

### 1 Background

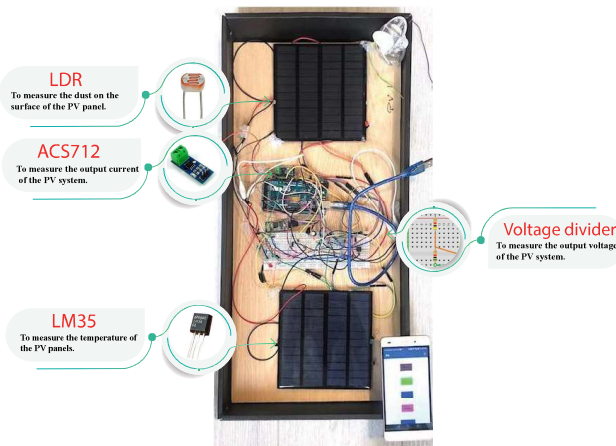
The widespread use of solar cell system faces some challenges that limits their performance and effect on the effectiveness of solar system, as there are many influencing factors such as (1) dust particles (2) high temperature (3) connection failure.

### 2 Aims

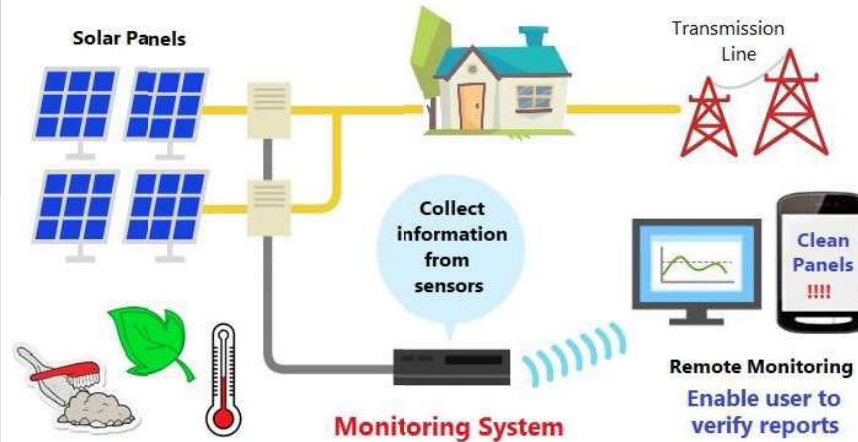
The aim is to design a prototype model that can allow to monitor the solar system using a mobile phone application.

### 3 Design

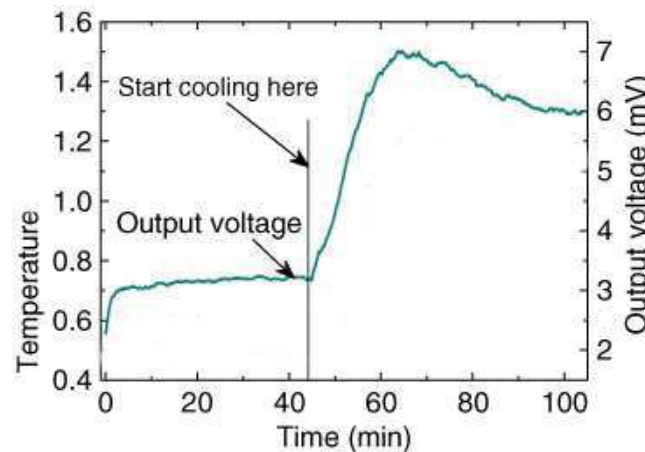
In typical PV monitoring systems, electronic sensors are used to attain data around key parameters that are required for the monitoring system. They include temperature, shading and contemporary sensor.



### 4 Methodology



Panel voltage decreases with the increasing in temperature. Therefore, the cooling operation (fan) needs to be started in order to compensate with the loss of efficiency.



### 5 Application

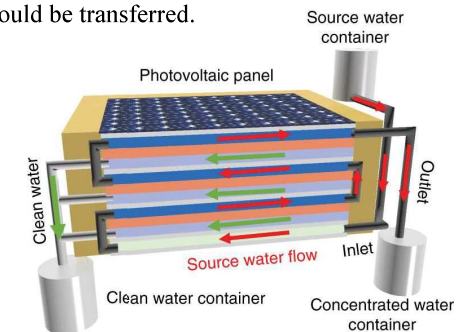
A mobile application was done in order to:

- Display the status of the PV panels and sensors outputs.
- Accurately communicate with the Arduino.
- Provide a secure application.
- Provide a user-friendly application for engineers.



### 6 Future development

A recovery heat can be added to convert the unwanted temperature to more useful energy by adding a coolant channel with pipes which allows liquid to flow through these pipes, then the excess temperature would be transferred.



### 7 Evaluation & conclusion

- According to the design, it was found that the temperature at which the system begins to lose a large amount of its efficiency is 30 celsius and 60% clearance of dust.
  - While monitoring the system, the distance between the end-user and the project must be within 10-meters.
- The testing and results have shown that they meet the aim and objectives and therefore, the system can be considered a successful.

