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| **Title:** | Enhancing Photovoltaic Power Generation through a Microcontroller-Driven Single-Axis Solar Tracker | | |
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| **Abstract:** |  |
| Aims: The principal aim of this study is to make an automatic single-axis solar panel tracking system according to the sun's movement. The purpose of this effort is to design an efficient microcontroller-based solar panel follower system to follow the trajectory of the sun.  Study Design: This research initiative aims to design, simulate, and implement an automatic single-axis solar panel tracking system using Arduino Uno microcontroller and light sensors and thus to ensure that the environment is clean and safe to combat the climate change effect. This is especially significant in locations where the amount of sunshine varies during the day.  Place and Duration of Study: Department of Electrical and Electronic Engineering, American International University-Bangladesh (AIUB), Dhaka, Bangladesh between January 2023 and July 2023.  Methodology: In this research effort, we used an Arduino Uno microcontroller, servo motor, LDR sensor, LEDs, solar photovoltaic panel, etc. to make the proposed system. Arduino IDE was used for the program development. The microcontroller controls a servo motor to drive the solar panel from east to west to follow the sun’s path in the same direction.  Results: The simulation results and hardware output results confirm its functionality.  Conclusion: This design has the potential to drastically cut energy costs and increase the use of renewable energy sources by augmenting the efficacy of photovoltaic systems through the use of a microcontroller-driven single-axis solar tracker, thus contributing to a more sustainable future. This can be scaled up in the future using more sensors and axis. | |