DUAL AXIS ROTATING SOLAR TRACKER WITH CLEANSING FACILITIES

Group – A11

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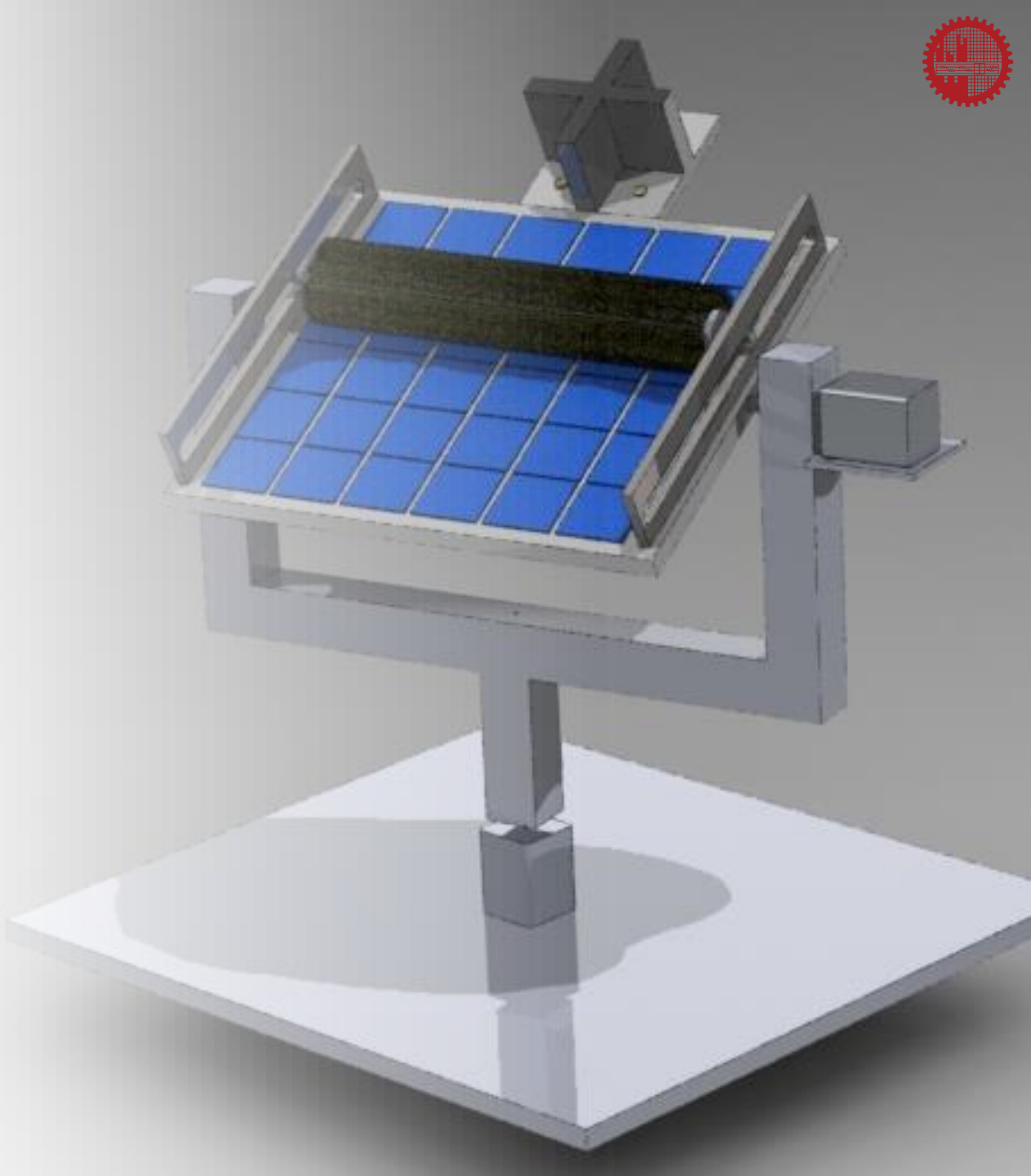
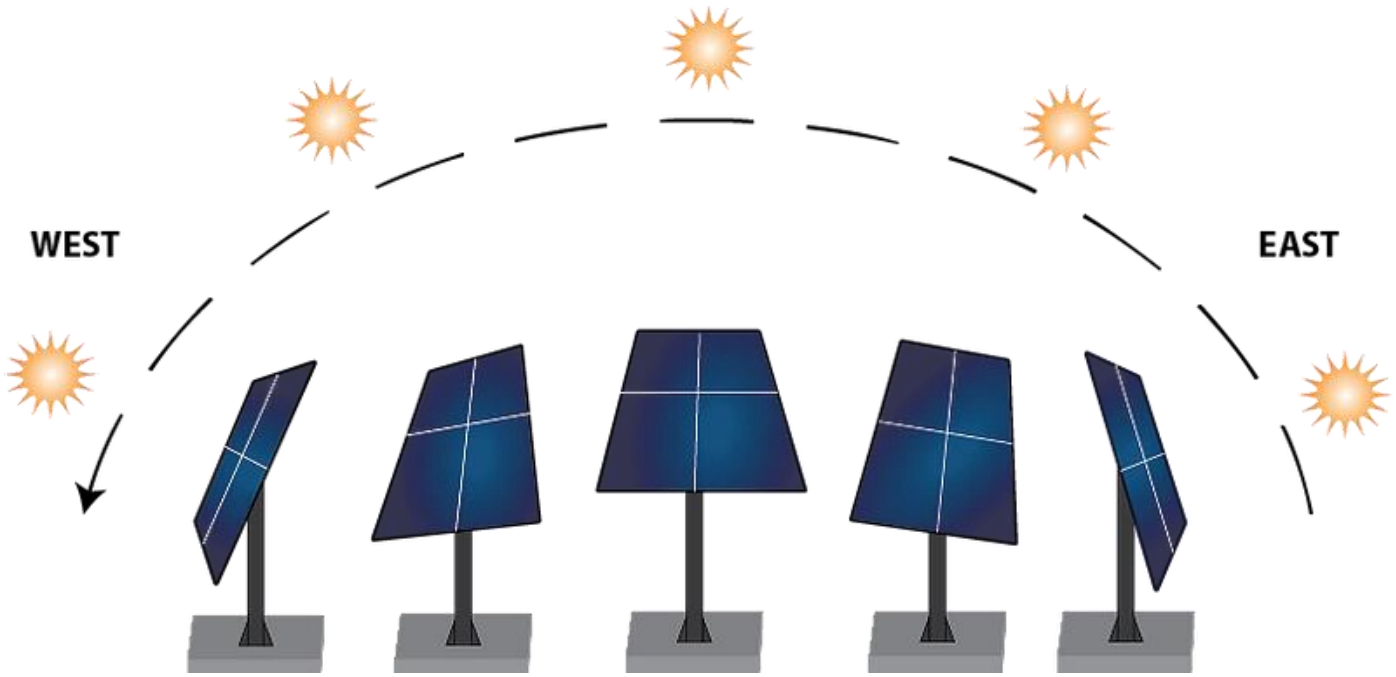


What is SOLAR TRACKER ?

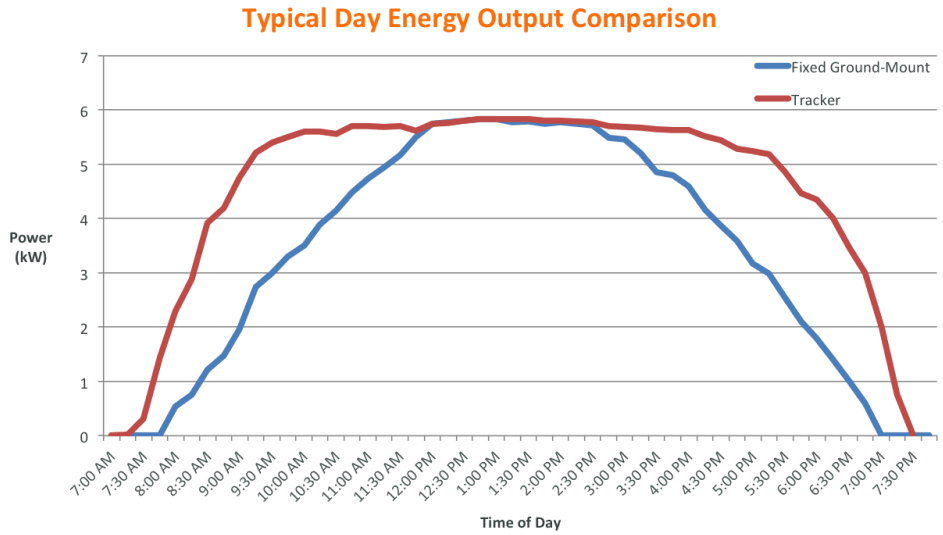
OVERVIEW

A device used for orienting a solar photovoltaic panel towards the sun by using photoresistors & microcontroller.



WHY TO USE SOLAR TRACKER?

- Increases the output & efficiency of a solar panel significantly.
- Increases the ability to grab the energy through out the day.
- Reduces the *cosine error* by increasing the effective collection area.
- Decreases the fluctuation of power output due to seasonal change.



PROJECT FEATURES :

01 Dual axis rotation

02 Automated cleaning

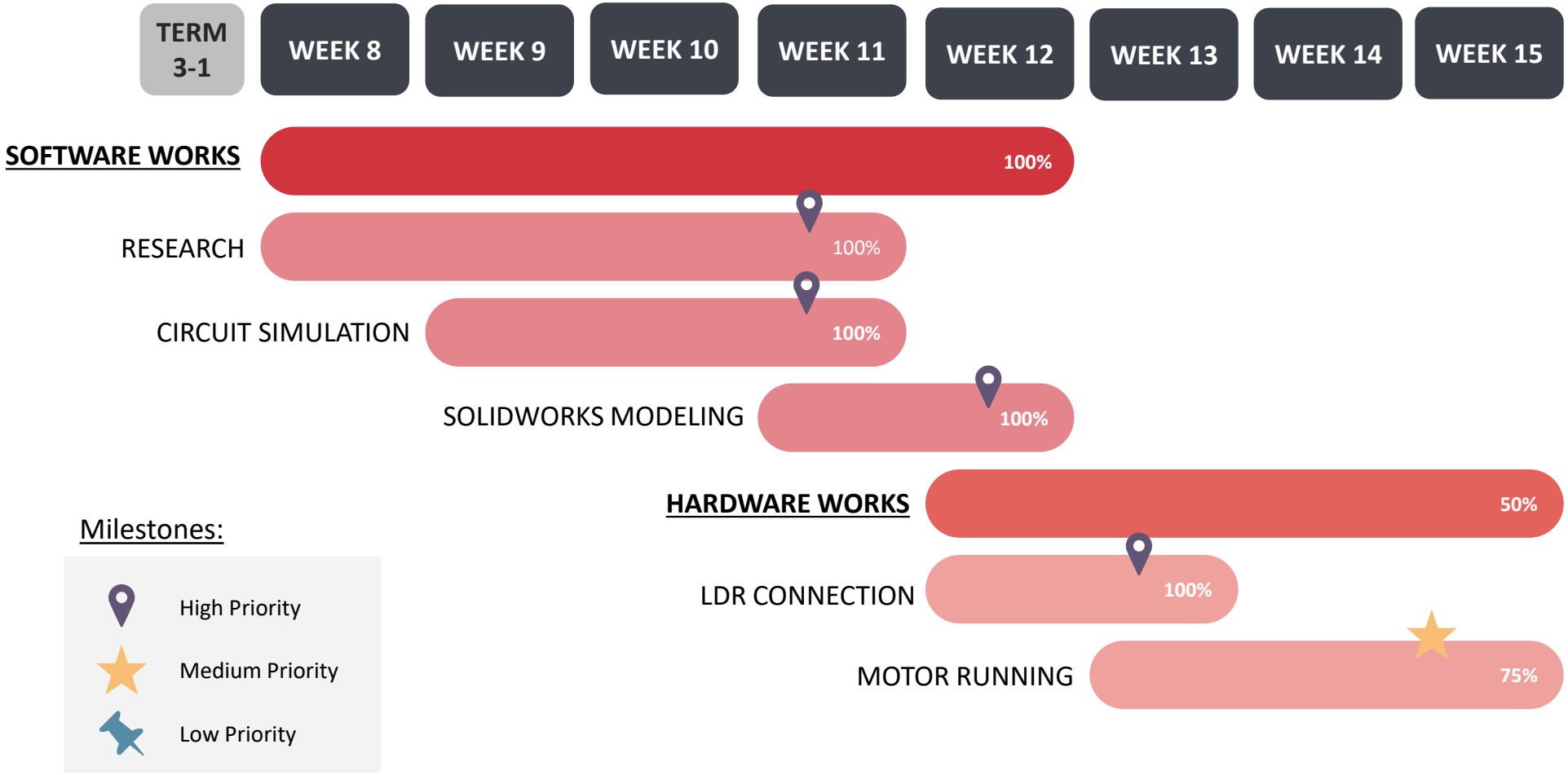
03 Smart energy monitoring

04 Associated by mobile app

05 Simple structure, easy installation & portable

06 Green & clean energy source

PROJECT TIMELINE



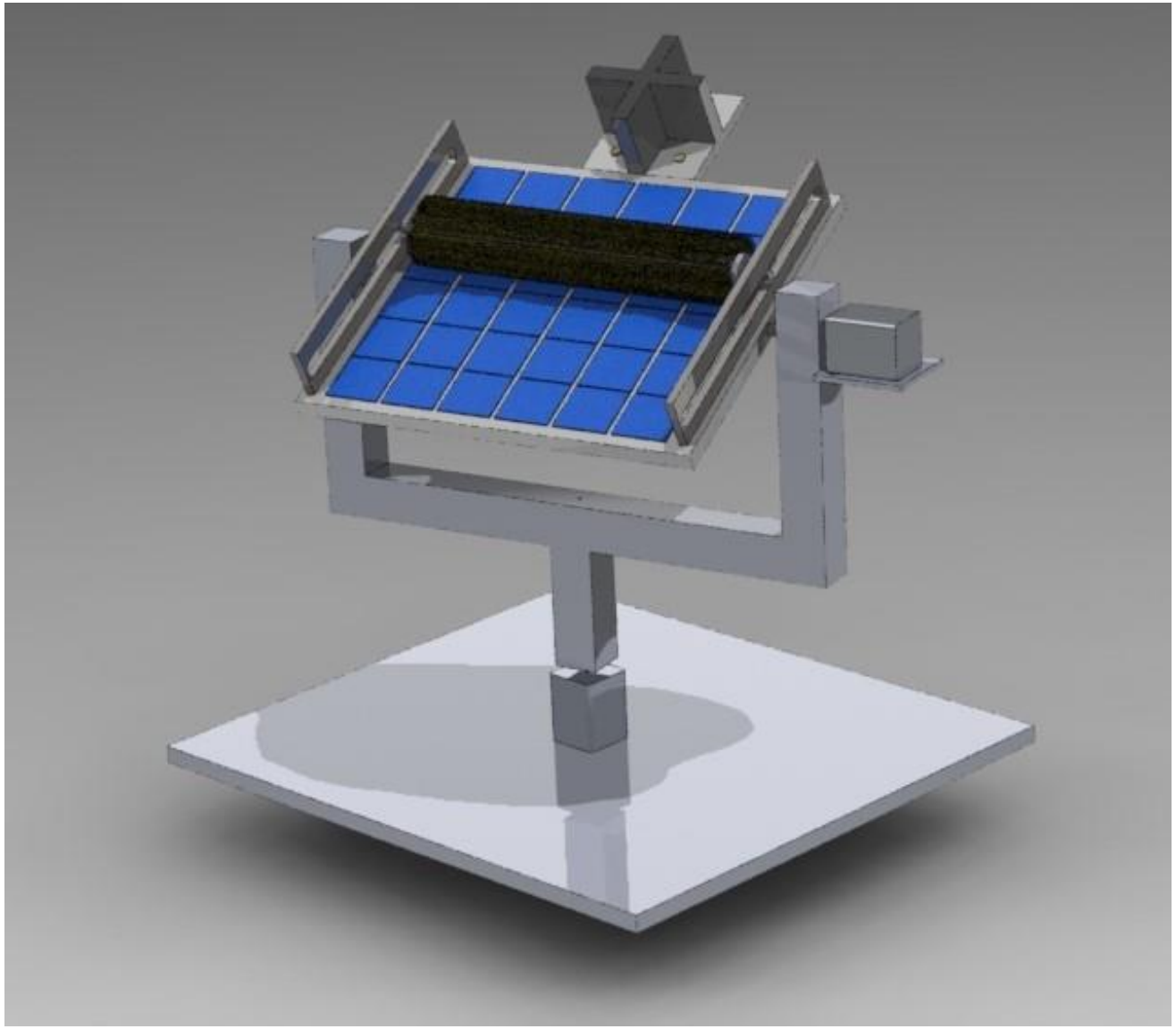
MAJOR COMPONENTS

To generate electricity from sunlight using PV system	To convert the input signals to desired output	To measure light density around the solar panel	To rotate the solar panel along horizontal axis & vertical & to roll the cleaning brush	To control the stepper motor,actuator precisely
SOLAR PANEL	**Arduino Mega**	**LDR**	**STEPPER MOTOR & ACTUATOR**	**Motor Driver**

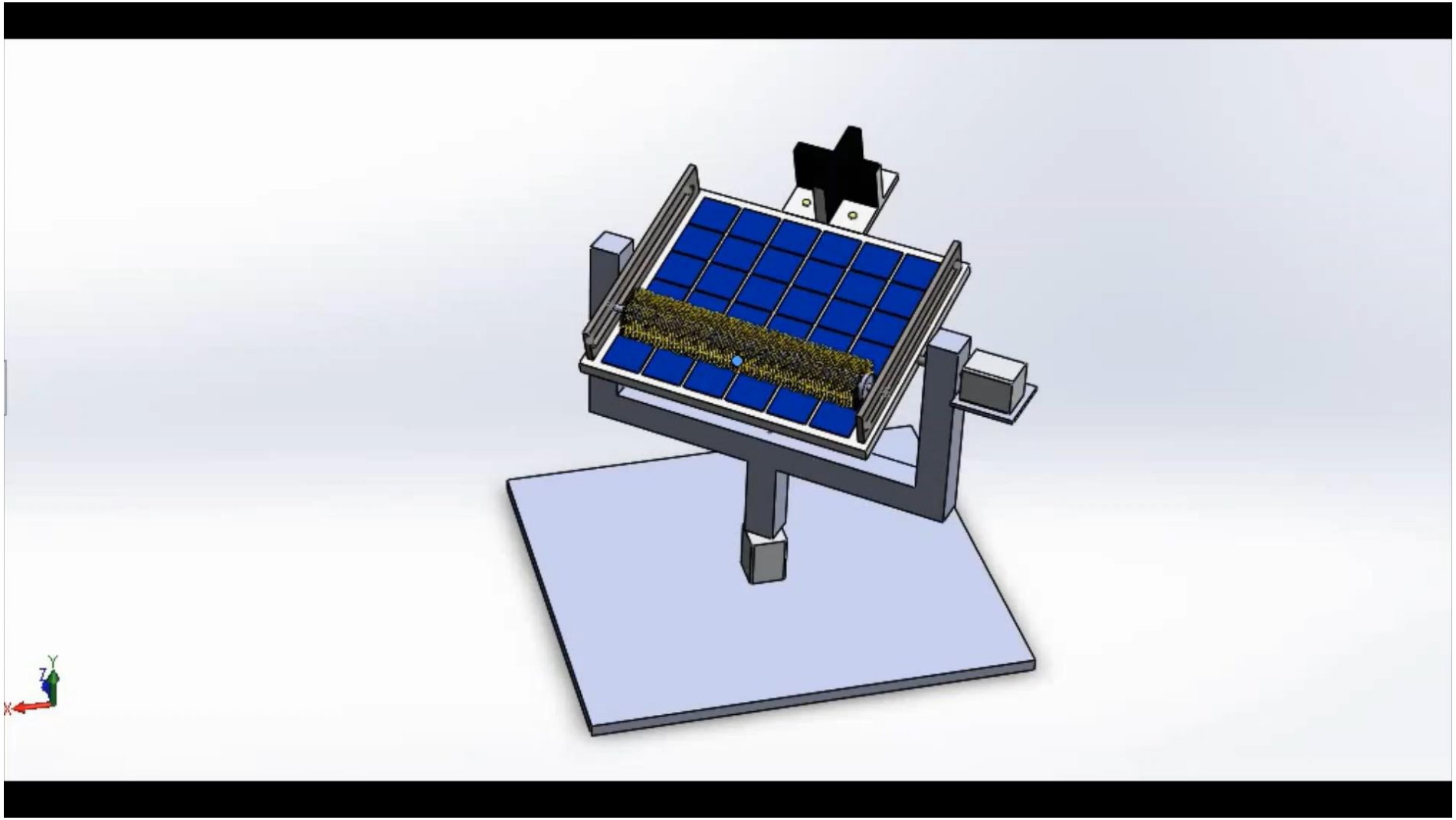
COMPONENTS	COST APPROXIMATION (BDT)
Arduino mega	1200
LDR	50
Stepper motor	2000
Motor driver	300
Solar panel	1000
Actuator	2500
12 V 1800 mAh LIPO battery	2200
Bluetooth module	200
Breadboard	100
Resistor	50
Supplementary components	400
Total costs	**10,000**

PROJECT DEMONSTRATION

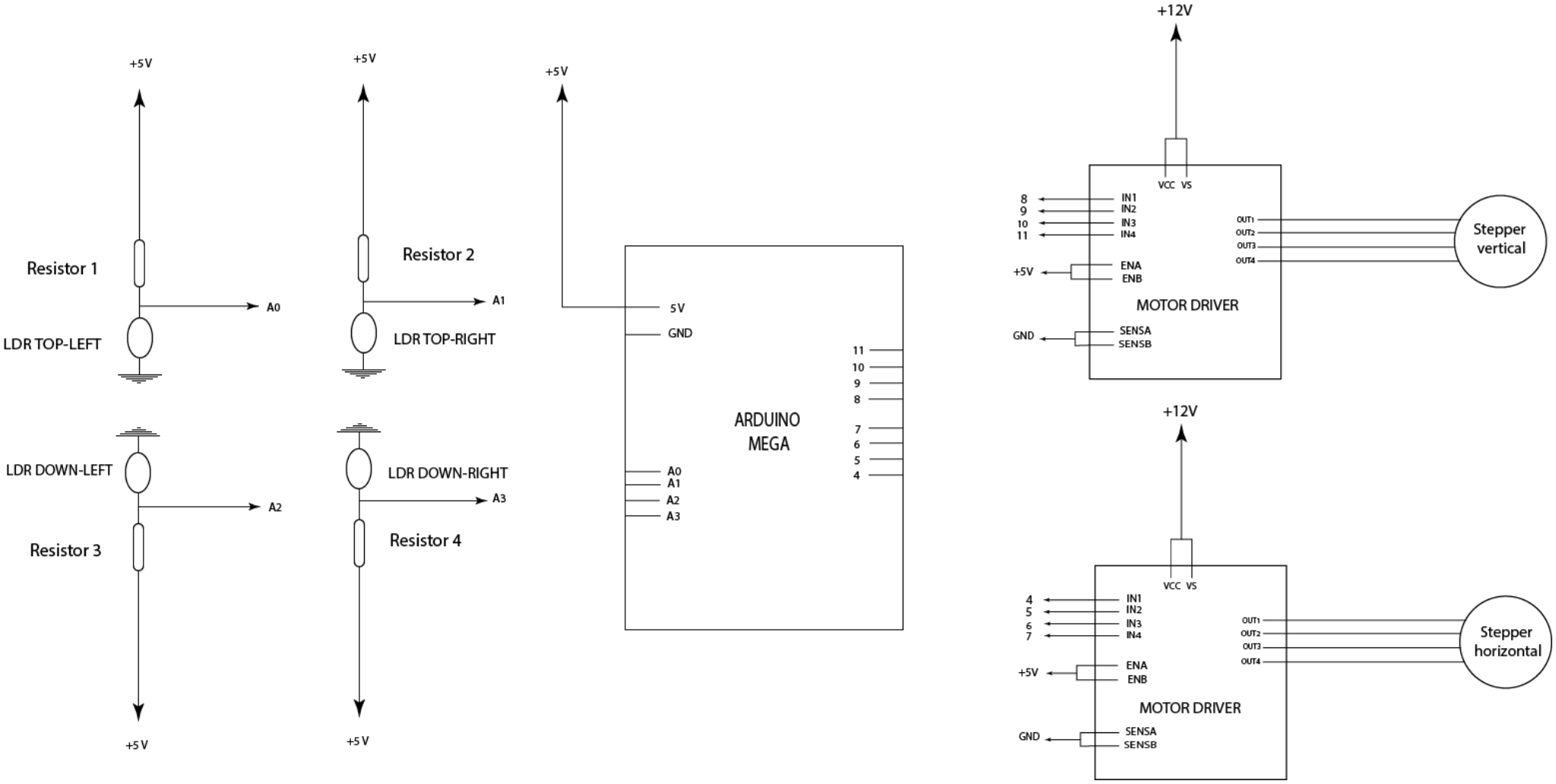
CAD DESIGN



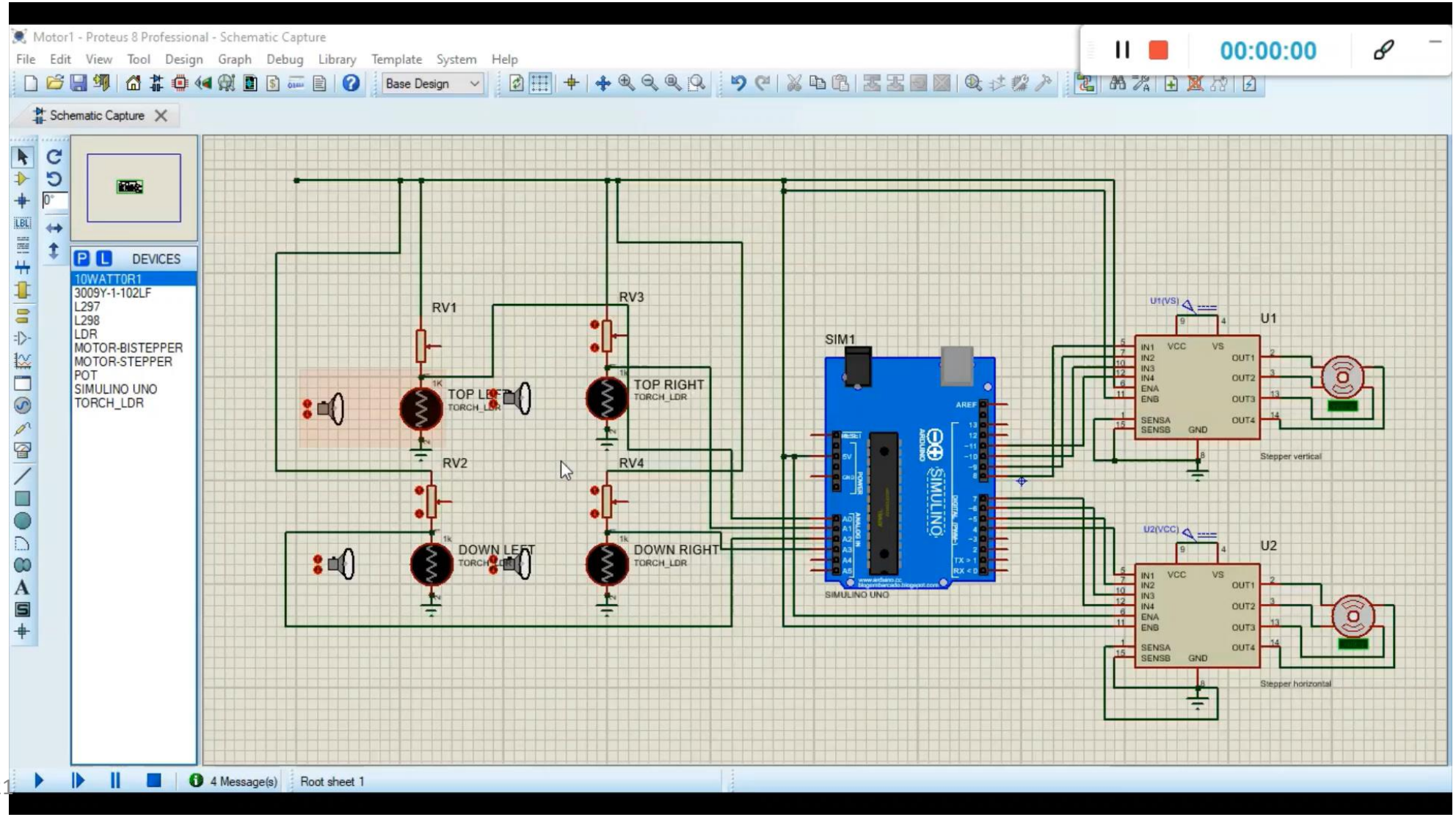
CAD DEMONSTRATION



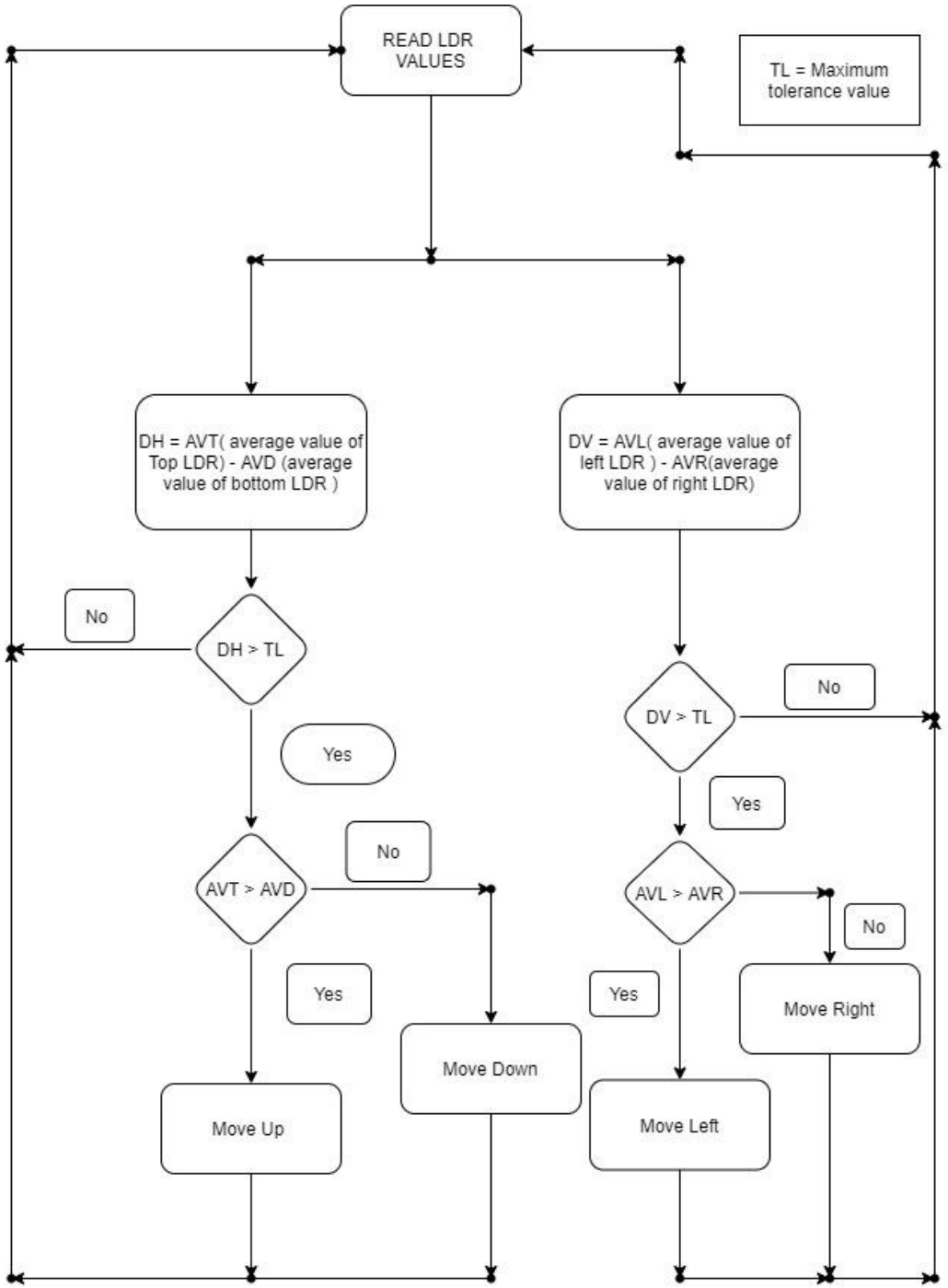
CIRCUIT DIAGRAM (SCHEMATIC)



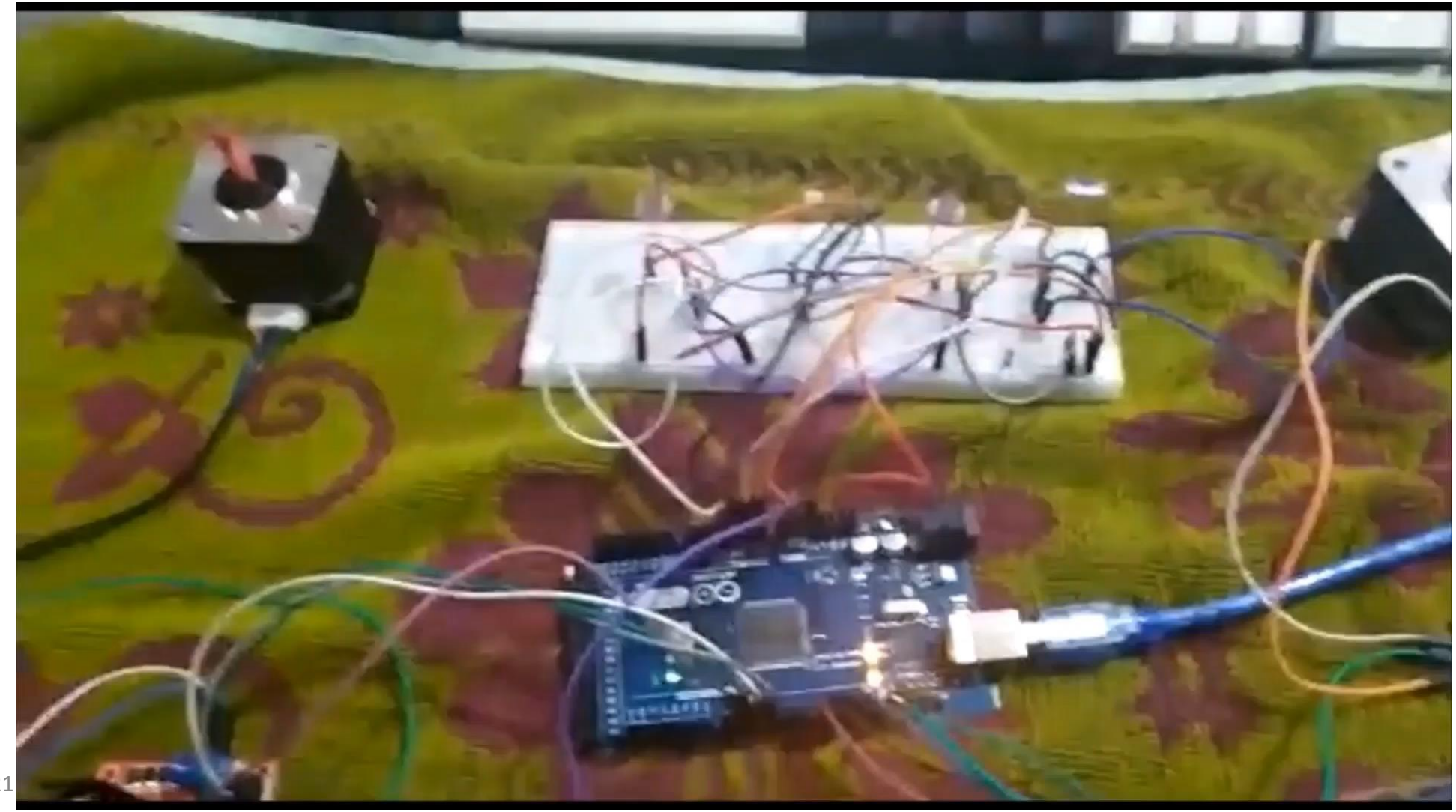
CIRCUIT DEMONSTRATION (SIMULATION)



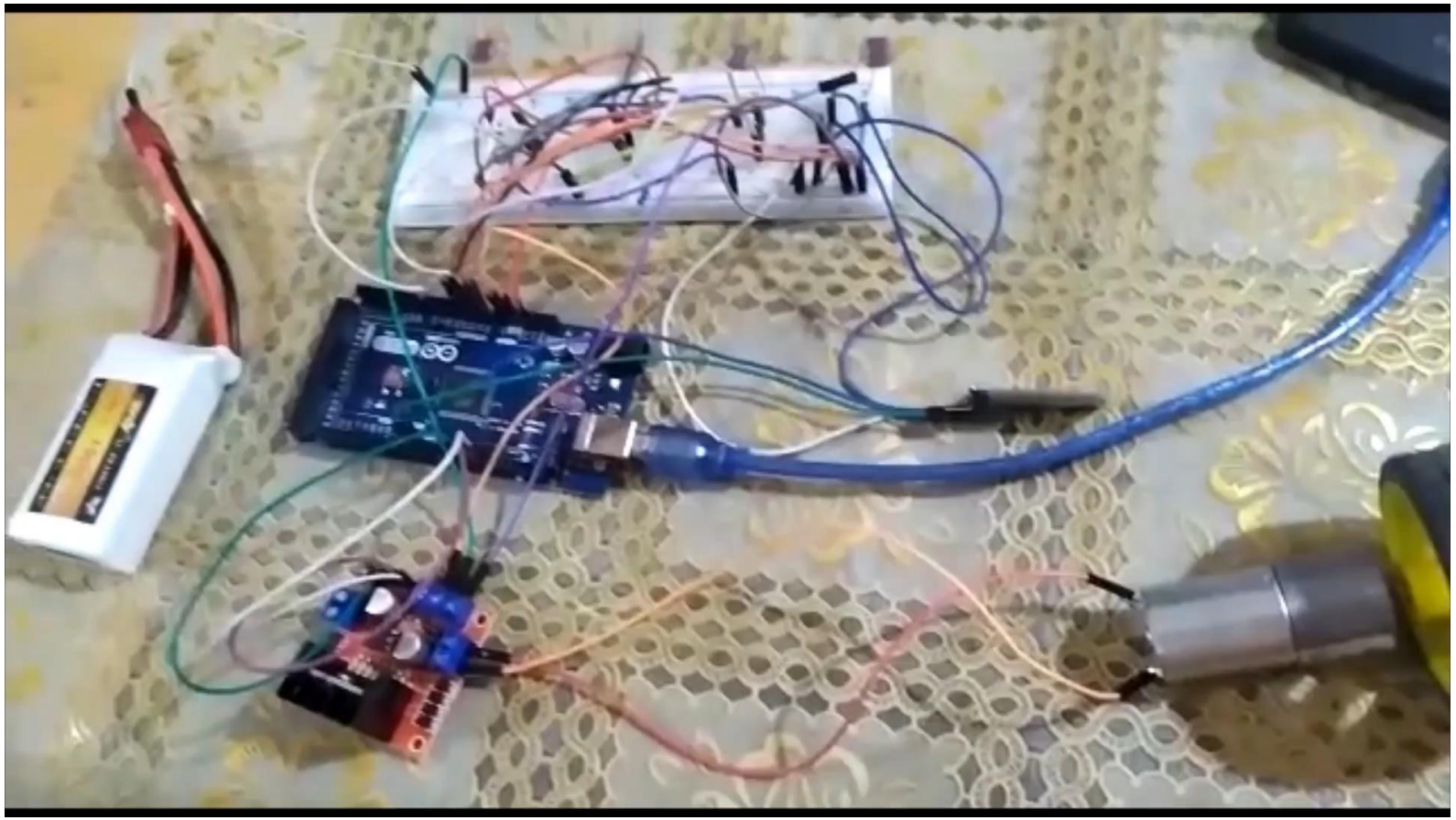
ALGORITHM

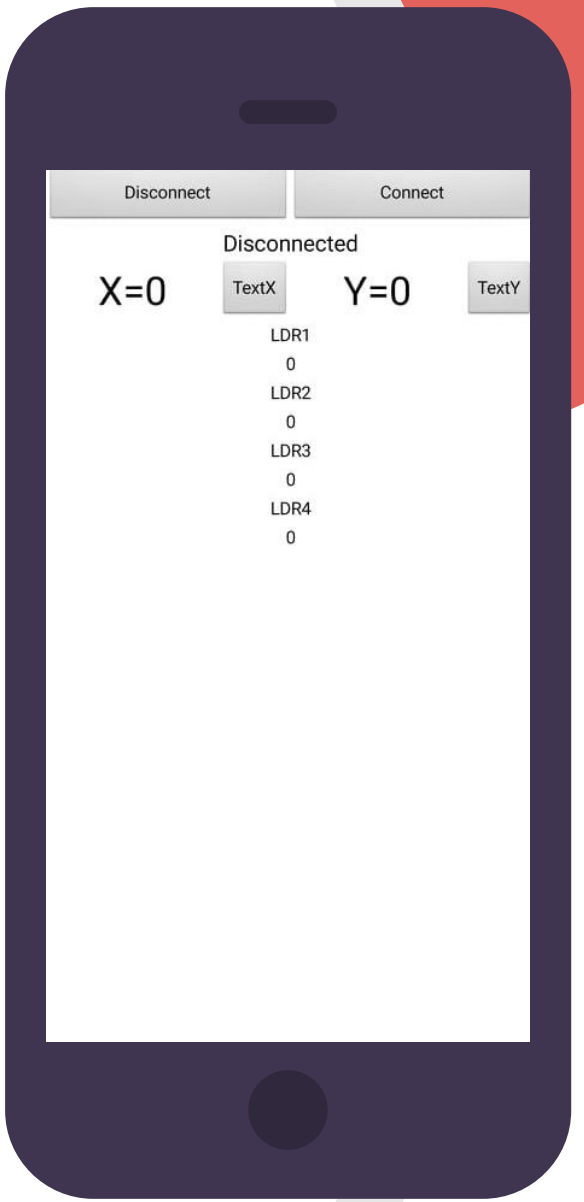

READ LDR VALUES
TL = Maximum tolerance value
DH = AVT(average value of Top LDR) - AVD (average value of bottom LDR)
DV = AVL(average value of left LDR) - AVR(average value of right LDR)
No
DH > TL
Yes
DV > TL
No
Yes
AVT > AVD
No
Yes
AVL > AVR
No
Yes
Move Up
Move Down
Move Left
Move Right

CIRCUIT DEMONSTRATION (HARDWARE)

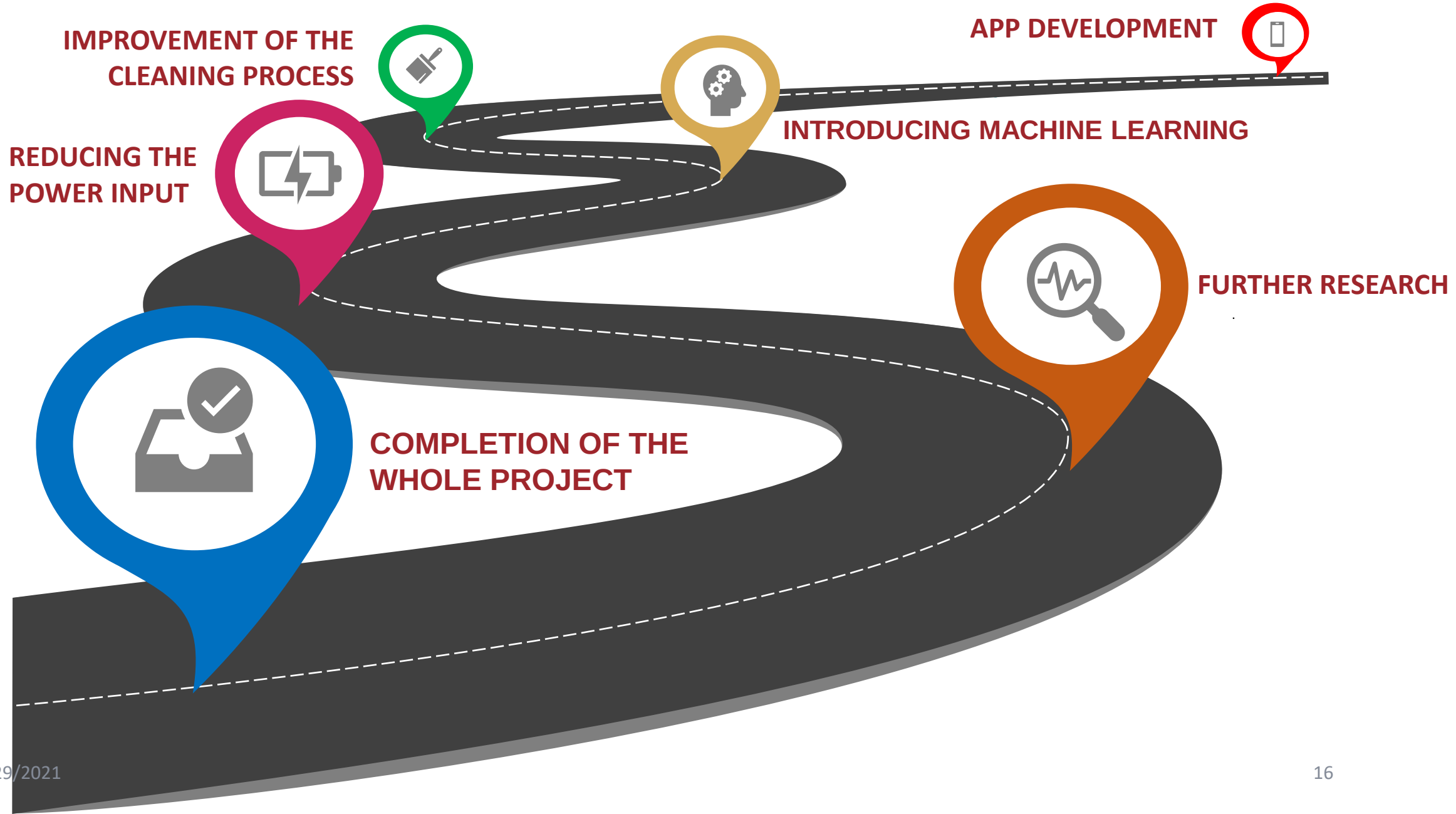


MOBILE APP DEMONSTRATION :

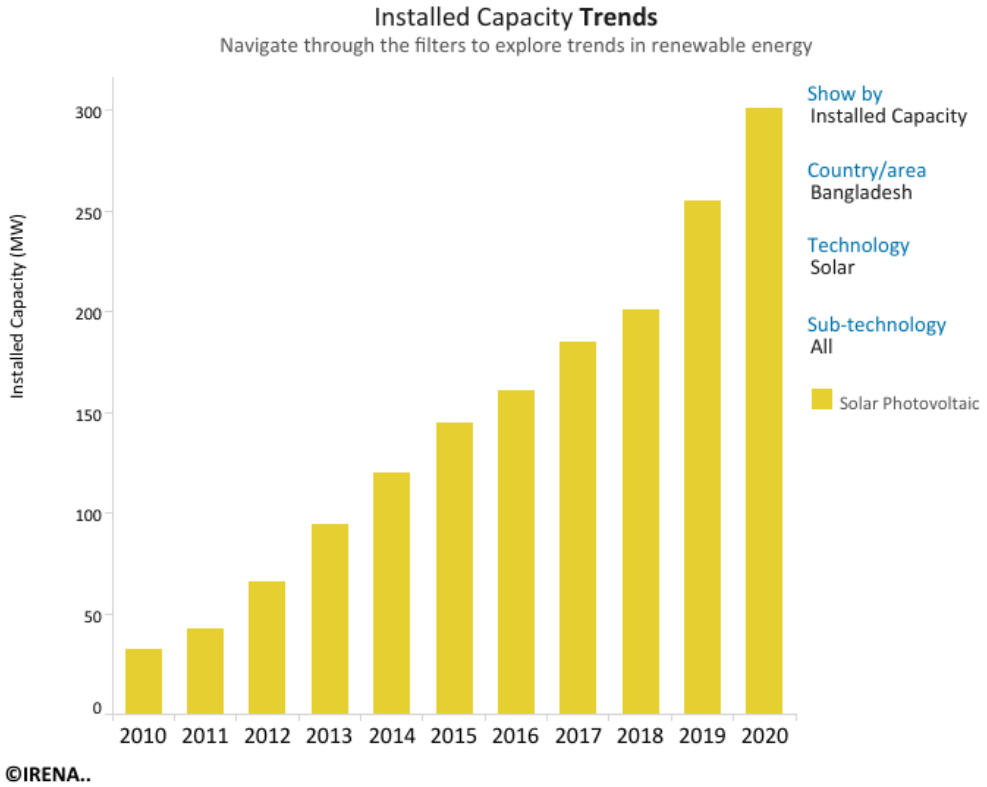


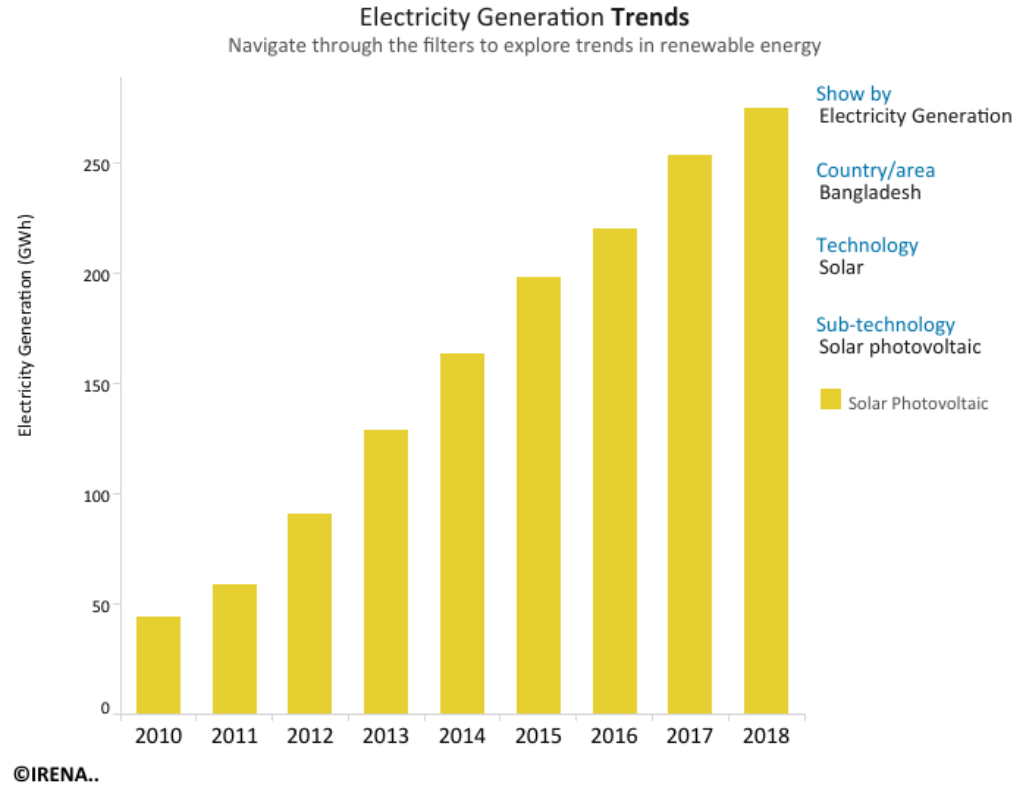


FUTURE PLANS



DATA ANALYSIS





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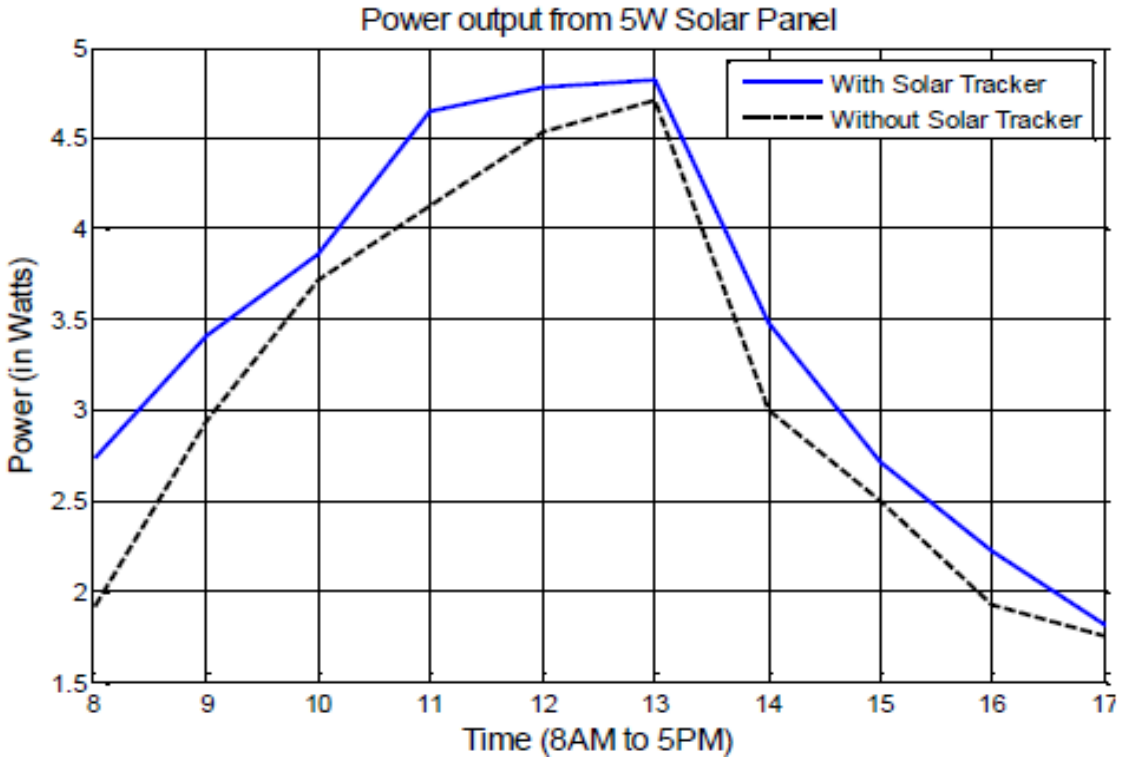
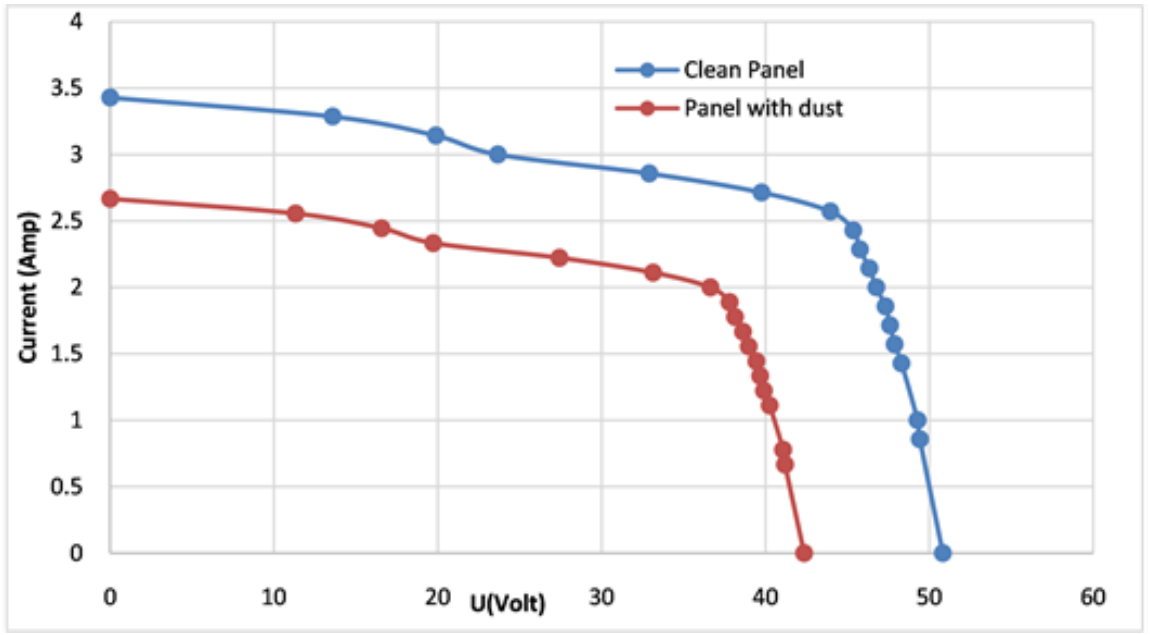


Hourly solar power output with & without solar tracker



Measured I-U characteristics for clean vs dusty panel

REFERENCES :

- *International Renewable Energy Agency*
- *Design and Implementation of a Single-Axis Automatic Solar Tracking System by Fahmid Sadeque (EEE, BUET) & Professor Quamrul Ahsan (EEE, BUET)*
- *Clean Point Energy, renewable energy specialist*
- *Trabant Solar, the next-generation of solar tracking*
- *Design and Performance of PV Dust Cleaning System by Khaled S. Al Qdah, Saleh A. Abdulqadir, Nawaf Y. Al Harbi*