

SPARR⁺OW

SGM 1/28



Needfinding

- Visited IKEA and Costco, and talked to employees about their inventory procedures
- Inventory taken every week (IKEA) or 2x a year (Costco) by pairs of people manually counting items.
Benefit of drones: Huge potential savings (not paying 100s of workers overtime to work overnight)
- **Potential problems for drones**
 - Barcodes not visible, multiple barcodes per item, or handwritten barcodes
 - Shelves may have uneven heights
 - Different items on a single pallet
- **Common issue encountered by retail stores:** Customers move and misplace items, making stock counts/locations inaccurate
- **Pain point:** Inventory counts in the system are not always up to date, especially during store hours, when customers can move items. Faster fix is needed for when customer requests a missing item.
- **Insight:** “Retail” stores/warehouses are less structured and prone to error due to customers as compared to “storage” warehouses. Each type of warehouse has its unique needs.



Benchmarking

Inventory Stock Taking

- Counting of on-hand inventory often by hand
- Mostly periodic as required for auditing or verification
- Warehouses: forklifts, barcode scanners
- Goal: **moving from a periodic inventory model to a continuous inventory model**

Relevant Systems

- **InventAIRy** and **DroneScan**: automated mapping of warehouse environment and inventory identification via barcodes
- RFID reading drones for steel yards
- **Kiva Systems (Amazon Robotics)**
- Others

Software Market

- Warehouse Management Systems (WMS) market breaks down into four types of vendors
 - Application megasuite
 - Supply chain management suite
 - Specialists
 - Independent components
- **SAP Extended Warehouse Management**
 - Inventory tracking and management module



Brainstorming

Current Problems

- Customers misplace items
- Full inventory sweep is time-consuming
- Highs cost associated with frequent counting
- Item retrieval is slow

Drone

- Fully automated navigation
- Path input
- **Follow tape & input height**
- Following a person
- Remote control

Computer Vision

- CV-based counting of items
- **Scanning barcodes**
- **Scanning RFIDs**
- CV detection of item presence/absence
- Take photos for human inspection



Drone Purchase

- Bought a **3DR Solo**, with the gimbal and GoPro HERO4

Features

- Has a flight simulator
- 4K camera, 12 Mp photos
- 1 GHz Linux computer in controller
- Open-source SDK





Questions

- Any updates on warehouse contacts?
- Opinions/thoughts on VC presentation?



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