Project Plan
O.P.E.N. v2.0: Smart Order Picking

The Capstone Experience

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Functional Specifications

• The Phoenix Group is a POS device distributor
• Warehouse “pickers” collect items to fulfill tickets
• Pickers have a tablet and a barcode scanner
• Goal 1: Find and display the most efficient path to all pick ticket items
• Goal 2: Track inventory in real time as items are scanned and tickets are fulfilled
Design Specifications

• Client App consists of two displays
  • Order Fulfillment Display
    ▪ Map with shortest route
    ▪ Item queue display
    ▪ Zoom/Move map feature
  • Inventory Display
    ▪ Click shelves on map for inventory details
    ▪ Search for Items by name or number
Screen Mockup: Inventory Display
Screen Mockup: Inventory Display
Screen Mockup: Order Fulfillment Display
Screen Mockup: Order Fulfillment Display
Technical Specifications

• **MySQL**
  - Holds all inventory data
  - Bluetooth Low Energy (BLE) Positions
  - Grid Layout
  - Exists on the Windows R2 Instance

• **Windows Tablet**
  - Self locates with BLE device Received Signal Strength Indication (RSSI)
  - Displays route and shelf inventory details

• **Windows R2 Server**
  - Service layer between the Database and the Tablet
  - Performs intensive routing calculations (shortest route)
System Architecture
System Components

• Hardware Platforms
  ▪ R2 AWS Server
  ▪ Windows Surface Pro Tablet
  ▪ BLE Beacons
  ▪ Barcode Scanner

• Software Platforms / Technologies
  ▪ NodeJS / Express (API Communication backend)
  ▪ MySQL
  ▪ Windows Tablet Application (O.P.E.N. v2)
Testing

• Create a “warehouse map” of capstone lab to test the Bluetooth devices’ accuracy and range
• Test various routes to ensure our quickest-route algorithm efficiently picks the best path
• Test server under load with multiple clients
• Run use cases for usability of the front-end client application
Risks

• Shortest Path Algorithm
  ▪ Finding the absolute shortest path could become too intensive.
  ▪ Instead of finding the absolute best solution, find a good solution

• Beacon Hardware
  ▪ Scalability and accuracy of readings of short range Bluetooth devices
  ▪ Increase device density or use GPS.

• Tablet Power Consumption
  ▪ Frequent network calls and receiving BLE signals
  ▪ Condense data readings and backend calls to decrease network traffic
Questions?