

Retrofit-able Smart Home Project

Status:	Filled
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Sponsor(s):	None –self funded
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Project Description

Budget: 1500 CAD, funded by group members.

Introduction

For more than twenty years the internet has been connecting people all over the world. The freedom and convenience of being able to share information and digital content instantly without cost has revolutionized this age of humanity. It continues to reach deeper and deeper in to our lives streamlining everyday tasks. Although it seems that the internet has changed everything there are still opportunities to take it further, we plan to do this by engineering a line of products to automate the home. In the future people will be able to control all of the electronics in their home from their phone, tablet or computer; a convenience we hope to prove is possible now. This will be accomplished by engineering the first line of products that can be retrofitted into existing homes offering wireless control over switches and power outlets. The switches and outlets will be capable of both receiving signals to activate or deactivate as well as transmitting measured data back to a central console for display to the user and for other processing purposes.

Product Description

Imagine leaving your home in a mad rush to beat unplanned traffic throwing your morning schedule out the window to catch your 9AM flight. In your haste you forgot to turn off the stove, normally you are reminded by the sharp whistle of the kettle. You arrive at the airport and make your flight. When you finally pull out your phone you see a 45 minute old notification telling you that the 240V socket in your kitchen has been drawing a lot of power for 30 minutes. Thankfully smart-home systems stepped in and cut power to the socket 10 minutes after you did not verify via the app. Crisis averted. You set your home lights to auto, an algorithm that randomly activates lights in your home to deter burglars in your absence. When you land in your city a week later you turn on the heated floors in the washroom 15 minutes before arriving to see your home in the exact condition you left it.

Smart-home systems hopes to provide all these conveniences and more to its customers. Giving them control of the electronic devices in their home from anywhere at any time. Not only giving them peace of mind but also information that was never available before. Information such as their power usage in real-time as well as the history of their usage, or notifications of activity in their home when they are not there themselves.

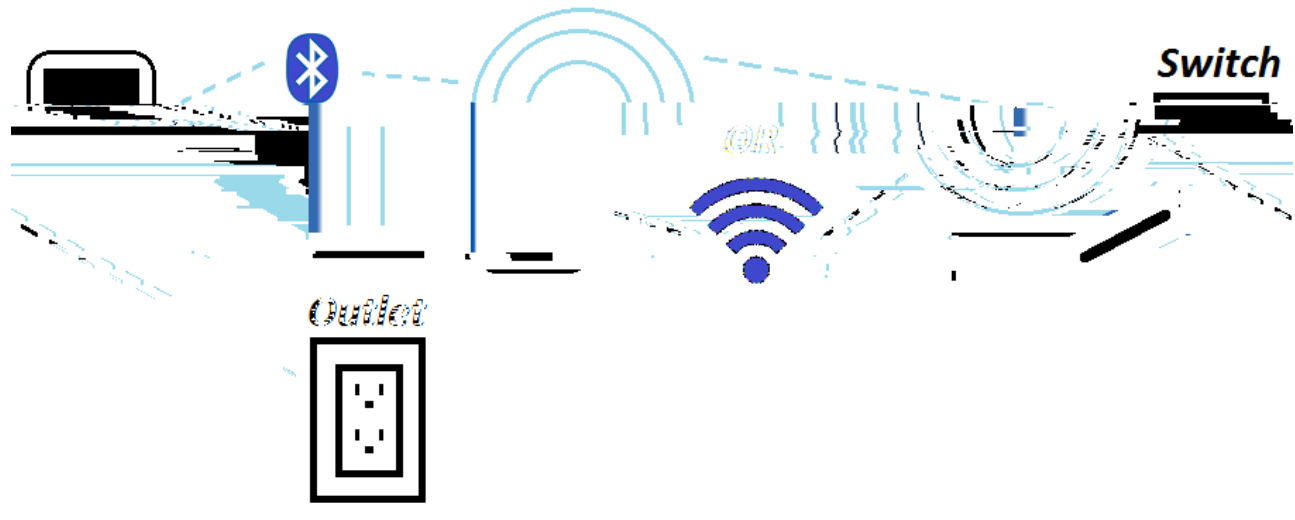
Tangible Project Deliverables

1. iPhone and/or Android App which allow one or more users control over the following:

Turn a switch on and off, as well as view the on/off status of each switch in their home, receive a notification when the state of a switch changes in their home.

Turn a power outlet on and off, as well as view the on/off status of each outlet in their home, receive a notification when the state of an outlet changes in their home. View live and accumulated data about the various power outlets in their home

The app will also help users group the different devices in their home together, room by room, floor by floor, and possibly even property by property.
2. A prototype of the switch that can be controlled as described above and fit in a standard sized electrical switch wall boxes. Be clickable instead of a standard toggle switch to ensure its digital state as seen by the software matches its actual state. Satisfy all residential safety codes especially those to prevent electrical fires.
3. A prototype of the wall outlet that can be controlled as described above and fit in a standard sized electrical outlet wall boxes. Be able to measure the power being drawn through itself. Satisfy all residential safety codes especially those to prevent electrical fires.
4. A set & forget console type module that acts like a router. The purpose of this module is to wirelessly tie together all of the smart-switches and smart-outlets in the users home. It will communicate with the user's phone via Wi-Fi (and possibly Bluetooth in the absence of Wi-Fi). This module will help to eliminate the hassles in re-pairing devices to user accounts that may arise in the event of power outage data loss or changing ones internet router. Also because it is possible for a user to have a few dozen smart-switch/outlet wall devices in the home the number of wall devices may exceed the number of devices a standard domestic internet router is capable of supporting.



Timeline

January & February: Research feasibility and plan concept, market research.

Research into competitive products. Feasibility of design and safety concerns. Decide on all app features & functionalities. Decide on which wireless technology to use. Build a business case.

March & April & May: Research and development

Develop a barebones version of the products without considering size, safety or appearance. Have a functioning prototype system that has successfully interfaced all 4 of the project deliverables described above, by the end of May

June & July: Engineer saleable product line

Redesign the 3 physical project deliverables to meet safety and size requirements. Create presentable and professional appearance of all 4 as if they were market place products.

August: Perfect where needed

Buffer time and project report polishing

Possible Future Additions

Web interface with the same functionality as the App but for computers

Rheostat switch for light dimming or fan speed control

Multi outlets, outlets with 4 or more sockets

Multi switches, switches that can control 2 or more circuits

Switches that can sense the users' presence and react accordingly

Control other types of devices in a user's home such as heating, hot water, and potentially security.

