HIGH-EFFICIENCY DUAL-AXIS SOLAR TRACKING DEVELOPMENT USING ARDUINO

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ABSTRACT

The renewable-energy sector is fast gaining ground as a new growth area for numerous countries with the vast potential it presents environmentally and economically. Solar energy plays an important role as a primary source of energy, especially for rural area. This project presents the design and development of high-efficiency dual-axis solar tracking system using Arduino platform. Furthermore, the ultimate objective of this project is to trace the maximum sunlight source to power the solar panel. The project is divided into two stages, which are hardware and software development. In hardware development, five light dependent resistor (LDR) has been used for capturing maximum light source. Two servo motors have been used to move the solar panel at maximum light source location sensing by LDR. Moreover, the code is constructed using C programming language and directed to Arduino UNO controller. The efficiency of the system has been tested and compared with static solar panel on several time intervals, and it shows the system react the best at the 10-minutes intervals with consistent voltage generated. Therefore, the system has been proven working for capturing the maximum sunlight source for high efficiency solar harvesting applications.

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Nowadays, climate change on globe is at a critical level. Climate change can be divided into two categories, human and natural causes. The natural variability and the climate fluctuations of the climate system have always been part of the Earth's history. Natural causes of climate changes are ocean current, solar variations, and earth orbital changes. The main parts of climate changes caused by human are man-made greenhouse gases. Global warming or climate changes can be seen through some of them natural phenomenon like the effect on crops and extreme weather conditions around the world. The technique that has been considered to control these problems is by renewable-energy harvesting.

Renewable-energy is an energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished) [1]. Renewable-energy is the best growing energy source on the planet. Renewable-energy is a source of energy that doesn't consume the finite resources of the Earth and can be easily and quickly replenished. Renewable-energy plays a key role in a country's energy needs; enabling businesses to gather energy cost investments and also revenue thus control the outcome of climate changes. In Malaysia, oil and coal are the primary resources of electrical energy for relatively long periods of time.