Leveraging IoT using an Arduino and ESP Wifi Module Based Dual Tripwire System to Reduce Electricity Wastage and Environmental Pollution

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Scientists recently reported that 2015 was the hottest year for Earth in the historical record by far, breaking a mark set only the year before. Electricity generation is a large contributor of CO2 emissions, hence, there is an urgent need for more efficient use of electricity. I set a goal of building a device that will automatically turn lights and other powered devices off when a room is vacant, and have this device be implementable in every room in every building. This can only happen if the device is cheap, safe, small, easily installable and be low maintenance. The impact can be amplified by leveraging the Internet of Things (IoT) by allowing the devices to communicate with each other and the intra/internet. My solution is a functional device that I have prototyped, called PowerOff, that accurately tracks the number of people in a room by monitoring its entrances. This small device includes infrared waves projected on two infrared sensors. Unlike a motion sensor, the data from the two sensors in PowerOff are outputted to an arduino microcontroller which monitors the people count in a room by using my innovative dual tripwire method. The arduino then communicates with a relay which controls the state of the light bulb, as well as other devices and the internet using an ESP module. Data collected from several locations shows that the amount of wasted electricity would decrease significantly saving billions of dollars and lowering the environmental impact of wasted power consumption.

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