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ARDUINO SOLAR TRACKER WITH BLYNK

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ABSTRACT

This extensive abstract describes an innovative Internet of Things (IoT)-enabled Arduino solar tracking system that aims to maximize solar panel performance by dynamically altering the panels' position throughout the day. Using IoT connectivity for remote accessibility and Arduino microcontrollers for accuracy and versatility, this modern invention marks a substantial advancement in solar technology. The system maximizes solar energy capture by ensuring correct panel alignment in real-time through the use of servo motors, light sensors, and an intelligent algorithm. The Arduino board serves as the main control unit, coordinating panel movements and allowing online or mobile application-based remote monitoring and control. By increasing solar panel efficiency, this connectivity not only improves the system's technical capabilities but also advances sustainable energy options. Beyond technological developments, this project represents an important step toward the general acceptance of renewable energy practices. It provides a clever, flexible, and effective solution that has the potential to change how solar energy is used in the future in order to create a more sustainable environment. In order to ensure both functionality and efficiency, the process went further by designing and integrating the Arduino board, light sensors, and servo motors as part of the solar tracking system. These steps were followed by careful testing. The results show major improvements in capturing electricity efficiency, confirming that the sun tracking system is a useful tool for optimizing solar panel performance. In summary, the project presents an effective use of Internet of Things-enabled solar tracking technology and presents an achievable method to improve renewable energy practices and make a positive impact on a more sustainable future.

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CHAPTER 1

INTRODUCTION

1.1 Background

This research aims to develop and deploy an innovative solar tracker system that combines Arduino microcontrollers with the Blynk Internet of Things (IoT) platform in response to the increasing demand for sustainable energy sources. One of the main problems with stationary solar panels is that they can't adjust to the sun's changing position over the day, which limits how much energy they can collect. The system seeks to accomplish accurate control and real-time adjustment of solar panel orientation by utilizing the open-source Arduino platform. Furthermore, another level of remote monitoring and control is added by the integration with Blynk IoT, improving the solar tracker's use and accessibility. The process entails choosing and integrating light sensors and actuators to precisely detect sunlight and move panels. An effective sun tracking algorithm is then programmed into the Arduino microcontroller. The project is important because it could provide an innovative, economical, and energy-efficient way to maximize solar energy conversion. This could lead to a wider adoption of renewable energy techniques. The goal of the research is to show the system's effectiveness and adaptability through extensive testing in a range of environmental settings. Better energy harvesting and an intuitive user interface via the Blynk mobile application are among the anticipated results. In the end, the successful implementation of this solar tracker system has a broader impact for developing sustainable practices in various applications and expanding the field of renewable energy.