Towson University
Department of Computer & Information Sciences
COSC880/AIT 880

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Tentative Project Title: Home Automation with Raspberry Pi

Graduate Credits Completed: 27

Semester to Register: Fall ____ Spring X Summer____ Year 2018___

Advisor's Name: Dr. Wei Yu

Project Description/Abstract:

Home automation has become very popular among homeowners and is an important smart system driven by Internet of Things. Home automation may include automating everyday routine activities such as turning on lights, reading the weather report, or opening the locks on exterior doors. When home automation was in its infancy, its hardware, software, and integration was segmented and did not interoperate well enough for a wide uptake rate. Today, home automation is more affordable and "smart" - with better interoperability between devices, accessories, and protocols. This project will seek to implement home accessories such as lighting using affordable hardware such as a Raspberry Pi based on user and environmental inputs.

Project Topics to be Studied:

Raspberry Pi
Python GPIO
Z Wave
Light circuits
Sensors (sound, motion, light)

Project Objectives:

The purpose of this project is to design and integrate a Raspberry Pi as a "smart home" device and see how a small use case can be applied to larger home automated networks.

Deliverables:

Project Proposal – scope and plans for graduate project
Source code (Python) – code for device logic
Video demonstration – demonstrate dimmable LED light responding to inputs
Written Report – Conclusion of results in the style of a conference publication
Public Presentation Slides – Summary of research and outcome, in a clear concise and presentable matter

Anticipated Project Timeline:

11-Dec: Proposal submission
8-Jan: Progress meeting 1
15-Jan: Acquire Raspberry Pi3, GPIO kit, set up GitHub repository for project documents
22-Jan: Familiarization with Python GPIO module
29-Jan: Progress meeting 2
12-Feb: Develop code to turn light on/off using command line as well as scheduler/timer
20-Feb: Integrate light/photo sensor
26-Feb: Progress meeting 3
12-Mar: Integrate motion sensor
19-Mar: Begin written report
9-Apr: Written report complete
1-May: Final report submission
May: Public Presentation

Reading/References List:

1. Docs.python.org. (2017). About these documents — Python 3.6.4rc1 documentation. [online] Available at: https://docs.python.org/3/ [Accessed 7 Dec. 2017].
2. RPi.GPIO 0.6.3 : Python Package Index", Pypi.python.org, 2017. [Online]. Available: https://pypi.python.org/pypi/RPi.GPIO. [Accessed: 07- Dec- 2017].
3. Crofton, Ben. "raspberry-gpio-python / Wiki / Home", Sourceforge.net, 2017. [Online]. Available: https://sourceforge.net/p/raspberry-gpio-python/wiki/Home/. [Accessed: 07- Dec- 2017].
4. N. Johansen, Z-Wave Networking Basics. Sigma Designs, 2017. Available: http://zwavepublic.com/sites/default/files/APL13031-2%20-%20Z-Wave%20Networking%20Basics.pdf. [Accessed: 07- Dec- 2017].
5. "Using light sensor module with Raspberry Pi | UUGear", Uugear.com, 2017. [Online]. Available: http://www.uugear.com/portfolio/using-light-sensor-module-with-raspberry-pi/. [Accessed: 07- Dec- 2017].
6. "On/Off Project - Switch a light on/off using your smart phone - PrivateEyePi Project", Projects.privateeyepi.com, 2017. [Online]. Available: http://projects.privateeyepi.com/home/on-off-project. [Accessed: 07- Dec- 2017].

Completed Graduate Courses:

Number	*Course Name*	*Semester*	*Grade*
COSC 578	DATABASE MANAGEMENT SYSTEMS I	Spring 2014	B
COSC 602	COMPUTER VISION AND IMAGE PROCESSING	Fall 2014	A
COSC 650	COMPUTER NETWORKS	Fall 2014	B+
COSC 609	SOFTWARE PROJECT MANAGEMENT	Spring 2015	B+
COSC 519	OPERATING SYSTEMS PRINCIPLES	Fall 2015	A
COSC 600	ADVANCED DATA STRUCTURES AND ALGORITHMS	Fall 2015	A
COSC 757	DATA MINING	Spring 2016	A-
COSC 617	ADVANCED WEB DEVELOPMENT	Spring 2016	A
COSC 734	NETWORK SECURITY	Spring 2017	A
COSC 732	WIRELESS NETWORKS/MOBILE COMMUNICATIONS	Fall 2017	

Projects Done in Other Courses:

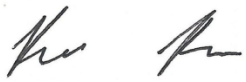
Course Number	Project Description
COSC519	USB Keyboard Driver for Linux Researched/analyzed USB keyboard module and modified the driver to swap key positions.

Project Requirements and Evaluation:

1. Reading and presentation *AA%*
2. Implementation *BB%*
3. Examination *CC%*
4. Written report to the instructor *DD% (required regardless of % points)*
5. Public Presentation * *EE% (required regardless of % points)*

* The instructor/student will announce the presentation time and place to the Department faculty and students. Those interested in the topic may attend the presentation.

I, Kevin Kuo propose to complete this project during the *Spring* semester of *2018* and understand that this project and its derived materials (e.g., source code, written reports, presentation slides) are to reflect my own work, unless explicitly and appropriately referenced. Furthermore, I understand that plagiarism or other unattributed use of material not written by me is completely unacceptable, and **will be considered sufficient cause for a failing grade on the project.** For additional information on academic integrity policy at Towson University, I will visit www.towson.edu/provost/resources/studentacademic.asp .

Student's Signature: 

Instructor's Signature: 

Graduate Program Director's Signature: _____