Intellux

Project Goals

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1. Table Of Revisions

Version	Date	Authors	Description Of Revision
0	24/09/2021	Abdulrahman Elgendy Ahmed Afifi Mina Ghaly Omar Mouftah	Initial goals and description of the system
1	13/02/2022	Abdulrahman Elgendy Ahmed Afifi Mina Ghaly Omar Mouftah	- Updating ease of use goal to include more installation details - Clarifying autonomous goal - Modifying stretch goals to be more realistic than anticipated

Introduction

In recent years, there has been an emerging movement towards having energy-efficient homes. This has helped reduce high energy bills by targeting inefficient systems and focusing on wasted resources [1]. One of the ways to achieve energy efficiency is through strategies to reduce artificial lighting by intelligent daylight utilization [2]. Excessive sunlight coming through a window can lead to visual discomfort due to glare and high cooling loads in the summer period. Users usually close manually operable blinds to reduce visual discomfort or excessive sunlight [2]. Most of the time the blinds remain in this state for the rest of the day, even when the weather and sunlight levels return to an acceptable level [2]. Instead, artificial lights are switched on during the day which leads to inefficient electrical energy consumption [2]. Furthermore, it reduces visibility to the outside and decreases the amount of natural light that a person receives which is essential for a human's immune system [3].

Project Description

Household blinds currently require manual operation to allow a desired amount of natural light through to illuminate one's living space. With varying weather and brightness throughout the day, it can become quite tedious to constantly shut or open the blinds for the desired effect within one's home. Our product (Intellux) aims to automate this process by sensing the light within and outside the home and adjusting the blinds to bring in the desired amount of natural light. To further reduce the cost and inconvenience to the user, Intellux will be an external accessory to be installed into blinds with beaded ropes, which is a wide variety of existing blinds. Thus, making it a more convenient living experience for users. Intellux aims to reduce the reliance on artificial lighting during the day by utilizing natural light and bringing blinds into the smart home era.

Project Goals

Minimum Viable Project Goals

1. Ease of use/installation:
    - To ensure that Intellux is easy to use, the connected application will be designed with the users' experience in mind to offer a simple and seamless experience when operating the system. Intellux will also be easy to install with a few simple steps to ensure the system is connected to the user's WiFi network.
    - For installation, the apparatus will not have any exposed wiring but it will expose the motor shaft and gear so the user can easily slide the beads onto the gear and cover it up when they are finished with the physical installation.
2. Autonomy:
    - Competing products currently do not have autonomy or a "Smart" feature in which the blinds can adjust themselves without needing user input every time. Intellux will have the ability to automatically adjust itself to match the preferences that the user has input once before. This eliminates the need for the user to constantly adjust the blinds to reach their desired brightness level. The user will have the option to adjust their blinds manually through a web application, but also have the ability to set a desired brightness level for the room, which the Intellux device will maintain based on the difference of light intensity in and out of the room.
3. Compatibility:
    - Intellux will be compatible with all blinds that have a beaded rope pulley system with a bead size of 4.5mm (diameter). The reason behind this is that blinds with

beaded ropes are one of the most common types of blinds [7]. This will allow Intellux to work on the majority of blinds that are not already automated.

Stretch Project Goals

1. Noise reduction:
    - Intellux will most likely use a small motor to raise and lower the bead ropes and thus it could cause some noise when the motor is working. Since this product will most likely be placed in bedrooms it will be a nice addition to create a noise free solution that allows users to focus on their daily activities without disruption.
2. Reusability:
    - Intellux is an accessory to existing blinds, thus it would be convenient to allow for easy removal and reinstallation on other blinds around the house as well; This way the user would not have to purchase multiple products to be able to use it on multiple blinds.

References

[1]: *Energy Efficient Homes: Five Trends Driving The Movement | Mitsubishi HVAC - Heating & Cooling Systems*. (2016, January 1). Mitsubishi Electric. https://www.mitsubishicomfort.com/articles/energy-efficient-homes-five-trends-driving-the-movement

[2]: Plörer, D. (2017, March 1). *Control Strategies for Daylight and Artificial Lighting in Office Buildings—A Bibliometrically Assisted Review*. MDPI. https://www.mdpi.com/1996-1073/14/13/3852

[3]: McDermott, M. (2019, May 13). *The Effects of Lacking Natural Light*. Sky-Scapes. https://sky-scapes.com/the-effects-of-lacking-natural-light/