Group 17 – PH222 Project Proposal

Members :

- Kartik Vuthoo (22B4234)
- Shorya Sethia (22B2725)
- Akshay Chaturvedi (22B2432)

Title :

Mobile, line-following sun-tracking solar panel for optimal solar power harvesting and displaying the efficiency in real time.

Abstract :

- The motivation behind building this project is to increase the efficiency of solar power generation
- This solution is relevant to the problem of improving energy generation through renewable sources in a sustainable manner.
- The Arduino will aid in the rotation and line following functionality for solar tracking.

Project Proposal Details :

The project focuses on building a device to move a solar panel such that it optimally harvests solar power.

To achieve this, the position of the sun will be tracked through the day through a rotation mechanism (with 2 degrees of freedom) for the panel, to ensure that the sun is always directly overhead the face of the panel. Rotation will be implemented by mounting 4 photodiodes on a specially designed 3D printed structure (a base with a cylindrical 4-sector protruding out of it) to impose a sense of direction. The photodiodes will receive variable brightness of sunlight if the panel is not aligned perpendicular to direction of sunlight.

Line following will be used to move the panel across the entire roof every few hours. This will allow it to determine the spot on the roof where the brightness is maximum.

The relative intensity with respect to a pre-decided (through a representative set of special measurements) optimal intensity level will also be displayed in real time.

Answers to questions :

1) The major parts are :
   a) Electronic Components (procured from the lab) –
      i) Servo Motors (2).
      ii) Photodiodes (4).
      iii) Arduino UNO (1).
      iv) IR Sensors (2).
      v) DC Motors (4).
      vi) Li-ion Battery (not procured from lab – separate power source (Answer 3)).

vii) Solar panel (1) (not from lab).
viii) LCD Display (1) (not from lab).

b) 3D Printed Components –
   i) Cylindrical 4-sector Divider (1).
   ii) Robust Servo Mounts (2).
   iii) Sturdy Base Structure (1).

c) Laser Cut Component –
   i) Line Follower Chassis (1).
   ii) DC Motor mounts (4).

d) Mechanical Component –
   i) Wheel of Line Follower (4).

<u>Hardware Block Diagram</u> :

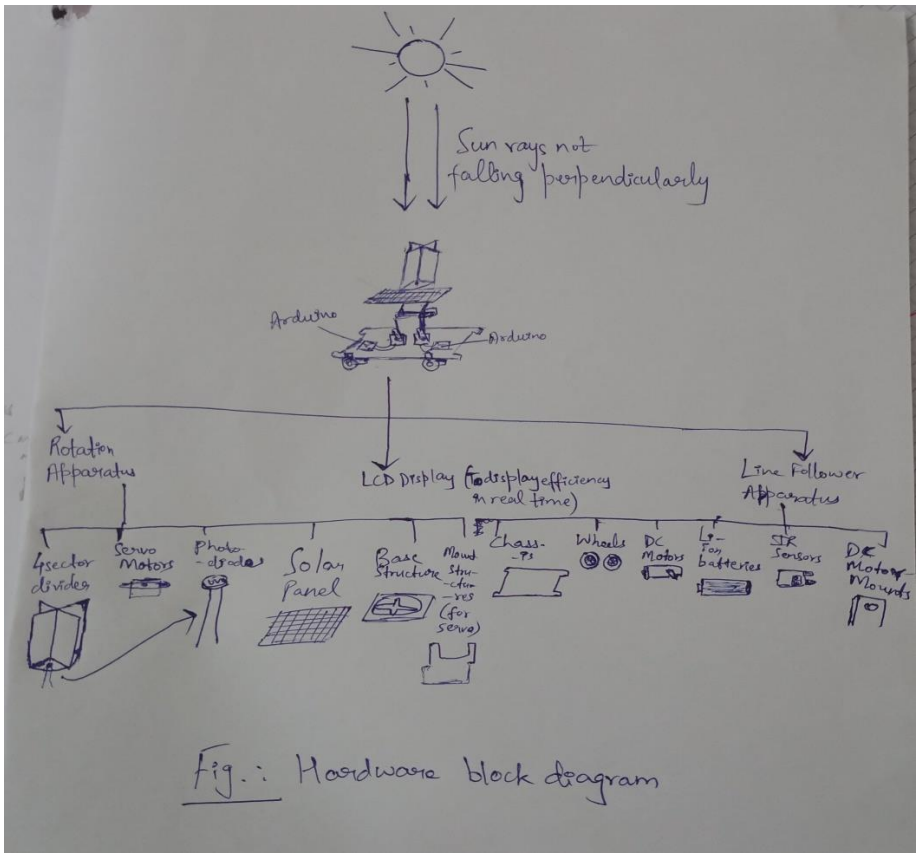

Fig.: Hardware block diagram

Work Allocation (Broad):

1) Kartik Vuthoo and Akshay Chaturvedi – Circuit design and hardware procurement.
2) Shorya Sethia – Arduino UNO coding.

The above allocation doesn't imply non-involvement of certain teammates in certain tasks. It just involves that said task will be "headed" by the allocated person (tentatively).