

Abstract

While the United States electricity use has flattened in recent years, electricity use-overall and as a portion of U.S. consumption – has nearly tripled since 2000. In the modern era of technological advancement cloud computing has definitely replaced personal computing and with that being said it is vital to manage and bring about increased energy efficiency in high power functioning areas. This study primarily focuses on conserving energy in regards to lighting in areas like data centers, parking lots and garages through a development of a smart lighting mechanism. The mechanism will be designed in a way in which the brightness of particular LEDs will be controlled by the detection of passive infrared sensors (PIR). The presence of human activity in relation to the sensors will thereby determine how bright the particular LED will be lit. Through a wireless communication the remainder of LEDs will simultaneously dim thus conserving energy. Determining more specific metrics such as the brightness of a particular LED will be developed through certain code that is inputted through a microcontroller that will then communicate with the sensors. Additionally, an LED driver will be necessary to connect with the LEDs to maintain constant current, as without this device, current will vary as will the brightness. This study is a part of a growing body of research on energy smart data centers. With data centers now representing more than 2% of the US electricity consumption, this project will contribute to further research on implementing this new design.