Automated Window System

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Abstract

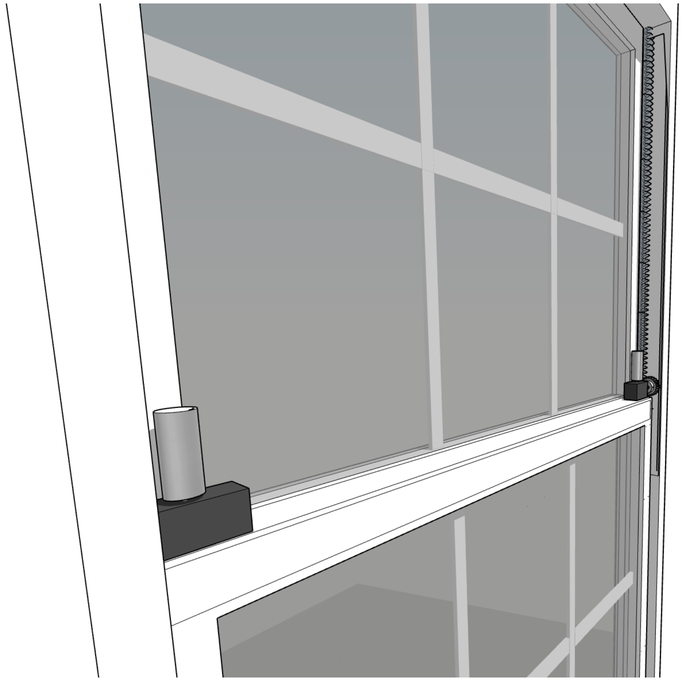
The Automated Window System enables users to **raise and lower residential single-hung windows** from any web enabled device capable of browsing the web. It allows for **opening and closing the windows to five different levels, as well as automatically locking the window** in the desired position. All devices required to operate the system can be powered from a **single electrical connection**.

Introduction

Homeowners often turn to electric cooling systems to regulate the temperature in their homes. Navigating throughout a home to open windows to create airflow is a burden for some, and others may struggle to raise and lower windows. Utilizing electronic air conditioning to alleviate these issues increases power consumption considerably. Utilizing this automated window system aims to not only add convenience to users, but also decrease overall residential power consumption by increasing the usage of home windows.

Methods and Materials

The Automated Window System consists of 3 primary components. Two-**12VDC motors** are mounted on the window ledge and utilize a **rack and pinion** system to raise and lower the window. A **Raspberry Pi Zero W** is used for all window controls logic and displaying the user interface via a web server. Powering the system is a combination of a 120VAC to 12VDC transformer and a 5VDC converter.



Results and Discussion

The prototype was fully developed and tested, and shown to create consistent and accurate results, well within design parameters. The user interface was developed to provide users exceptional ease of operation, and provides users information on current window position, as well as hourly and daily local weather.

Conclusions

The prototype developed as a result of this project was largely successful. Overall goals of the project included consistent raising and lowering, ease of use, a single power source, an aesthetically pleasing design, and quiet operation, which were all achieved.

Acknowledgements

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