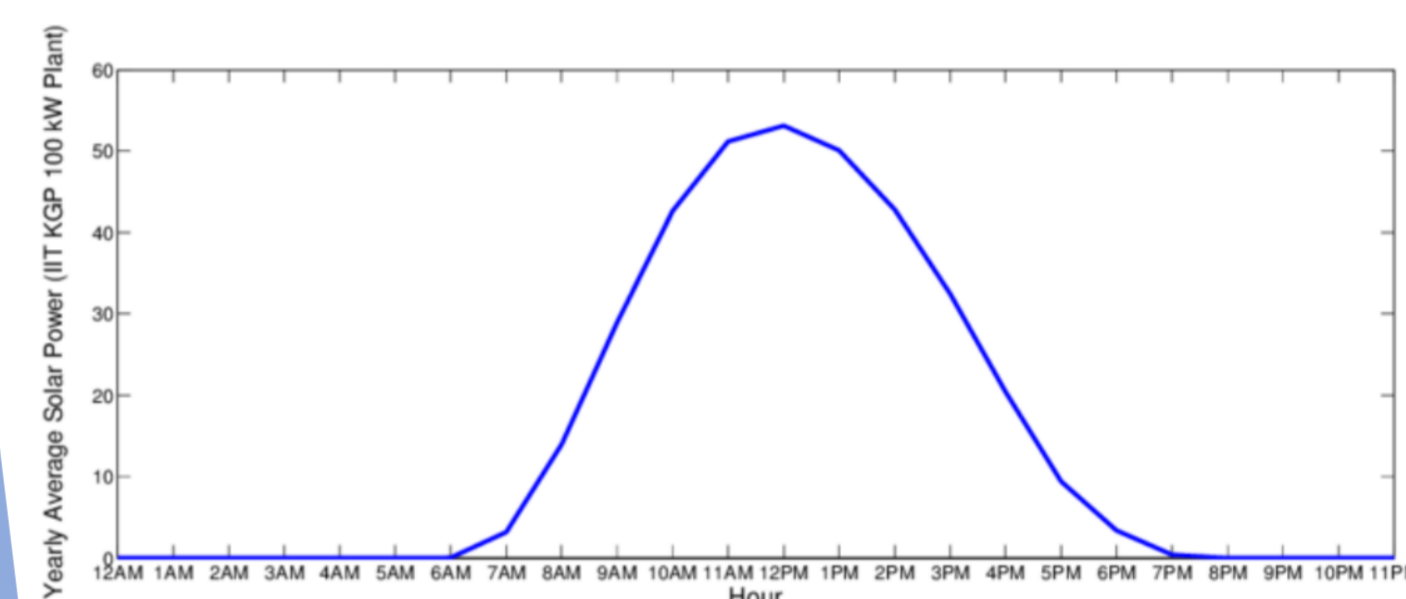


Figure 2: Power Graph of Fixed Solar Panel.

- The power efficiency of fixed solar PV system is low due to nature behavior of Sun path.
- Shading Loss and Angle Loss

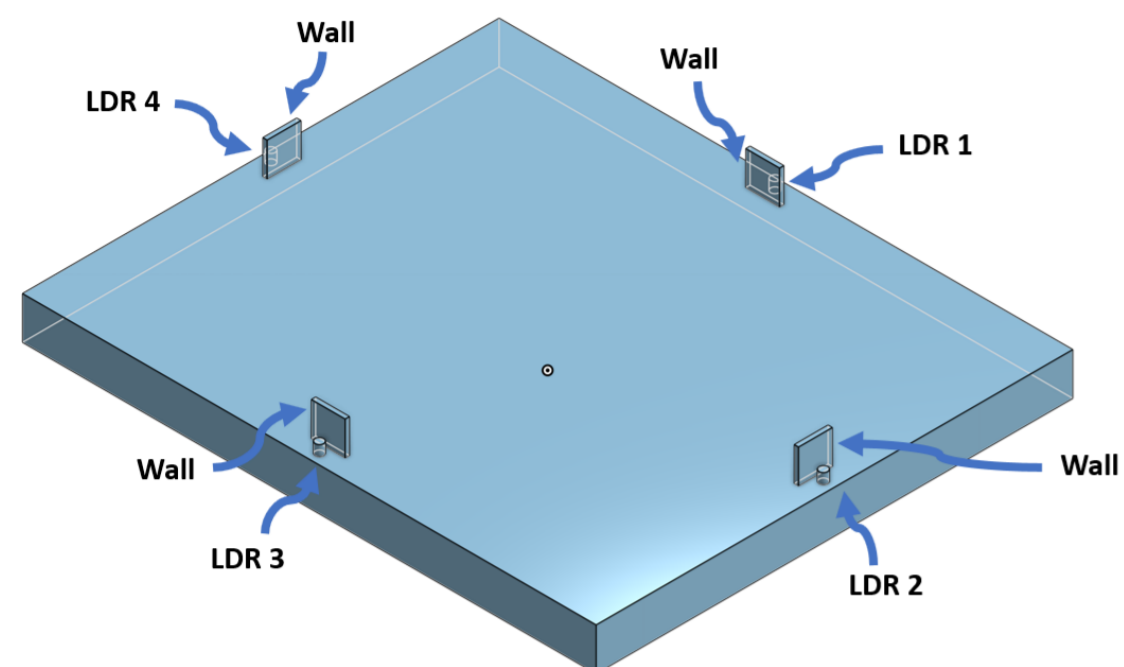


Figure 6: LDR sensor set arrangement design in AADAT (Middle-Separate)

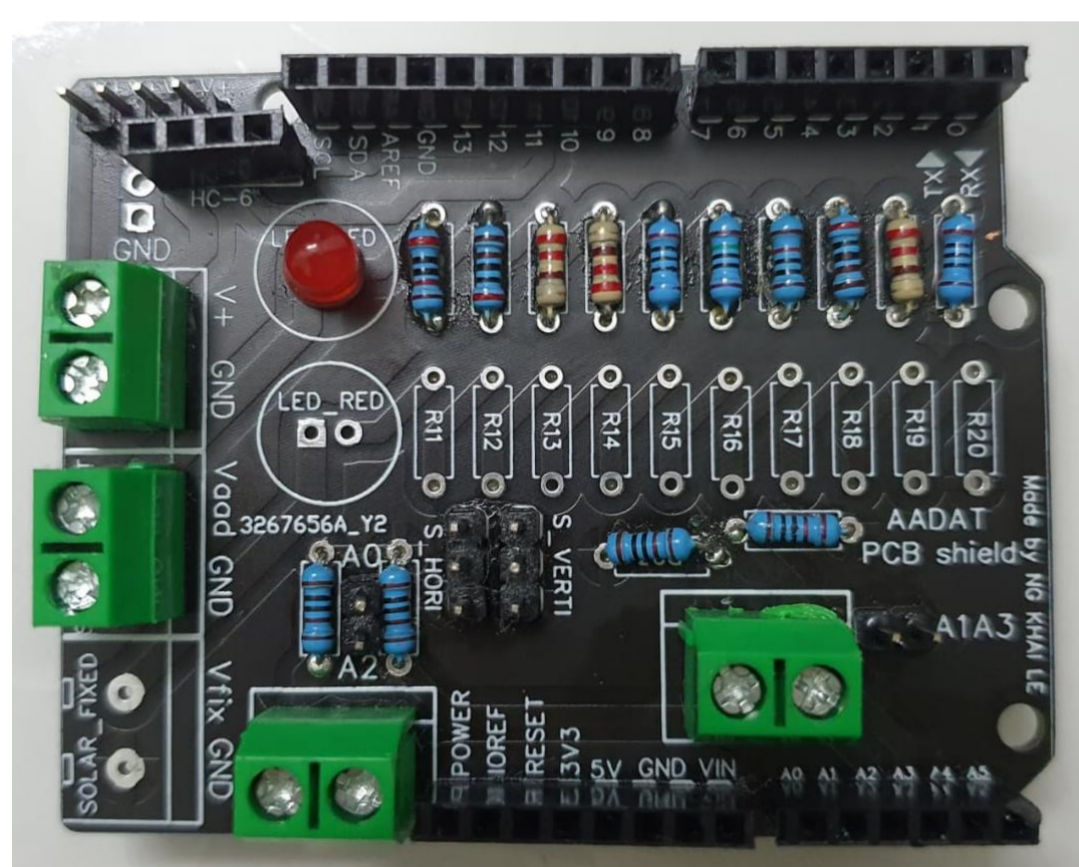


Figure 7: Printed Circuit Board (PCB)

Fabrication

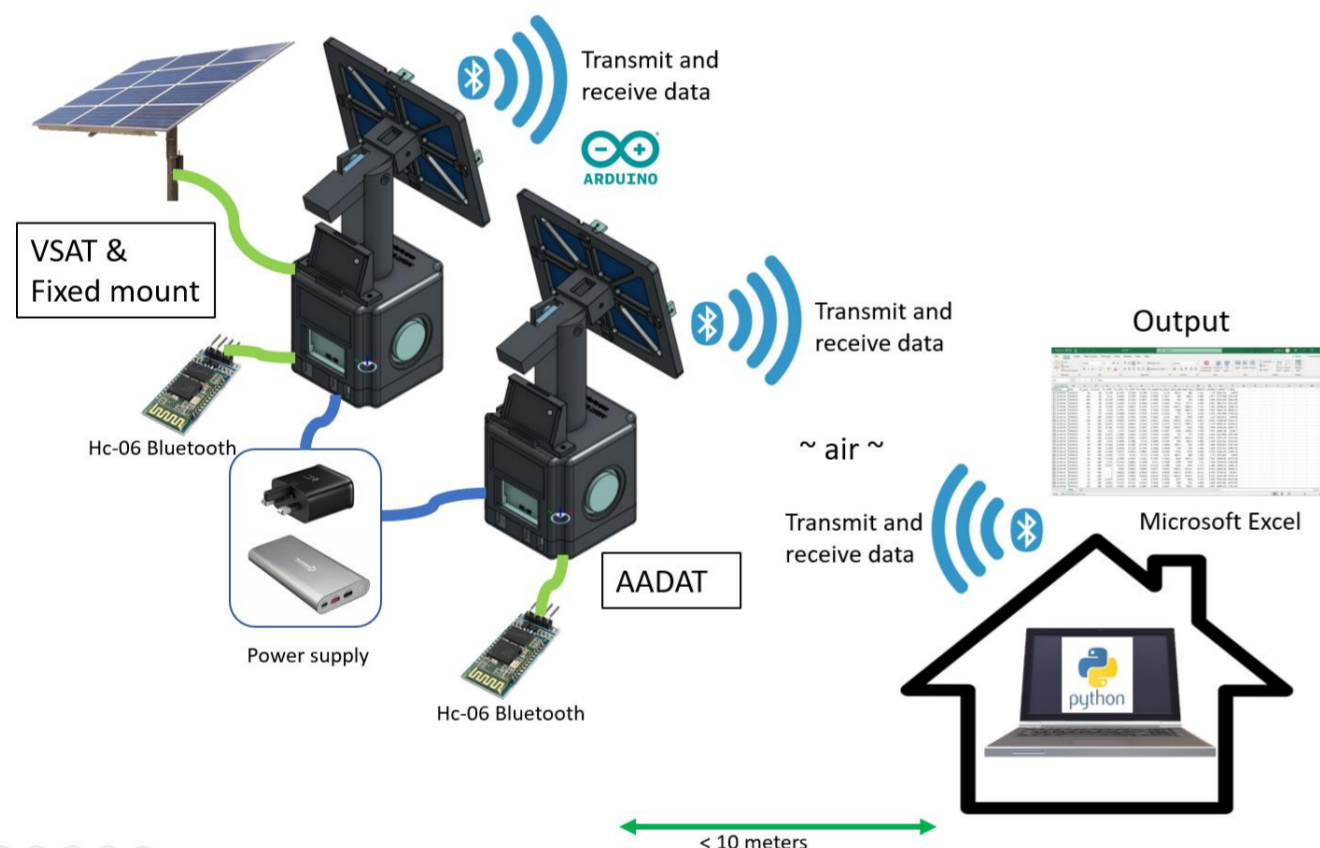


Figure 8: Master & Slave Protocol

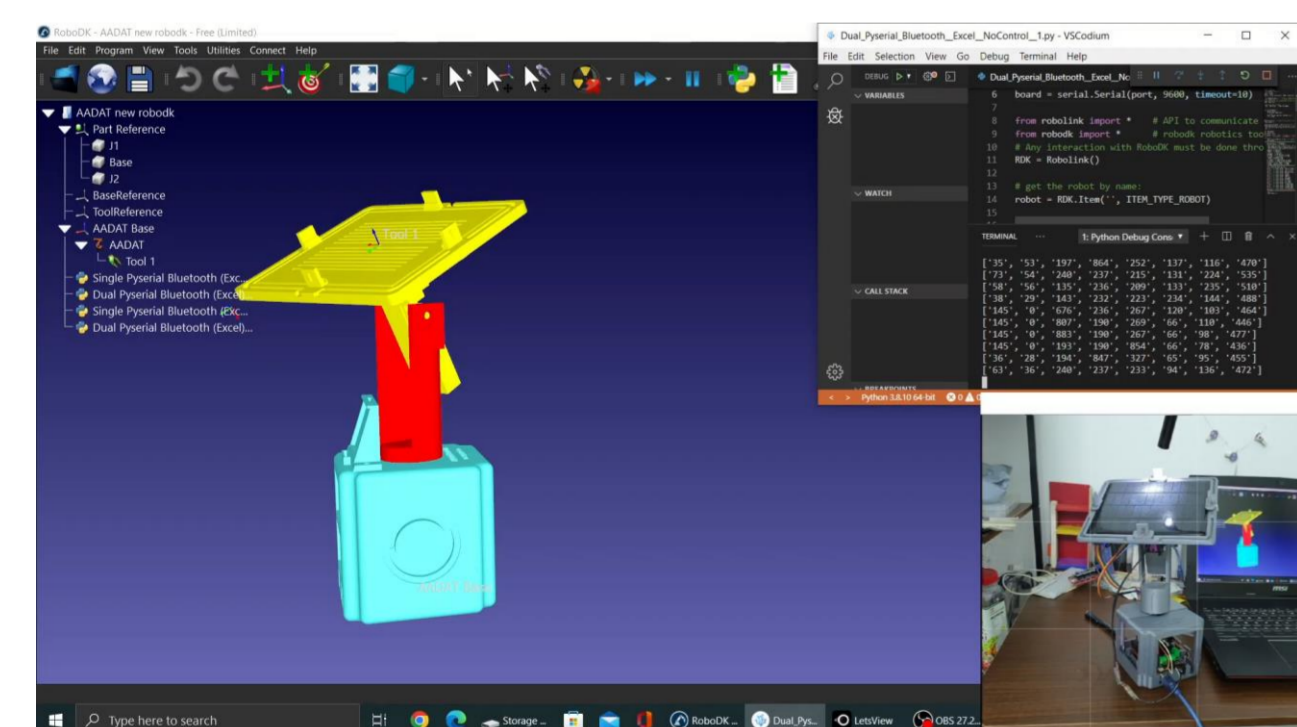


Figure 9: Virtual Solar Tracker



Figure 5: Experiment of Collecting Instantaneous Power at Each Period

## Results

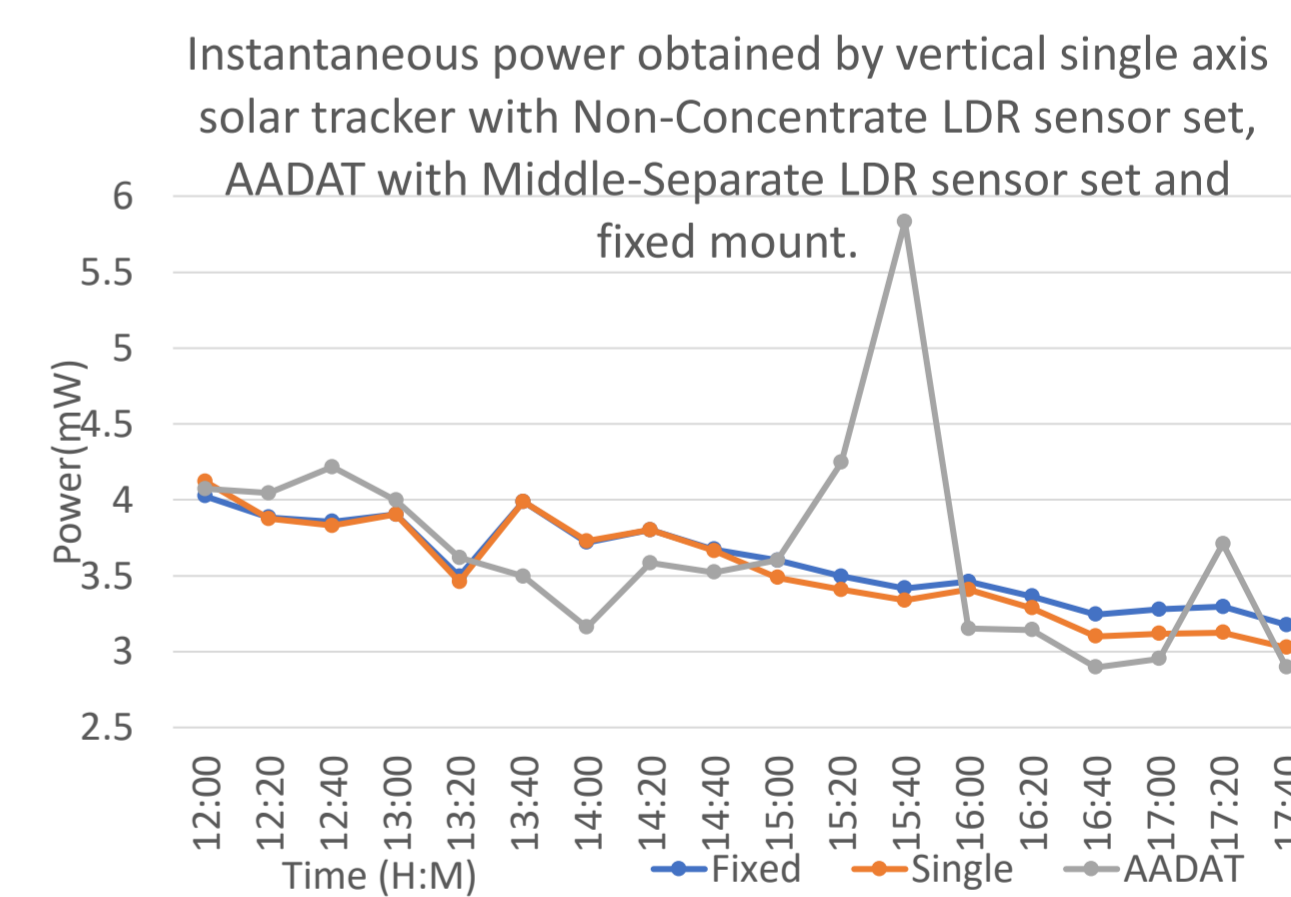


Figure 10: Output power per period of different solar system

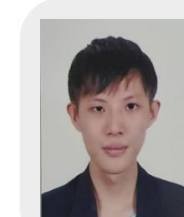
Table 1 : Table of comparison of total instantaneous power of different solar system

Type of device	Total Instantaneous Power (mW)
Fixed Mount	67.784
Single axis solar tracker	66.6749
AADAT	68.8997
Difference (Single VS Fixed)	-1.6362%
Difference (AADAT VS Fixed)	1.646%
Difference (AADAT VS Single)	3.337%

## Conclusion and Impact to Social, Nation, and World.

- The performance of the dual axis solar tracker system is able to be enhanced with the incorporation of robotic technology.
- fulfil the Nation Goal which is to achieve 31% Renewable Energy share in the national capacity mix by 2025, published by SEDA Malaysia
- A solar system with higher power generation could speed up the time for Return of Investment and increase the public motivation to install the solar panel.

## Science & Engineering Category



Ng Khai Le  
D200252C@sc.edu.my



Dr. Tan Jia Hou  
jiahou21.jt@gmail.com



Leong Kah Meng  
kmlong@sc.edu.my



Dr. Dalilah binti Nordin  
nurdalilah@sc.edu.my

Grant No  
SUCRF/C1-2021/FEIT-11