**Smart Home using IoT**

Team 4: Hunters

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**Motivation**

Our motivation for this project is to gain experience working with the Internet of Things (IoT) by creating a smart home using relatively cheap and readily available materials. The Internet of Things involves the interconnection of everyday objects, equipped with sensors and transmitters, through an online network in order to exchange data and automatically notify users of specific changes. For the smart home, household items such as lights, doors, mailboxes, and appliances can be connected to the internet to enable a homeowner to monitor and detect changes. This frequent monitoring can potentially help reduce energy costs by making the home run more efficiently.

**Significance/Uniqueness**

Many homeowners do not currently utilize the IoT in their homes, but the IoT is considered the future of the way we interact with devices in the world. In 2015, 10 billion devices were connected to the internet, a number projected to grow to 34 billion by 2020, with 24 billion IoT devices [1]. Consumers, however, have been hesitant to embrace IoT technology, though simple smart home sensors can make the IoT more accessible to the average homeowner. We consider our project to be pushing the edge of this internet revolution.

**Objective**

Our objective is to connect regular objects in the home using Arduino and Raspberry Pi sensors that can collect data and be monitored by the user via an Android application. Some of the available sensors include motion and sound detection, temperature/humidity, smoke and gas detection, distance detection, and GPS monitoring. We hope to combine these in ways that would be useful to a homeowner to observe. Since this is also a software project, we also plan to focus on application aspects such as security, usability, and data analysis.

**System Features**

Some examples of sensor monitoring and notification include:

* When user is not home, notify user of door opening or motion detection inside the home (security)
* If door is opened, turn on lights
* Notify when mail is delivered
* Detect smoke, gas, and increased temperature; notify user when not home of possible fire or gas leak
* Place GPS tracker on dog collar and monitor dog location at all times
* Detect number of cat visits to the cat box since last cleaning

Since the sensor system is made of components, we can add more or reduce these components as we see fit during the course of the project. Additional system features will include measures to make the system secure; a usable and intuitive interface; and data collection, processing, and reporting tools (for example, which rooms are coldest or warmest for HVAC adjustment, where does the dog spend most of his time outside, etc.).

**Similar projects**

Raspberry Pi and Arduino have been used by many other tech hobbyists for home automation. Some examples:

* Uber Automation w/Arduino and Pi [2]
* Building a Home Automation System with OpenHAB to Control LEDs Wirelessly [3]
* Many additional examples on the Raspberry Pi website [4]

**Alternative projects**

Smartwatch translator

Charging slot locator

Android and web monitoring of worker time and location and dispatch to jobs

References

1. “Here are the IoT trends that will change the way businesses, governments, and consumers interact with the world”. Greenhough, J. and Camhi, J. Business Insider. August 29, 2016. Accessed January 29, 2016 at <http://www.businessinsider.com/top-internet-of-things-trends-2016-1>
2. Uber Home Automation with Arduino and Pi. Accessed January 29, 2016 at <http://www.instructables.com/id/Uber-Home-Automation-w-Arduino-Pi/>
3. Building a Home Automation System with OpenHab to Control LEDs Wirelessly. Bunker, J. Accessed January 29, 2016 at <http://makezine.com/projects/building-a-home-automation-system-with-openhab-to-control-leds-wirelessly/>
4. Accessed January 29, 2016 at https://www.raspberrypi.org/blog/tag/home-automation/