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Home Appliance Control with a Mobile Application

ECE 4220  
Project Proposal

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# Problem

Often, people forget whether or not they left their lights on at home. Without the proposed project, the resident has no way of keeping track of the status of their home when they are not physically present. This system will provide an easy way to remotely control lights in their home. The system will be able to communicate with a raspberry pi using a mobile iOS application. The user will be able to monitor and control their lights when they are out of the house.

**This system will not be using the FairCom database.**

**Index Terms:** Data communication, embedded systems, LED bulbs, iOS, Objective-C, Raspberry Pi, wireless networks, Xcode.

1. Related Systems

An obvious alternative to remote controlled lights would be controlling the lights from their location. The advantage to this is that there is a lot less overhead that comes with network communication; however, the proposed project will provide an optimal solution for the case when the resident is away from their home.

This version of home automation will provide control over the lights from a portable unit. The portability and ease of access of this control is made possible by the development of an iOS application on an iPhone.

1. Goals

The goal is to create a system that will allow users a more convenient lifestyle around the house. In the case of the sick, disabled, or elderly, they will be granted control over their lights without the need of a caregiver.

The system will provide the user with the ability to reduce power consumption in their homes by supplying a means to manage home lighting from a mobile device.

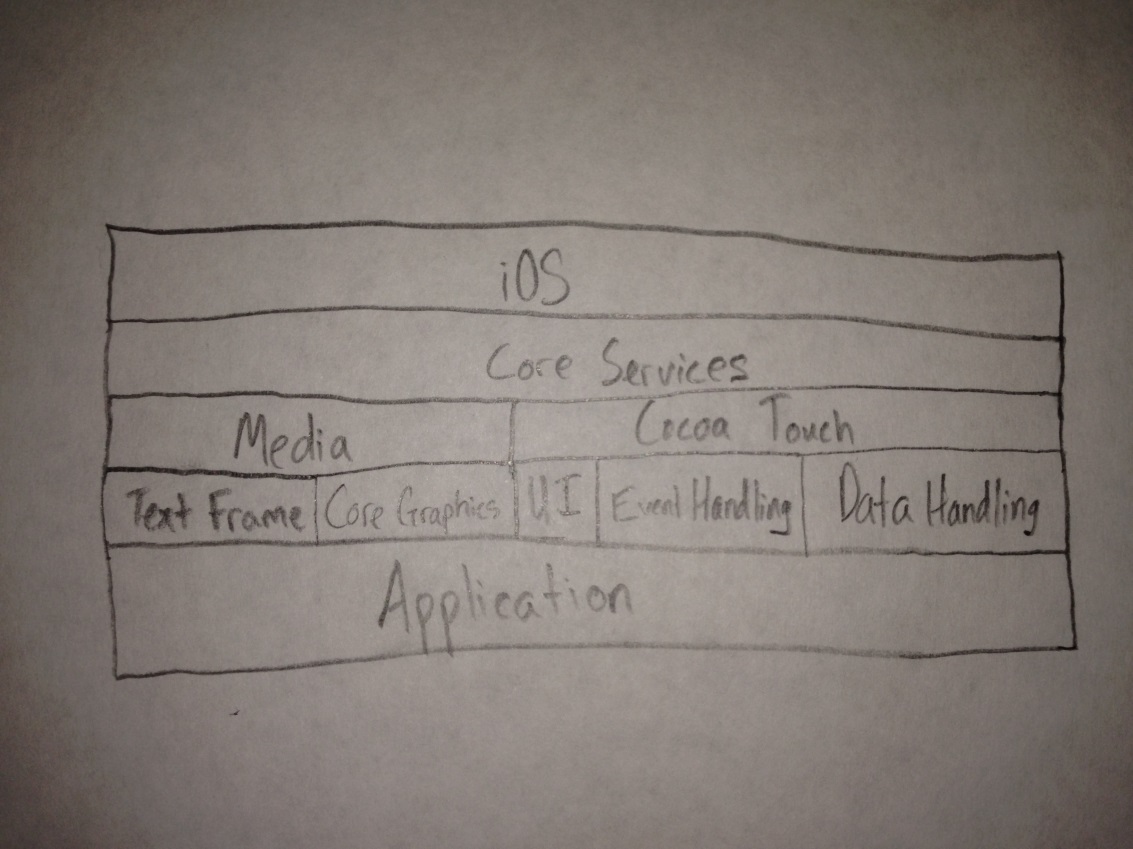
1. Benefits/Outcomes

The final product will allow the user to easily monitor the lights in their home from a mobile application. It will also open the possibility of added appliance control (oven, television, water, temperature), which could, in turn, centralize all home control.

1. Constraints Specifications

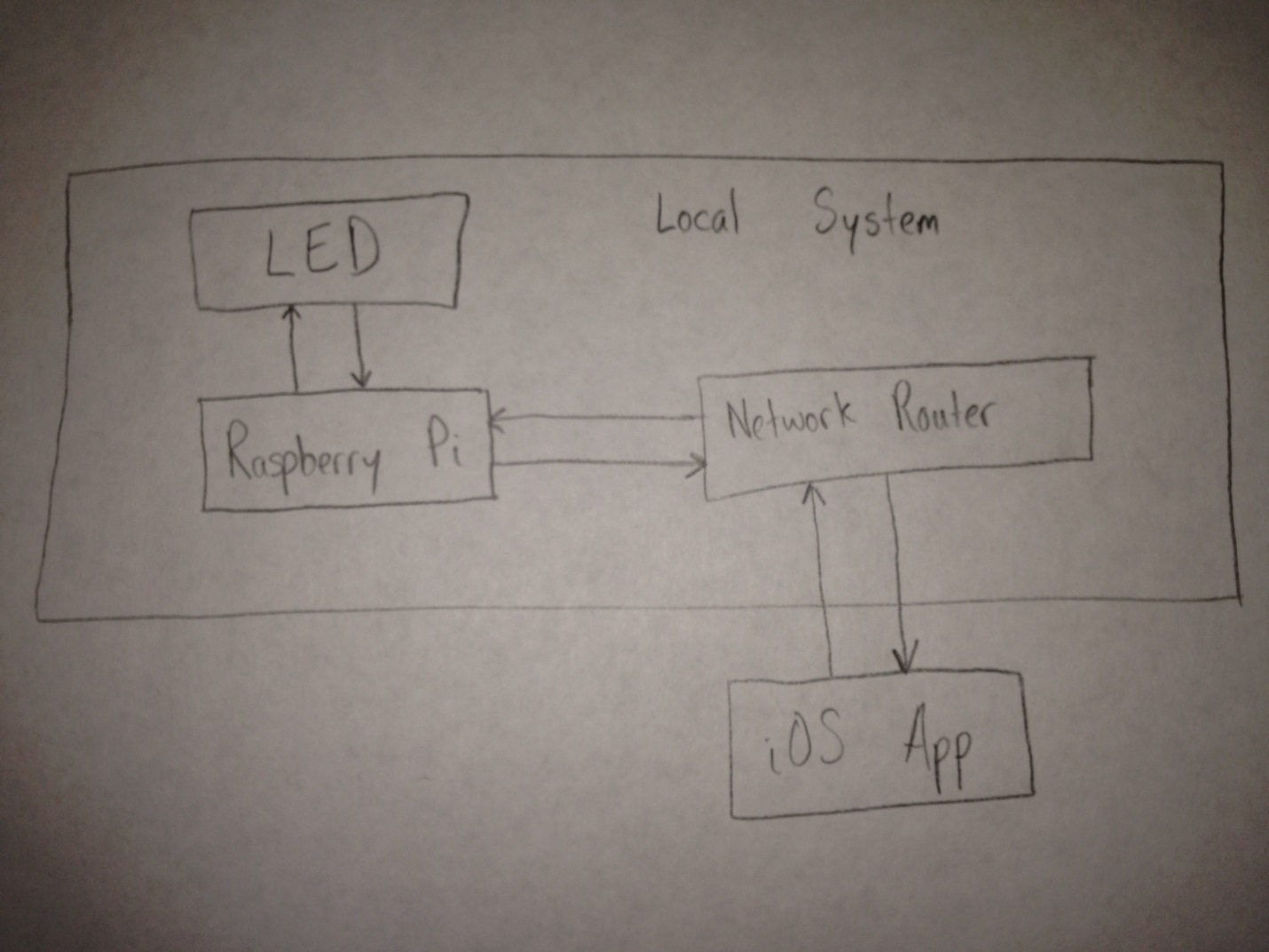
The local system will be comprised of a router, raspberry pi, and LED light. The router will communicate with the user interface (iOS application).

The iOS application will be coded in Objective-C and using the Xcode IDE. Xcode provides a Media and Cocoa Touch API for developers to more easily create their applications.



Software architecture for iOS application

The network router in the local system will communicate with the iOS application through a named pipe. The following figure is a simple representation of the system:



Functional block diagram for light monitor system

The aspects used from ECE 4220 will be network communication. More specifically, the application will communicate with the router using named pipes.

1. Assumptions

The user will need an iOS device to install the application. These options include an iPhone, iPad, or iPod Touch.

The proposed system will use an LED bulb to test the system, but the system would be able to be installed for any type of light.

The user would also need a Raspberry Pi for the system to operate.

1. Methodology

The application will be developed on my Mac desktop. An Apple developer’s license has already been purchased. I already own a raspberry pi and a network router. If something were to go wrong with these supplies, I will use the TS-7250 systems in the lab in room C1246 Laferre Hall.

A timeline of event deadlines is located on the next page, to help me stay on pace throughout the rest of the semester.

1. Timeline/Schedule/Milestones

Supplies will be purchased/obtained by April 13, 2015.

iOS application will be developed and installed on iPhone by April 17, 2015.

Hardware components and raspberry software will be installed by April 24, 2015.

Full functionality will be ready by May 1, 2015.

1. Strengths/limitations of the system

This advantage to using this system over a standard light control is the portability of control and monitoring.

The system will not be so easy to install, so it is not very flexible for every consumer.