

INFO5990: Smart Trolley Inc.

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Outline

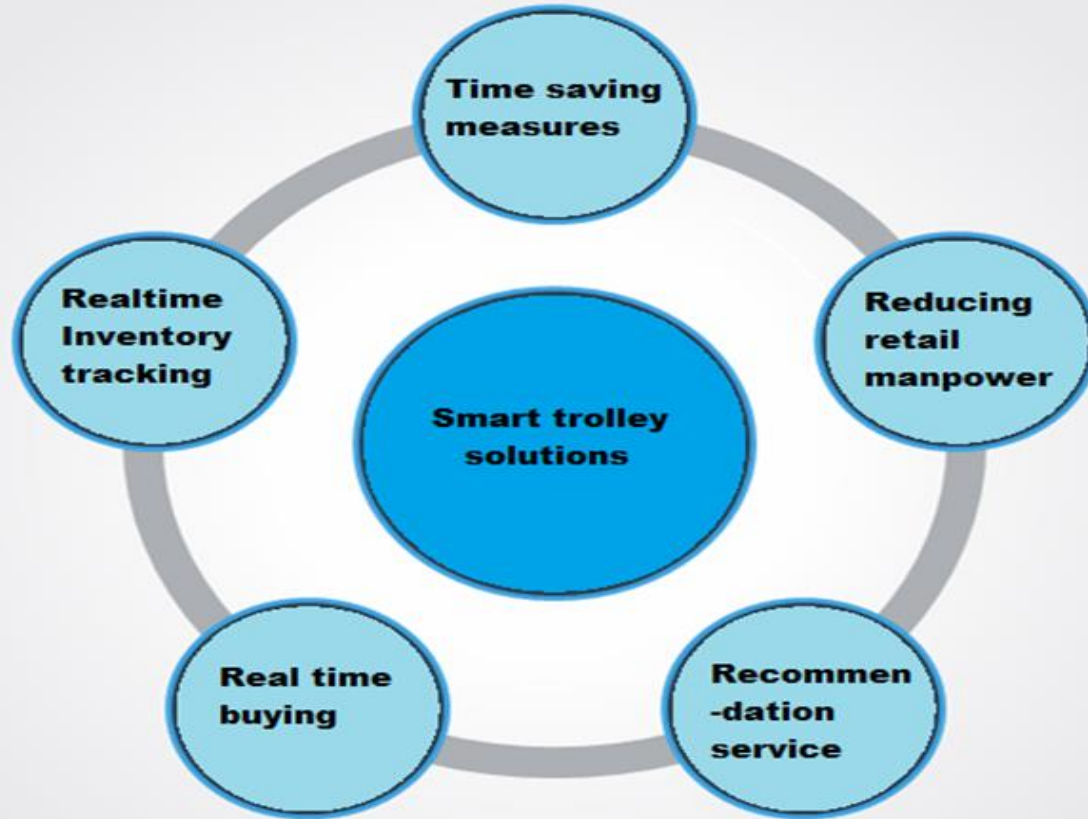
- Introduction
- Problem & Solution
- Justification & Implementation
- Working Diagram & Operating frequency of RFID
- Recommendation System
- Payment System
- Anti-theft System

Introduction



Ref: Google Image

Solution



Justification

Ideal shopping experience

Shoplifting - 57 % or \$2.6 billion

Gap in the Market




Ref: Google Image



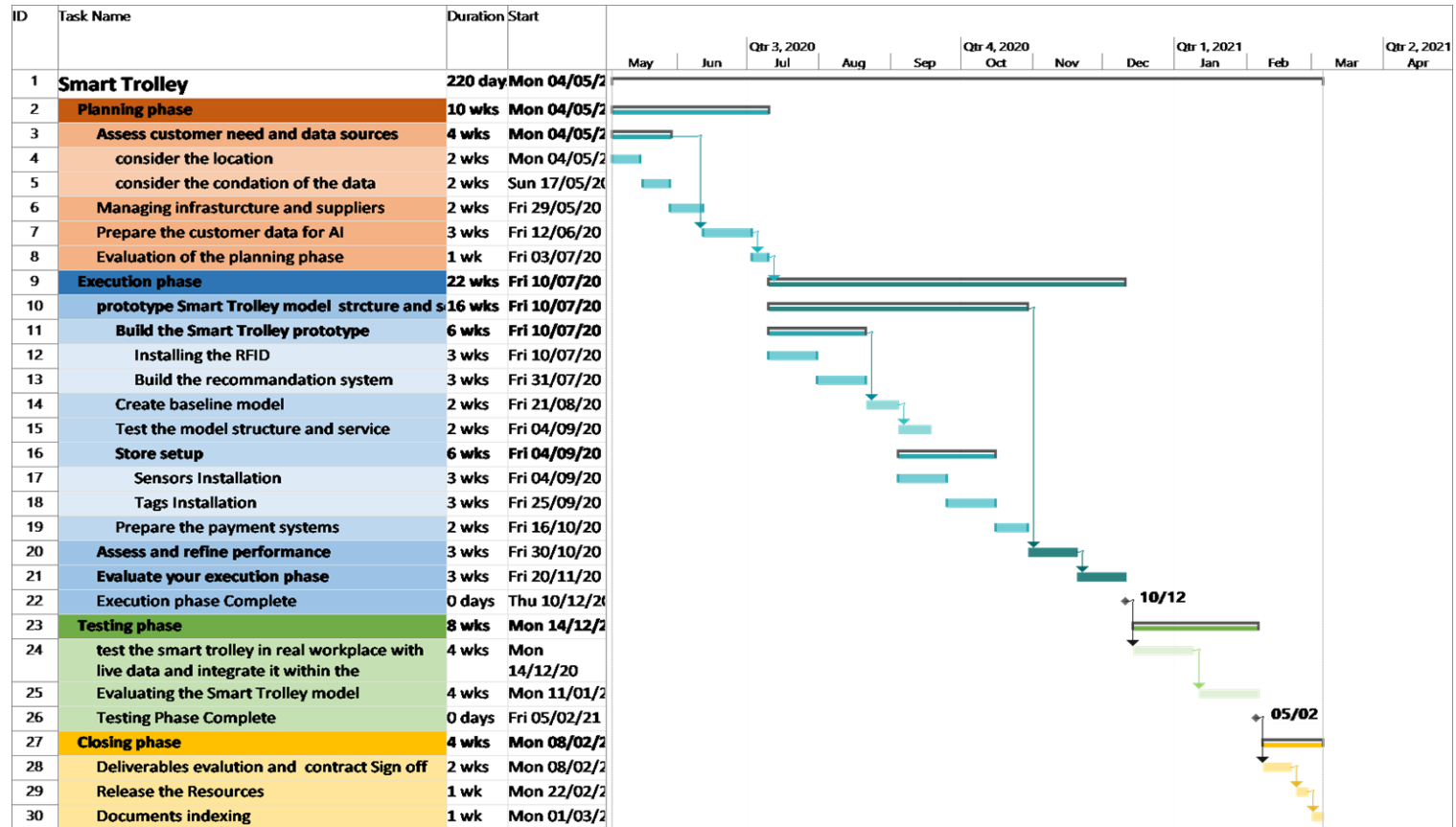
amazon go
grocery

Fresh produce, ready-made options for dinner, household essentials, and more—all available with no lines and no checkout.

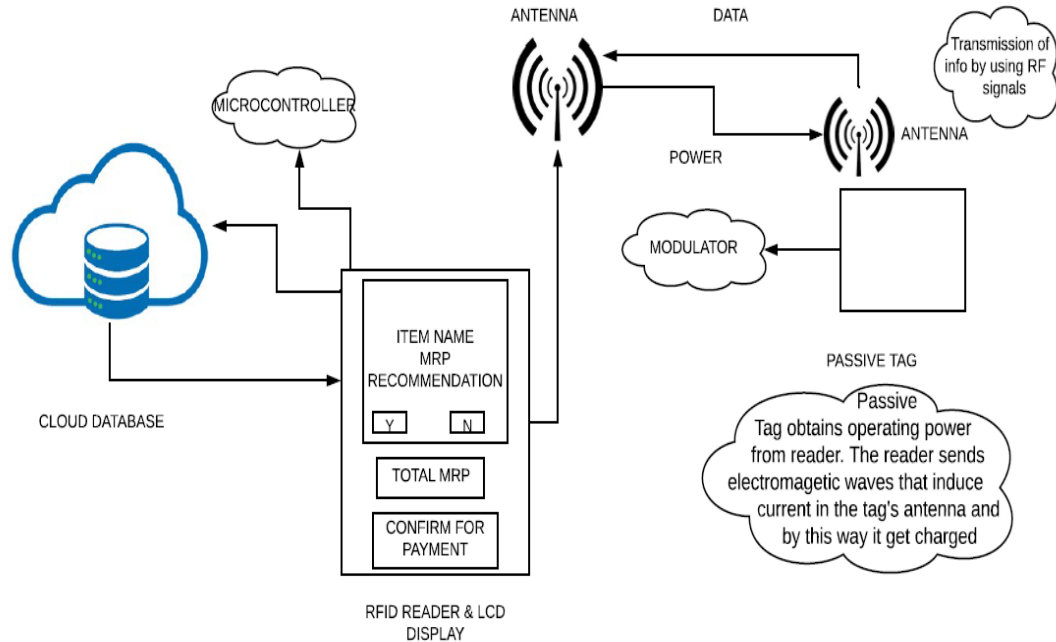


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Implementation: WBS & Timeline



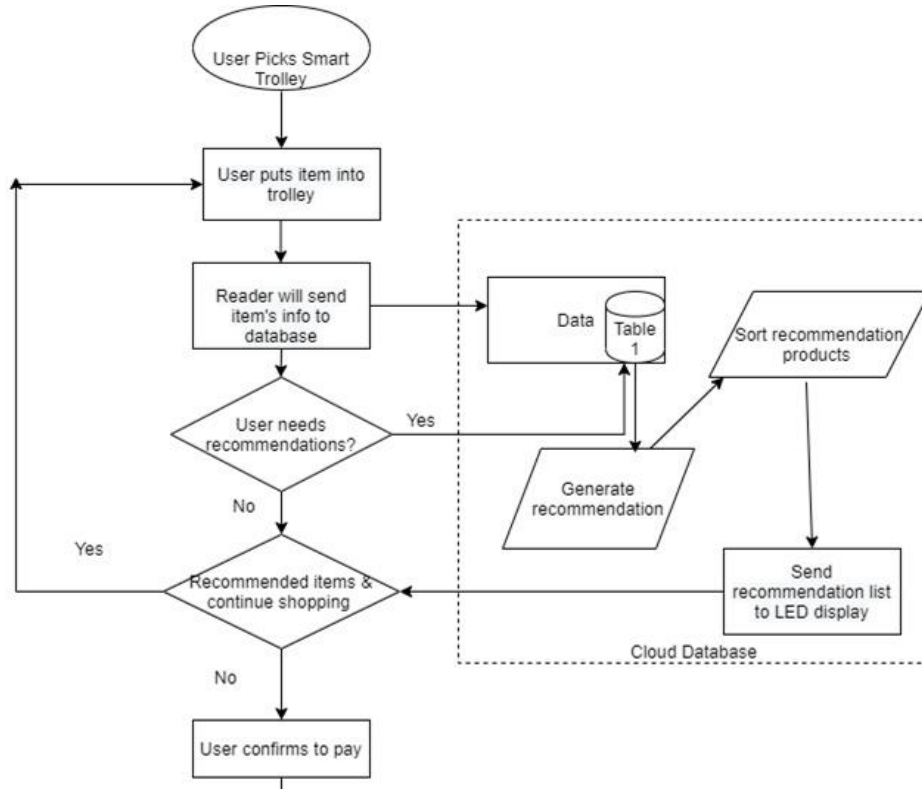
Working Diagram & Operating frequency of RFID



Frrequency	Range
Low Frequency (12-140 KHZ)	20-30cm
High Frequency (13.56 MHz)	20-30cm
Ultra HF (868-928 MHz)	3 metre
Microwave(2.45 & 5.8 GHz)	3 metre

System Operating Frequency :- High Frequency(13.56 MHz).

Recommendation System



The recommendation system provides product information and suggestions to customers, helps users decide what products should be purchased, and simulates sales staff to help customers complete the purchase process.

Components

- Smart Trolley with RFID signal receiver
- LED display is used to accept cloud analysis results, show the content generated by the recommendation system and provide user interaction interface
- Cloud server, responsible for data storage and recommendation analysis

Algorithms used in Recommendation System

- User-CF

- A user-based collaborative filtering algorithm recommends goods liked by other users who has similar preferences

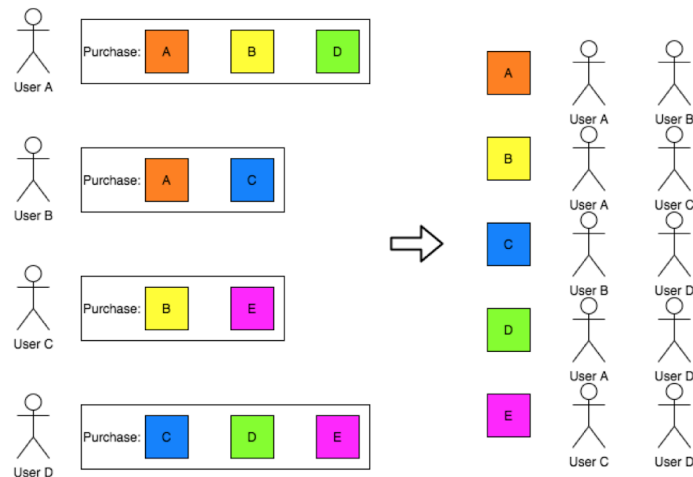
$$p(u, i) = \sum_{v \in S(u, K) \cap N(i)} w_{uv} r_{vi}$$

- Item-CF

- An item-based collaborative filtering algorithm recommends items that are similar to the items the users purchased previously.

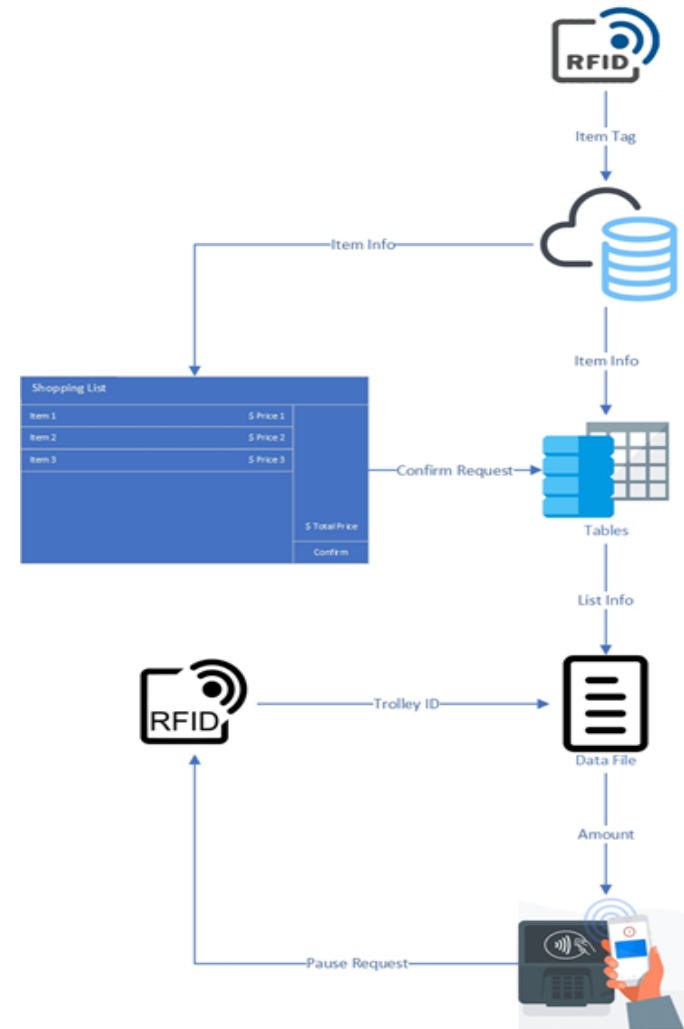
$$P_{ub} = \sum_{a \in N(u) \cap S(b, K)} W_{ab} R_{ua}$$

The following figure shows that user A has purchased items {a, b, d}, indicating which users have made purchases of the item and user B has purchased items {a, c}.



Payment System

- Shopping List Application(SLA)
- Tap Machine
- RFID Reader



Anti-theft System

- RFID Method:

RFID reader

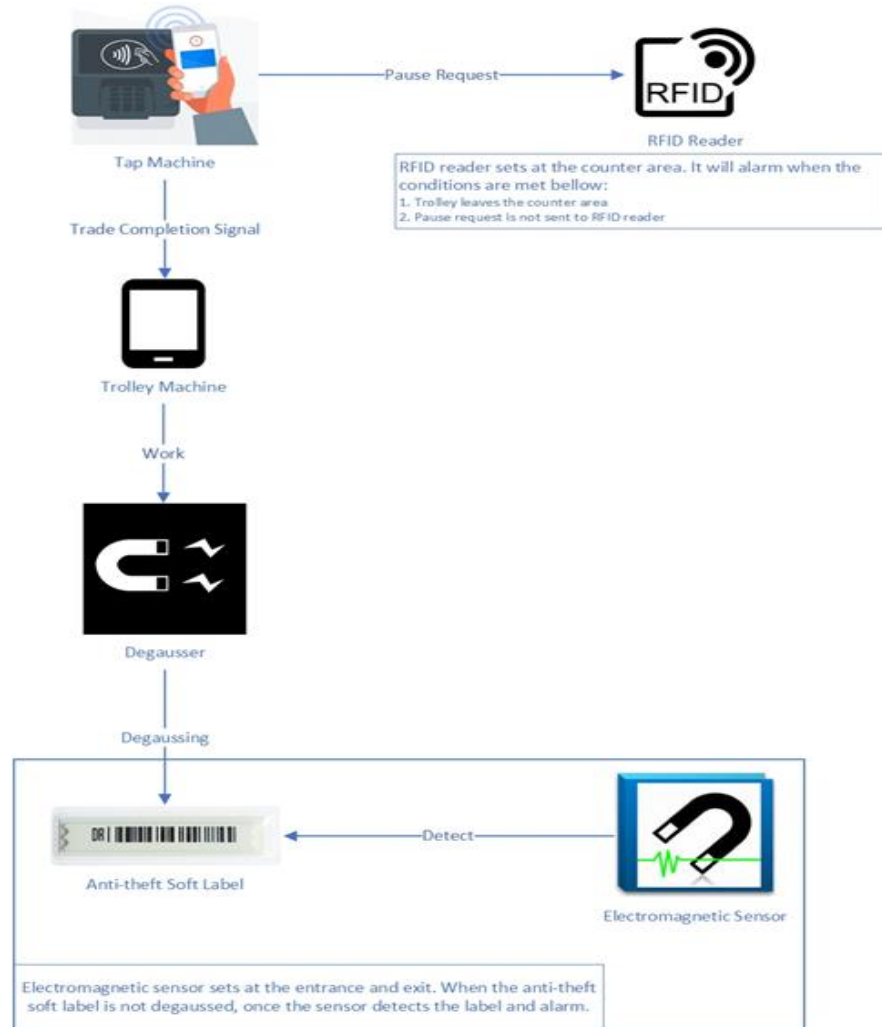
- EAS Method:

Anti-theft Soft Label

Degausser

Electromagnetic Sensor

*EAS: electronic article surveillance



Issues of the Idea

- Complexity in coordination between each component of RFID technology.
- Not as user friendly at first.
- Non technologically proficient.
- Senior citizens.
- Application user manual.

Thank You