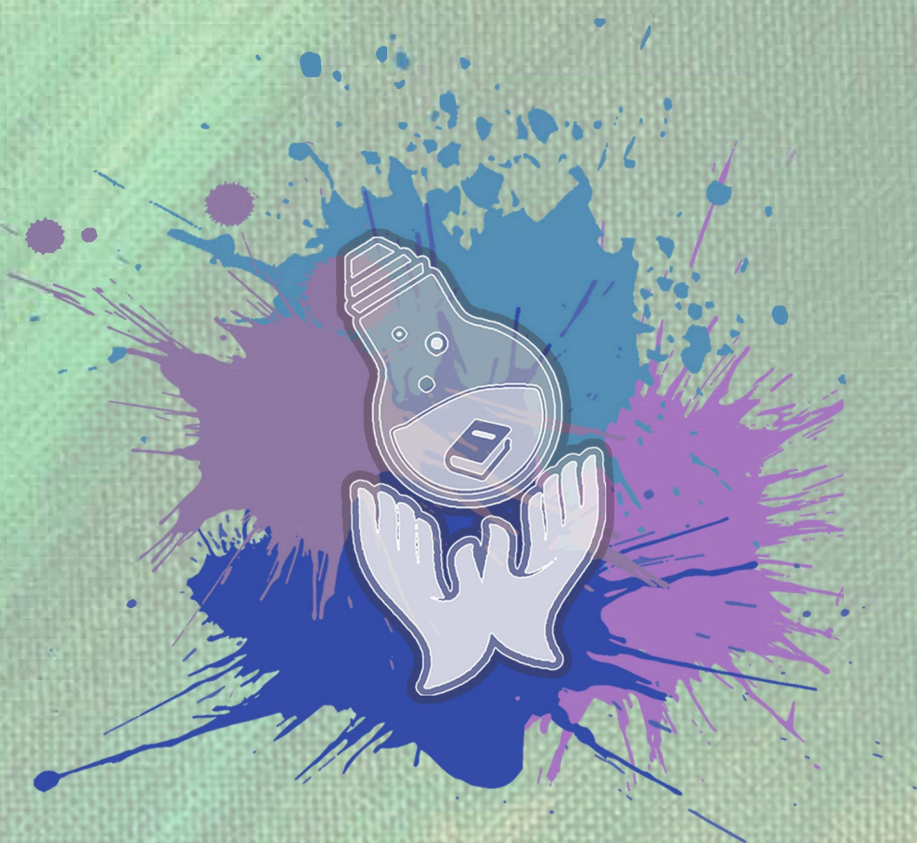UNIVERSITI
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SYSTEM IDENTIFICATION OF A SOLAR MAXIMUM POWER POINT TRACKING SYSTEM FOR DUAL AXIS

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Abstract:
The project is on Maximum efficiency of a solar panel. As the sun is not constant at one place and by fixing the solar array at a place, maximum power generation is not possible. This project develops a solar power generation system using maximum power point tracking system to gain more direct sun light on Photovoltaic (PV) modules leads to enhanced energy yield. Therefore, tracking systems are implemented to improve the performance of PV system by tracking sun trajectory. The current design of Maximum Power Point Tracking (MPPT) trackers are more efficient than conventional single state solar power generation. Then by comparing two designs initially produced, Maximum Power Point Tracking (MPPT) tracking devices are found to be at better efficiency than static models. The system locates maximum- power generating point using an MPPT controller. The base line results of this study were obtained via physical implementation of simulated system to analyze the various parameters. The system then uses a quadratic-equation based algorithm that calculates the quadratic function corresponding to the maximum power generation point. With the advent of different applications of PV solar power, system planners have been implementing different strategies and techniques to maximize the output of solar system with commonly available technology in market. Additionally, various mathematical techniques were utilized to analyze the results gathered from the physical implementation. The results of this study are based on two types of analysis. The comparison of static Photovoltaic output graphs with real time measured values for the systems and a Dynamic Photovoltaic Maximum power point Solar Tracker (MPPT) system. Both PV systems were implemented practically to get appropriate results and mainly all the equipment and services utilized in installation are widely available in local market.

Keywords:
Maximum power point tracking; photovoltaic; solar panel; controller; quadratic function

1.0 INTRODUCTION

Solar energy, being one of the cheapest and cleanest forms of energy sources, is widely available for the world as a good alternative source of energy. Power source contrasted with different techniques for power age is substantially more improved. Since the end of the last century, this field of power has had a significant influence on the field of energy. As an alternative, many technologies are being developed from various sources, which is one of the most advanced technologies in the world of energy production. It is one of the many methods of power generation that comes under the category of renewable energy.

The developments of the project are to create a sustainable economy because of this system uses renewable energy sources from the sun. Solar energy is arguably the most abundant renewable energy, and this project taps into its potential for the field of power generation. Max Power Point Tracking System (MPPT). The most important this system can increase the value of the house and saves a valuable resource. To utilize an elective wellspring of vitality as a sunlight-based vitality that is created can be used as an elective wellspring of vitality or power in residential enterprises and more. Through calculations, this framework and investigation of this framework will be based on the principles of future enhancement and implementation.

2.0   LITERATURE REVIEW

A solar tracker is a device that tracks the movements of the sun and is a device or a playboard towards a sun. For a flat panel photovoltaic system tracker are used to minimize the angle of incidence between the incoming sunlight and a photovoltaic cell. This increases the amount of energy produced by a fixed amount of installed capacity. Subsequently, a great deal of knowledge has been selected for controlling our exploration to realization. The researcher has looked at various techniques and is looking for the most dependable, accurate and measurably legitimate result.
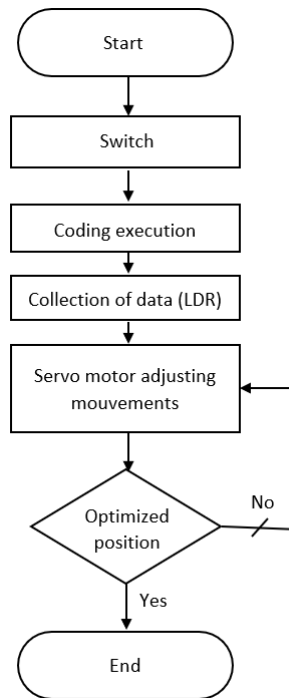
3.0   METHODOLOGY

Figure 1: Methodology

4.0   ANALYSIS AND FINDINGS

From the research, there are several methods for the solar systems which are Switching, coding execution, collection of Data (LDR), servo motor adjustments, and Optimized positions. The study is focused on the above flow chart as a whole process guide for the prototype to work to produce the required results for analysis. From the research, there are two types of solar power generation models which are the static model and the dynamic MPPT tracker modelling. The study is focused on the MPPT modelled system. From the simulation of the Arduino controller, the designed circuit need to include a maximum of four Light Dependent Resistors (LDR), and four 100KΩ Resistors.
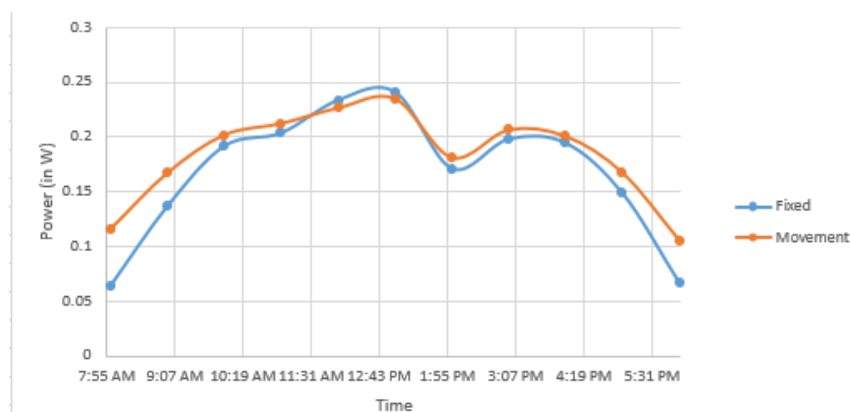

Figure2: Measurement

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Figure 2 shows the varies measurements of power for fixed and moveable solar panel. It showed that the system of tracking (MPPT), has more power received by the solar panel and it increasing as the heat increase. Thus, allowing a better yield for the system and it is profitable. Given the season in which the measurements were taken corresponds to the rainy season. We see that the clouds distort the curve, for a curve without error it would be necessary to make a very large number of measure and if possible, in dry season.

5.0   CONCLUSION

The main hindrance of solar energy going widespread is there is a national high capital cost of solar modules. But the benefits reaped from the systems implementation prove to be well worth the cost as over several years, the cost of implementing the MPPT system can be recovered back, and the overall power yield of the MPPT is greater than those of static single axis tracker over a long-term period. The disadvantage of solar energy production that the power generation is not constant throughout the day as it changes with weather conditions. This disadvantage is overcome in the project by implementing the tracker based solar system that eliminates this disadvantage entirely.

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