Solar Tracking System

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ABSTRACT

This study proposes a low-cost solution for enhancing the energy generation efficiency of solar panels through sun tracking. The system utilizes light-dependent resistors (LDRs) to detect sunlight intensity and a TDA 2030 amplifier for signal processing. By employing a simple yet effective control mechanism, the system dynamically adjusts the orientation of the solar panel to maximize sun exposure throughout the day. The research investigates the feasibility, performance, and practical implications of the proposed system in real-world applications.

INTRODUCTION

The development of technology in healthcare has brought about innovative solutions to address critical issues such as medication adherence. One such solution is the smart medication reminder box, which leverages a combination of real-time clock (RTC) modules and code-driven systems. This paper presents a review of smart medication reminder boxes that rely on pre-programmed schedules for LED activation and buzzer alerts to remind individuals to take their medications. The paper explores the effectiveness, advantages, and potential limitations of this technology in improving medication adherence, ultimately contributing to better health outcomes.

Review of Solar Tracking System:

- •"Efficiency at its Peak: Its ability to adjust to the sun's position throughout the day significantly increased energy production, maximizing savings on electricity bills."
- "Innovation in Action: Installing the sun tracking solar panel was a game-changer for home. Its intelligent design ensured optimal sun exposure, proving its worth by consistently generating more power than fixed panels."
- "Unmatched Performance: The sun tracking solar panel outshines traditional panels with its dynamic orientation. Witnessing its ability to follow the sun's path and adapt to changing light conditions was truly impressive."
- "A Wise Investment: Upgrading to the sun tracking solar panel was undoubtedly a wise decision. Its advanced tracking system maximizes sunlight utilization, offering a substantial return on investment and contributing to a greener future."

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BLOCK DIAGRAM

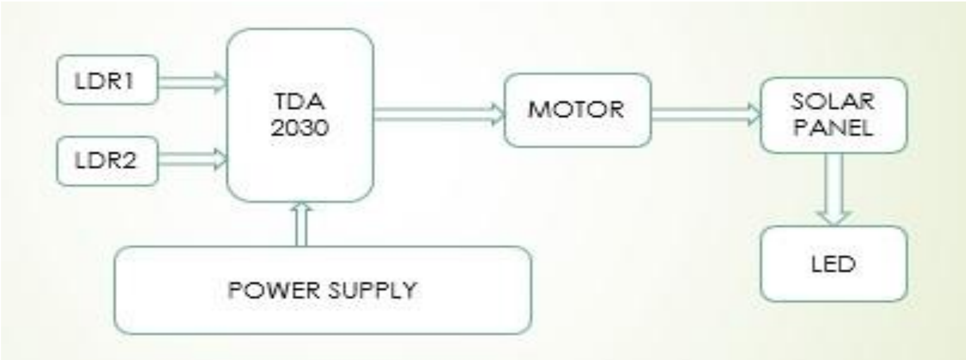

Figure 1 Block Diagram of System.

BLOCK DIAGRAM DESCRIPTION: SUN TRACKING SOLAR PANEL

TDA 2030 amplifier: This audio amplifier chip can be repurposed to amplify signals from the LDRs, ensuring accurate detection of sunlight intensity.

Solar panels: These are the primary components that convert sunlight into electricity. They serve as the energy source for the system.

LDRs (Light Dependent Resistors): LDRs are light-sensitive devices used to detect sunlight intensity. They provide input to the control system about the brightness of the sunlight.

DC motor: The DC motor is responsible for adjusting the orientation of the solar panels based on input received from the LDRs. It's controlled by the system to ensure optimal sunlight exposure.

Power supply: A stable and reliable power supply is essential to power the entire system, including the TDA 2030 amplifier, LDRs, and DC motor.

SCHEMATIC DIAGRAM

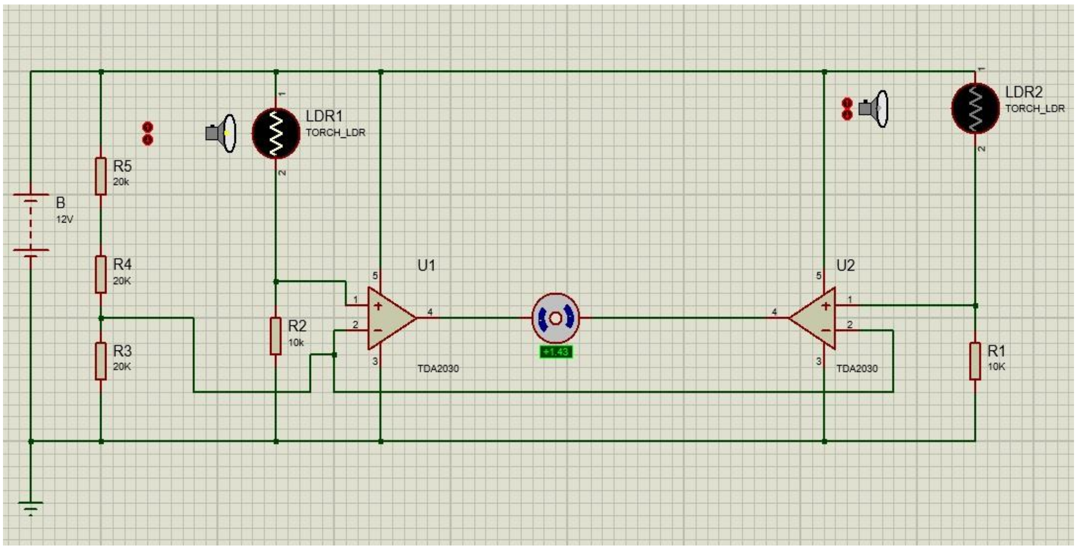

Figure 2. Schematic Diagram

OPERATION OF SCHEMATIC

1. Solar Panel: Represents the primary energy source, converting sunlight into electricity.
2. LDRs (Light Dependent Resistors): Placed at strategic locations to detect sunlight intensity.
3. TDA 2030 Amplifier: Amplifies the signals received from the LDRs for signal processing.
4. DC Motor: Controls the movement of the solar panel to track the sun's position.
5. Power Supply: Provides electrical power to the entire system.
6. Sunlight Intensity Detection: The LDRs continuously monitor the intensity of sunlight falling on them. They generate analog signals corresponding to the detected light levels.
7. Signal Amplification: The analog signals from the LDRs are amplified by the TDA 2030 amplifier. This amplification stage ensures that even subtle changes in sunlight intensity are accurately captured.
8. Signal Processing and Comparison: The amplified signals are processed and compared to determine the relative brightness of sunlight falling on each LDR. If one LDR detects significantly more light than the other, it indicates that the sun is not directly facing the solar panel.
9. Panel Orientation Adjustment: Based on the comparison results, the control system sends appropriate signals to the DC motor to adjust the orientation of the solar panel. The motor rotates the panel to align it with the direction of the sun.
10. Continuous Monitoring and Adjustment: Throughout the day, the system continuously monitors the sunlight intensity and adjusts the orientation of the solar panel accordingly. This ensures that the panel maintains optimal alignment with the sun, maximizing energy generation efficiency.

FLOWCHART OF SYSTEM

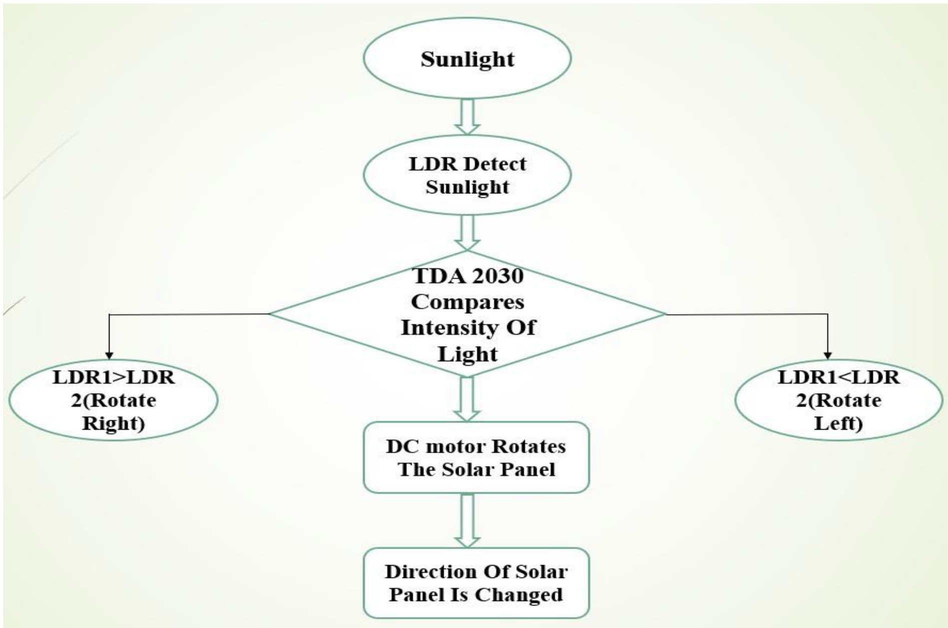

Figure 3. Flowchart of System

Sunlight is detected by an LDR (Light Dependent Resistor).

The LDR's output is fed into the TDA 2030, an audio power amplifier IC, which compares the light intensity received by two LDRs (LDR1 and LDR2).If the light intensity detected by LDR1 is greater than that of LDR2, the DC motor connected to it rotates to the right, causing the solar panel to change its direction and face the area of higher light intensity. Conversely, if the light intensity detected by LDR1 is less than that of LDR2, the DC motor connected to LDR2 rotates to the left, causing the solar panel to change its direction and face the area of higher light intensity.

This process repeats as the sunlight changes, allowing the solar panel to maximize its exposure to sunlight and optimize its energy production.

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