Reducing Power Consumption using an Arduino Based Relay Light-Switch through a Dual Laser Tripwire System

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Humans have been using switches for controlling lights, and other power sources, for a long time. When people leave their rooms, they often forget to turn off these switches resulting in the wastage of unimaginable amount of electricity. There is a need for a new cheap technology that automatically turns off lights when a room is vacant. This will allow a ubiquitous and invisible implementation, thus reducing the environmental impact of wasted energy consumption. My solution is an inexpensive device that accurately tracks the number of people in a room by monitoring its entrance. This small device, installed invisibly, includes two invisible laser beams shining on two photoelectric sensors. The data from the two sensors are outputted to an arduino microcontroller which monitors the people count in a room. The arduino knows whether to increment or decrement the people count in the room based on the sequence in which the two photoelectric sensors are tripped. The arduino then communicates with a relay which controls the state of the light bulb (on or off). Data collected from a local school and a University supported my hypothesis stating that the restrooms were vacant during a large portion of the day, although the lights were on during these periods. The graphs created show significant spikes in the usage of the restrooms for short periods. The amount of wasted electricity would decrease significantly if my device is implemented in numerous locations including homes, schools, public restrooms, retail stores, etc., thus lowering the environmental impact of wasted power consumption.

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