NFC Pet Collar

Overview
Our focus this semester was to produce a pet door enabled with Radio-Frequency Identification, or RFID. This pet door would be capable of allowing or disallowing pet entry by toggling a locking mechanism on the door based on communication with an RFID key tag worn by the pet. The pet door itself would use an RFID reader to interface with a microcontroller, which would be capable of controlling the electronic lock associated with the door. There would also be an Android smartphone application to aid users in managing pet collar permission and editing settings on the pet door hardware.

Objectives
- Build pet door utilizing RFID technology capable of locking and unlocking with RFID-enabled pet collars
- Create Android smartphone app to:
  - Manage pet collars permissions
  - Pair new RFID collars
- Produce user friendly experience that integrates the hardware and software portions of the project

Approach
- We started off by researching the idea of using NFC for the project and found out that RFID would be a better choice. We also found that multiple patents already exist for this idea.
- We made a site visit to iron out the details of the project. We proposed the idea of using RFID instead of NFC and they agreed. They also approved a mockup of the GUI that we showed them for the android app.
- We bought a microcontroller, BLE Shield, magnetic lock, RFID reader and other hardware. We created a circuit and tested out each component one by one and found out our RFID reader was defective. So we got another RFID reader with a smaller range.
- We implemented the Bluetooth connection, pairing and toggling tag permissions functionality on the app.
- Finally we bought the pet door, attached the hardware components to it and got them to interact with the app.

Outcomes
- This project was not intended for commercial purposes.
- This project helped us learn how to maintain a schedule and work towards achieving a goal in a professional manner.
- This project taught us how hardware components and software components can interact with each other to produce a working product.