

ARTIFICIAL INTELLIGENCE SOLAR PANEL CLEANING MECHANISM

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ABSTRACT

The solar plate cleaning is done by different methods like manual workers, either help of the mop, spraying water on the solar plate etc. but our system is clean the solar plate by automation system. so solar plate efficiency is increase and the life of the solar plate is increase. all area of industries are going to like automated, economically and environment freely to reduce the global warming problem. But, in production of metal by molding process no any wide change. Our main concept for this project is cleans the solar plate by automation system itself. We designed and built an automated self-cleaning solar panel. The panel detect the presence of an obstruction shading a cell and actuate a cleaning mechanism that clean off the obstruction and therefore, restore the panel to normal capacity. Construct the automation system which clean the solar plate in few time we and lowest cost. So, project background is clean the solar plate by automation. To power the cleaning mechanism, we built our own power supplies which are supplied by a 12v battery.

Keyword: -Power Supply, Limit Switch, DC Motor, Wheels, Arduino-Uno, IR sensor, Wipper.

1. INTRODUCTION

Solar energy is one of the main promising clean energy sources in future of the world. The technology of Photovoltaic PV is always on continuous developing in many applications, so it is generate electricity without dangerous effect on environment .Now a day, energy-related aspects are becoming extremely important. They involve, for instance, a rational use of resources, the environmental impact related to the pollutants emission and the consumption of non-renewable resources. For these reasons there is an increasing worldwide interest in sustainable energy production and energy saving. Among the technologies that could play a role in the generation of sustainable and widespread energy, interesting solutions are represented by photovoltaic (PV) cells, wind generators, biomass plants and fuel cells. In particular, photovoltaic systems can be considered one of the most widespread solutions with significant margins of improvement while ensuring the generation of energy with low environmental impact.

It can utilize in pipelines cathodic protection. Furthermore, Photovoltaic systems are today largely used in rural electrification, and grid connected systems, also in a water pumping irrigation and remote check point etc. Because of their versatility, low maintenance, and long lifetime, photovoltaic (PV) modules are an alternative for small, off the grid energy projects.

2. OPERATION

First IR sensor detects the dust on panel. If the sensor gives 1 signal to microcontroller means no dust accumulated or its density does not affect solar panel performance. When it gives 0 to controller means need to remove dust by cleaning mechanism. Microcontroller take action as per programmed in uploaded in it. It drives the drive mechanism within control of limit sensors and make one complete cycle for cleaning After further check IR module check for dust on panel if it is clean then wait for dust to be accumulated as on cycle is going on.

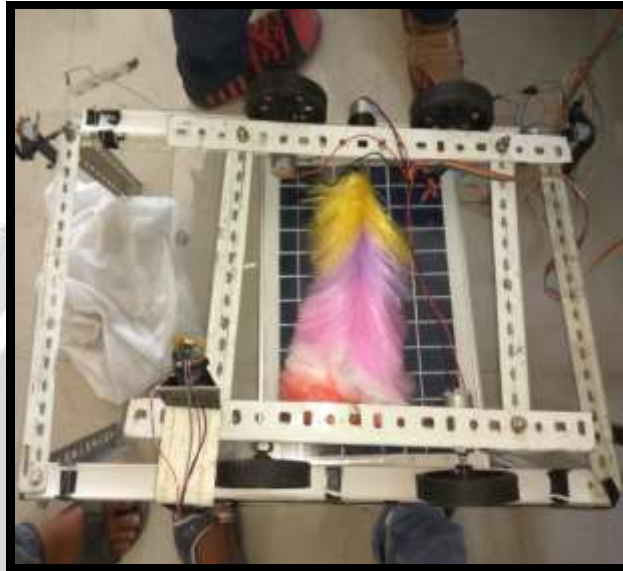


Fig -1: project Diagram

2.1 System Components

- **IR Sensor:-** used for detecting dust on solar panel
- **Aurduno uno:-** Open source low cost micro controller
- **Driver:-** 12volt dc motor driver
- **Limiting switch :-** used for limit the path

3. Arduino Software Programming

We are using an Arduino Uno, ArduinoDuemilanove, Nano, Arduino Mega 2560 , or Decimal. Aurdino programmed on aurdino open source software available on aurdino web site.The Programed use as below;

```
// automatic solar panel cleaning robot system
int SENSOR=3;
int LIMITSWITCH1=4;
int LIMITSWITCH2=5;
int MOTORD1A=6;
int MOTORD1B=7;
int MOTORD2A=8;
int MOTORD2B=9;
int BRUSHMOTORD3A=10;
int BRUSHMOTORD3B=11;
void setup()
{
pinMode (SENSOR,INPUT);
```

```

pinMode (LIMITSWITCH1,INPUT);
pinMode (LIMITSWITCH2,INPUT);
pinMode (MOTORD1A,OUTPUT);
pinMode (MOTORD1B,OUTPUT);
pinMode (MOTORD2A,OUTPUT);
pinMode (MOTORD2B,OUTPUT);
pinMode (BRUSHMOTORD3A,OUTPUT);
pinMode (BRUSHMOTORD3B,OUTPUT);

}

void loop()
{
if (digitalRead(SENSOR)==LOW)
move();
}

void move()
{
boolean STOP=false;
// FORWARD
digitalWrite(MOTORD1A,HIGH);
digitalWrite(MOTORD1B,LOW);
digitalWrite(MOTORD2A,HIGH);
digitalWrite(MOTORD2B,LOW);
digitalWrite(BRUSHMOTORD3A,HIGH);
digitalWrite(BRUSHMOTORD3B,LOW);
while(!STOP)
{
if (digitalRead(LIMITSWITCH1)==HIGH)
{
//REVERSE
digitalWrite(MOTORD1A,LOW);
digitalWrite(MOTORD1B,HIGH);
digitalWrite(MOTORD2A,LOW);
digitalWrite(MOTORD2B,HIGH);
digitalWrite(BRUSHMOTORD3A,LOW);
digitalWrite(BRUSHMOTORD3B,HIGH);
}
}
if (digitalRead(LIMITSWITCH2)==HIGH)
{
STOP=true;
//STOP
digitalWrite(MOTORD1A,LOW);
digitalWrite(MOTORD1B,LOW);
digitalWrite(MOTORD2A,LOW);
digitalWrite(MOTORD2B,LOW);
digitalWrite(BRUSHMOTORD3A,LOW);
digitalWrite(BRUSHMOTORD3B,LOW);

}
}
}

```

4. ADVANTAGES

- Faster because our robots move faster than a human... a LOT faster. And it's not just one robot, it's a fleet of robots.
- Greener because we use less than a cup of water per module and our robots are entirely battery powered. While the sun is plentiful, water is scarce and we take conservation seriously.
- More consistence result because robots don't get tired, they get tuned. We get better and better with every module cleaned, and at sites with hundreds of thousands of panels, that counts
- It is clear that the economic benefit of increased production and preserving the lifetime of the panels greatly outweighs the cost of periodic maintenance of the PV modules surface.
- Maintaining a clean surface on your solar panels is essential for optimum energy output.
- Solar system is designed to clean solar panels faster, safer, easier and is better for the environment
- Solar Panel Cleaning is required for Optimum Performance.

5. CONCLUSIONS

There are many benefits from such a project.

- 1) Economical benefit, where there is no more money will be paid to a cleaning agency.
- 2) It is time saving, where there is no time will be spent to clean those solar panels. Besides that, frequently cleaning will ensure that the solar panel works with a good transmittance.
- 3) Safety and health of workers in sites. Since robots are capable of working in hazardous environments, more dangerous operations are being handled by robots. Thus the safety and health of workers is ensured, thereby reducing expenditures on health and medicines.

6. REFERENCES

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