Dual-axis Solar Panel Tracking System

By

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Outline

- Introduction
- Problem Statement
- Project Specification
- System Design
- Component
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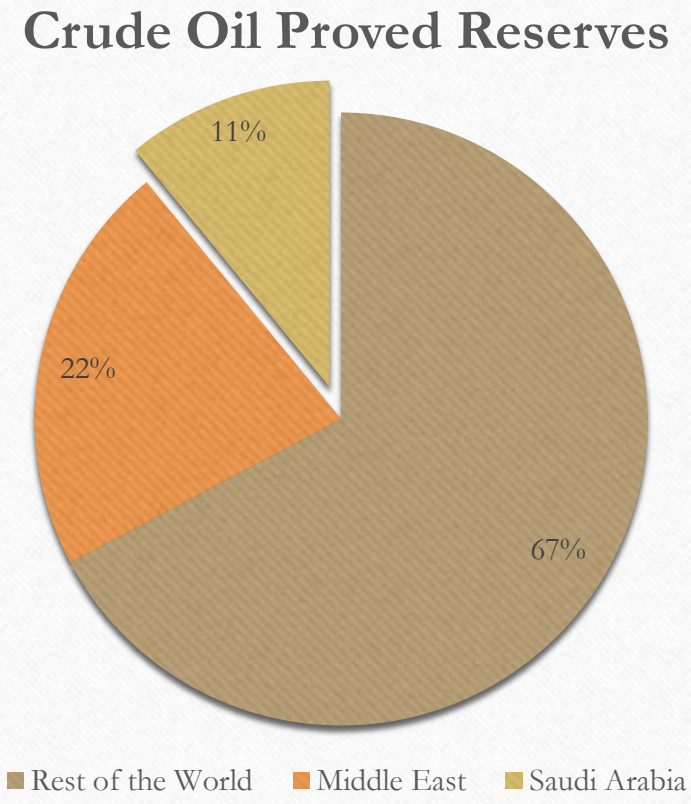
Introduction

- Oil is running out
- Sun is everywhere

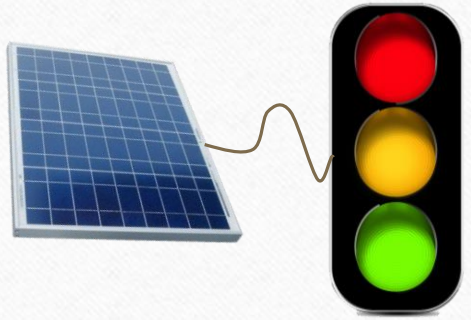


Problem Statement

- Increase the utilization of solar panels.
- Feeding the traffic lights with solar power.

  Result into:

  - Greener world
  - Utilization resource that use to power the traffic light.
  - Open the door for renewable resources
  - Achieving closed economy in energy needs



Project Specification

Requirement

- Adjust the Solar Panels to the most efficient angle.
- Feed 80% of its daily power.

  With the following criteria:

  - Cost-effective solution.
  - Competent dual-axis tracking system with high degree of precision.
  - Battery switch in case of night or shady situation .
  - Fall-safe switch in case of an emergency or an error.

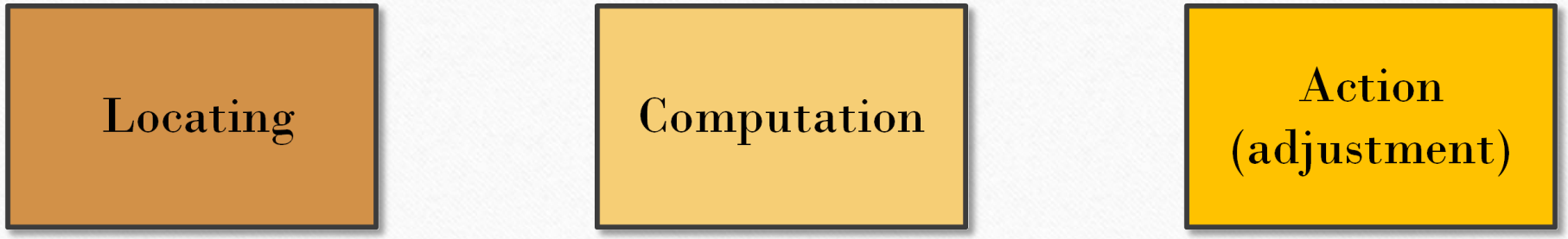
Project Specification

Specifications

- Using Sensors will lower the cost of calculation and adjust the panels more accurately
- Comparing the angle calculated from the algorithm
- Using stepper motors to move the panel with high precision (200 steps/revolution)
- Battery charging controller used to switch between either solar (normal usage), battery (night or shady) or grid (In case of a system failure).

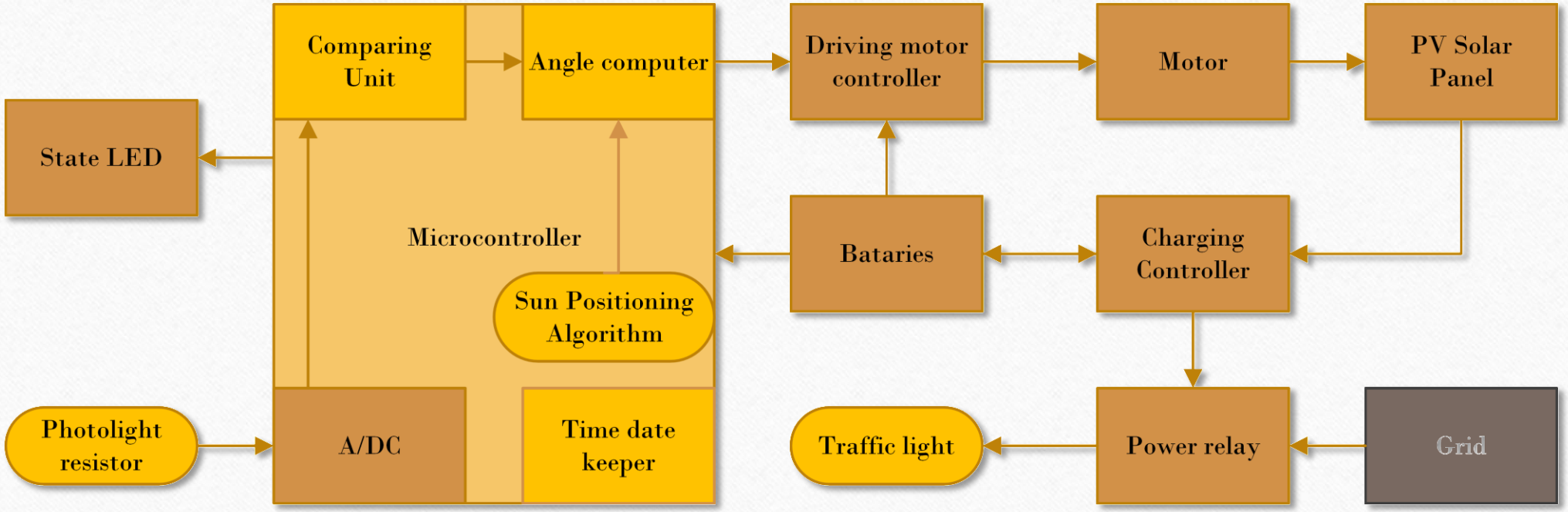
System Design
Architecture

- Sub-Function Identification



System Design

Architecture



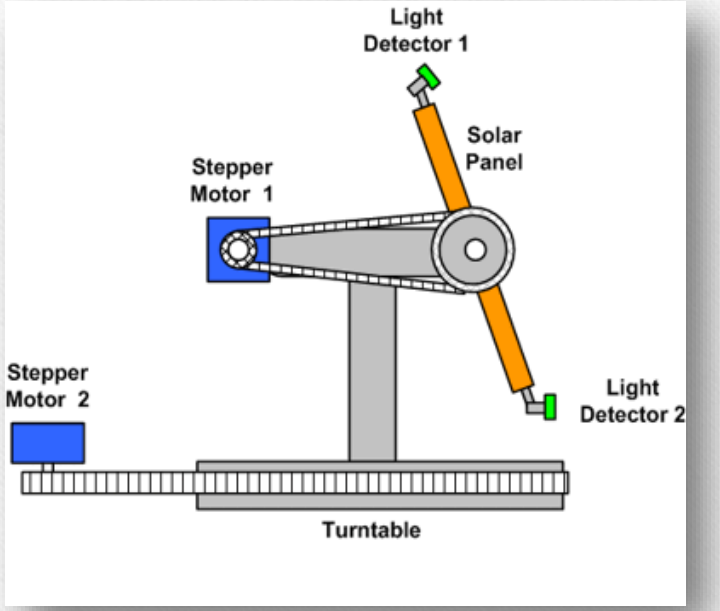
COMPONENT

READY FOR USE

- Stepper Motors.
- Linear actuators.
- Photo-light sensors.
- PV Solar Panel.
- Batteries.
- State LEDs.
- Driving motor controller.
- Charging controller.

Component Customized

- Stand to hold the PV Solar Panel

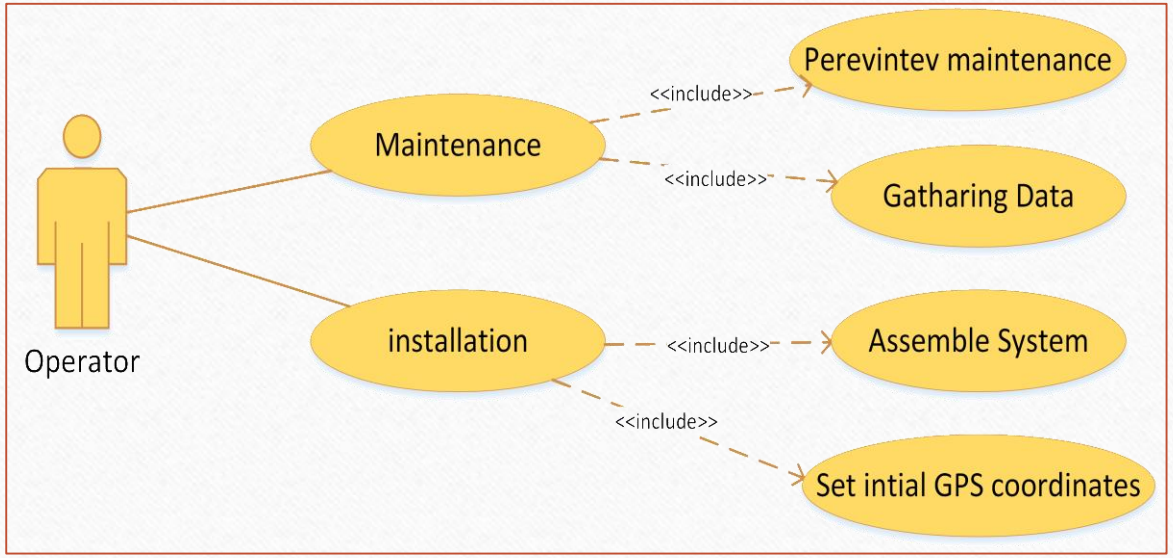


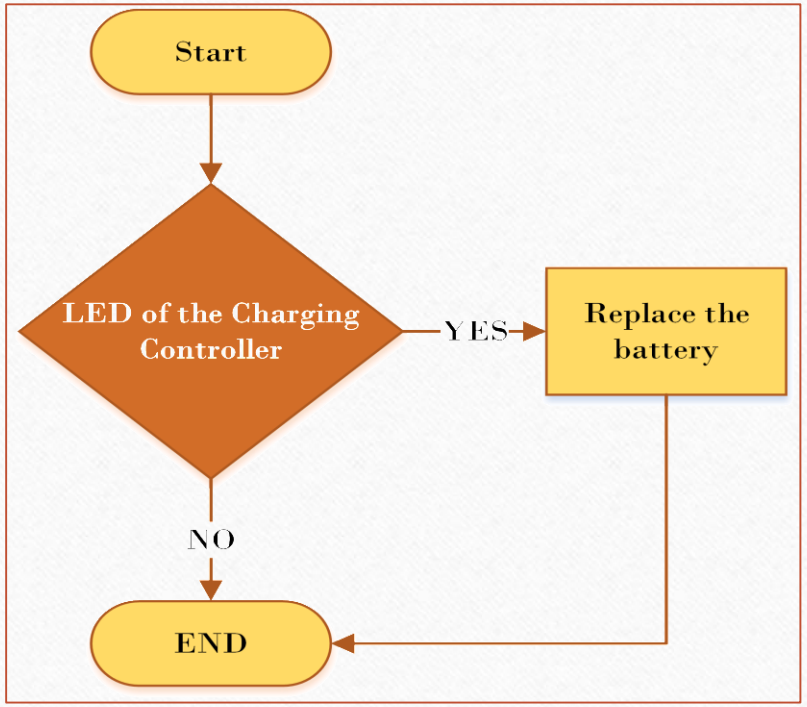
Component Customized

- Algorithm to track the sun
- Power relay

Implementation & Integration

- Actors
- Activity diagram





Design Decisions

- **Stepper Motor vs Servo Motors**

Criteria	Weight	Stepper motor	Servo motor
Cost	0.4	6	4
Power - Continuance feed	0.25	8	2
Accuracy	0.15	6	4
Precision	0.05	4	6
Weight	0.05	5	5
Torque	0.1	7	3
Total	1	36	24
Final score		6.45	3.55

Thank you

Any Question ?