A Novel Low-Cost Intelligent Shopping Cart

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A Novel Low-Cost Intelligent Shopping Cart (NLISC)

- Introduction
- NLSIC System
- NLSIC Implementation
- NLSIC Testing
- NLSIC Conclusion
- NLSIC Video demo
Introduction

• Problem Statement – Design & develop low-cost innovative shopping aide to facilitate increase in in-person shoppers foot-fall
• Assumptions
  – No obstruction in Aisles
  – Aisles have enough clearance for shoppers and their cart to move
Introduction

Assumption – Organization/Arrangement of Shopping arena
NLISC System

- Key Components/Modules
  - Dynamic Location detection
  - Server Communication
  - User Interface & Display
  - Billing & Inventory

![Diagram of NLISC System components]

- Dynamic Location Detection
- Server Communication
- User Interface & Display
- Billing & Inventory

- Identify items on Cart - RFID
- Display Product Details (Offers, brand, etc)
NLISC Implementation

Dynamic Location Detection

- IR transmitters mounted on Aisle, receivers on shopping cart
- Aisle identification $\rightarrow \log_2(N)+1$ \{ where $N$ is total #aisle in the shopping arena\} IR trans-receivers

<table>
<thead>
<tr>
<th>IR transreceiver2 at height 20cm</th>
<th>IR transreceiver1 at height 10cm</th>
<th>Decision on aisle#</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Unused</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Aisle1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Aisle2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Aisle3</td>
</tr>
</tbody>
</table>

- Entry/Exit of Aisle
NLISC Implementation

Server Communication Module
- Wireless Zigbee
- Server stores the Product database

<table>
<thead>
<tr>
<th>Product-Id</th>
<th>Product Name</th>
<th>Aisle Number</th>
<th>Cost (In Indian Rupees)</th>
<th>Discount %</th>
</tr>
</thead>
<tbody>
<tr>
<td>670842</td>
<td>Colgate toothpaste</td>
<td>1</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>670843</td>
<td>Dove Soap</td>
<td>2</td>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>670844</td>
<td>Tide Powder</td>
<td>3</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td>670845</td>
<td>Oral B toothbrush</td>
<td>1</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>670846</td>
<td>Camay Soap</td>
<td>2</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td>670847</td>
<td>Surf Powder</td>
<td>3</td>
<td>140</td>
<td>10</td>
</tr>
</tbody>
</table>

- Products retrieved based on Aisle #
NLISC Implementation

User Interface & Display Module
• Simple Keyboard & LCD display
• Can be enhanced to improve customer experience
• Options for user to make some choices!
NLISC Implementation

Billing & Inventory Management Module

• Proximity based
  – Unique RF-Id tags for products
  – Running total as added onto cart

• On shopping completion update Server database information
NLISC Testing

- Usage Scenario
  1. Broadcast offer information to Carts
  2. Detect Aisle/Bay# and Entry/Exit
  3. Get relevant Aisle/Bay products & display
  4. Selected/shopped items identified by RF-Id reader
  5. Repeat Step 2 if shopping not complete
  6. If shopping complete process for billing & update inventory
Conclusion

• NLISC successful designed, developed/implemented and tested
• Billing security to be enhanced to improved customer confidence
• Challenges while multiple carts in shopping arena needs to be explored
  – Communication
  – Server updates
NLISC Video Demo
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Thank You