LED LIGHTING CONTROLLER PROJECT

Assignment 1: Idea for Project

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Introduction: LED Lighting Controller Project

In the field of home and small-scale commercial automation, the LED Lighting Controller project draws inspiration from the Cisco Digital Ceiling program, modifying its ideas to address the specific issues encountered in these situations, (Cisco Digital Ceiling, 2016).

Statement of Problem:

Conventional LED lighting installations have inherent limitations, since each fixture requires a separate 120VAC to 36VDC power supply. This setup presents substantial issues.

1. Point of Failure: Ceiling-mounted power supply, which are frequently exposed to severe temperatures behind insulation, are common failure locations.
2. Inefficiency: Small, individual power supply have inadequate efficiency, which affects total system performance.
3. Installation Complexity: The use of electricians and obligatory Electrical Safety Authority (ESA) inspections complicate the installation procedure.

Methodology:

The LED Lighting Controller project presents a unique approach for powering LED lighting using low-cost CATx networking connections. This technique tackles the highlighted difficulties by utilizing the following important features:

1. Simplified Installation: Non-electricians may manage the wiring, resulting in lower installation costs.
2. Cost-Efficient Wiring: CATx cable, which requires less copper, is more economically viable than typical NEMA 15/2 electrical wire.
3. Centralized Power source: Multiple fixtures may now be powered by a single, energy-efficient power source, increasing overall system efficiency.
4. Enhanced Reliability: Locating the power supply and electronics away from severe temperatures improves system reliability and makes replacement easy if necessary.

Hypothesis:

This project's hypothesis is that by following the provided technique, the LED Lighting Controller would overcome the constraints of standard LED lighting systems. The use of CATx networking cables for

power distribution, together with the integration of sophisticated control capabilities, is projected to produce the following results:

1. Increased dependability: Placing the power supply centrally and away from severe temperatures will reduce failure sites and improve overall system dependability.
2. Cost Savings: Simplified installation and the use of cost-effective CATx cable will result in lower installation costs, making the solution more financially viable.
3. Efficient Power Management: Centralized power supply, along with PWM management and MQTT protocol integration, will optimize power use, resulting in greater efficiency.

The LED Lighting Controller project uses a hypothesis-driven method to revolutionize LED lighting systems in residential and small commercial settings, providing a dependable, cost-effective, and technologically sophisticated solution.

References

Cisco Digital Ceiling. (2016). Retrieved from Cisco: https://www.cisco.com/c/dam/global/zh_cn/assets/pdf/white-paper-c11-736542.pdf