Designing a smart phone Appcessory using Bluetooth Low Energy - Bluetooth Doorlock(TCY1b – 13)

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Introduction
In our door lock system, when the user arrives at home, the door will be automatically unlocked. The users can just touch the unlock button in the app and the door will open. When they leave the house, they can close the door and the door will be automatically locked. A key is not needed to lock or unlock the door and it is more convenient and secure. Though we still provide a key as backup.

In this project, we design a door lock with a Bluetooth module, and make an app using Bluetooth Low Energy to control the door lock. The app can be used in any Android phones that have Bluetooth Low Energy function with Android 4.3 or above such as a Nexus 4.

Aim and Objectives
The aim of this project is to design and make a door lock with a Bluetooth Low energy module and a smart phone app using Bluetooth Low Energy to control the door lock. The door lock should be secure and convenient to use. The app should be user-friendly.

The main aims and objectives of this project are:
• To design an app. using the proximity function of BLE to control a door lock;
• Safe control of the door lock using the app or the hardware of the door lock; and
• Stable and user friendly product.

System Block Diagrams

Results
The testing results of our Android app are troublesome as expected. There are often many bugs and issues with any kinds of wireless connection and there is no exception with Bluetooth signal transmission using UART protocol. We spent lots of time to deal with problems of UART connection failure and Bluetooth Low Energy sleep mode issue. Once these issues solved, progress on the software side go well. The stepper motor on the hardware side is relatively easy to deal with. We followed the standard code that control stepper motor and it runs with no issues.