Project Architecture

C. A. R. T. S.
Completely Automated Retail Transaction System

18-549 Team 13 (Shark Laser)

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Status Update

- This project will expedite the checkout process in retail stores.

- Current status - idea and methodology confirmed, waiting on parts to begin development.

C. A. R. T. S.
Architecture - Step One
Architecture - Step Two
Architecture - Step Three

Force

Serial
Architecture - Step Three

- $100
- USB
Use Cases - Power

Startup

- Store manager activates Arduino and loads product with necessary inventory data

Shutdown

- Store manager deactivates Arduino - Arduino uses display and status LEDs to alert user to low power state

Idle

- After a while with no objects and no movement, display will shutdown to conserve power
Use Cases - Normal

Object Placed in Cart

- Object is sensed by weight impulse and increased weight on cart floor and RFID tag is read and is added to list (the screen will confirm a product was added)

Object Removed from Cart

- Object is sensed by lowered weight on cart floor followed by an RFID tag read and is removed from list (the screen will confirm a product was removed)

Abnormal Change to Cart

- Weight changes (either increased or decreased significantly) followed by a failed read or no read, the screen will let the user know to rescan
Use Cases - Checkout

Corrupted List

• Items are on the list that are not actual in store items or there is corruption over transmission, will call a clerk.

List Checkout

• If the items are successfully transmitted to the checkout stand, the screen will notify the user of success

No Checkout

• If the cart did not successfully checkout, it will not have the notification of success, store employees should not allow the user to leave the store
Use Cases - Abnormal

Overfilled Cart

It will display to the user that their cart is over filled and requires manual checkout

No Power

The store clerk will not see a valid checkout, the user will have to use manual checkout

Broken Sensor (weight/rfid)

The screen will display that the cart is out of order, the next time it checkouts, it will transmit that something is broken
Risks and Mitigation

Risks:
- RFID interference
- Detecting loading vs. unloading items
- System failure could lead to incorrect checkout
- Metal/Liquid interference with RFID

Mitigation:
- Use multiple, low-range sensors
- Use weight sensor to verify RFID input data
- Provide user feedback using status LEDs
Plan of Action

Plan A

• Fully working product with functional screen and ability to fully resolve all standard grocery store items

Plan B

• Limit list of function items to items that do not cause RFID interference (i.e. no metals/liquids)

Plan C

• Remove display and rely on status LEDs for feedback
Questions?