SmartParkingLot Project

Projects website: https://bigbosstony.github.io/

Table of Contents

Proposal

Proposal for the SmartParkingLot Project Prepared by Yan Yu* Computer Engineering Technology Student*

Executive Summary

As a student in the Computer Engineering Technology program, I will be integrating the knowledge and skills I have learned from our program into this Internet of Things themed capstone project. This proposal requests the approval to build the hardware portion that will connect to a database as well as to a mobile device application. The internet connected hardware will include a custom PCB with sensors and actuators for _detective car entry, taking pictures and trigger the parking gate_. The database will store the number plates. The mobile device functionality will include _checking the plate number and parking time and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department _Humber Department of Public Safety_. In the winter semester I plan to form a group with the following students, who are also building similar hardware this term and working on the mobile application with me Thomas Chang, Alisha Singh Chauhan. The hardware will be completed in CENG 317 Hardware Production Techniques independently and the application will be completed in CENG 319 Software Project. These will be integrated together in the subsequent term in CENG 355 Computer Systems Project as a member of a 2 or 3 student group.

Background

The problem solved by project is _when we entering a parking lot, we need to stop to take a ticket and when we left we have to go the ticket machine to pay our ticket. By working with this project we take pictures and read the plate number automatically, so we can save more time and be environmental friendly. Background _ANPR – Automatic number plate recognition is a technology for automatically reading vehicle number plates. And OpenALPR is a similar system, accuracy above 97 percent and it is open source. We can adjust OpenALPR to Raspberry Pi 2. HD camera for taking pictures at both Entry and Exit. Database used to store plate numbers and then calculate the duration of how long the car has been parking. Infrared ray to detective the car in the entry or exit. Driver could pay at the exit by using Interac™ Card, smartphone with NFC or cash.

I have searched for prior art via Humber's IEEE subscription selecting "My Subscribed Content"[1] and have found and read [2] which provides insight into similar efforts.

The first (Du, Ibrahim, Shehata, & Badawy, 2013)

The second (Lindstrom, 2005)

The third (Veglis, Leclercq, Quema, & Stefani, 2005)

The forth (Liu, Xu, & Cheung, 2015)

In the Computer Engineering Technology program we have learned about the following topics from the respective relevant courses:

• Java Docs from CENG 212 Programming Techniques In Java,

• Construction of circuits from CENG 215 Digital And Interfacing Systems,

• Rapid application development and Gantt charts from CENG 216 Intro to Software Engineering,

• Micro computing from CENG 252 Embedded Systems,

• SQL from CENG 254 Database With Java,

• Web access of databases from CENG 256 Internet Scripting; and,

• Wireless protocols such as 802.11 from TECH152 Telecom Networks.

This knowledge and skill set will enable me to build the subsystems and integrate them together as my capstone project.

References

Du, S., Ibrahim, M., Shehata, M., & Badawy, W. (2013). Automatic license plate recognition (alpr): A state-of-the-art review. *IEEE Transactions on Circuits and Systems for Video Technology*, *23*(2), 311–325. https://doi.org/10.1109/TCSVT.2012.2203741

Lindstrom, G. (2005). Programming with python. *IT Professional*, *7*(5), 10–16. https://doi.org/10.1109/MITP.2005.120

Liu, Y., Xu, C., & Cheung, S. C. (2015). Diagnosing energy efficiency and performance for mobile internetware applications. *IEEE Software*, *32*(1), 67–75. https://doi.org/10.1109/MS.2015.4

Veglis, A., Leclercq, M., Quema, V., & Stefani, J. B. (2005). PHP and sql made simple. *IEEE Distributed Systems Online*, *6*(8). https://doi.org/10.1109/MDSO.2005.42