FIND YOURS.

More Than The Robot

Presented by:

6 River Systems
Objectives

• Set the table stakes for fulfillment mobile robots.

• Identify how machine learning and artificial intelligence reduce in-aisle walking.

• Present data that shows how a directed workflow makes picking faster and removes errors.
Current State
Changing Operations

Distribution Centers - supporting hundreds of big box stores shipping cases and pallets of merchandise to stores

Fulfillment Centers - supporting millions of customers shipping packages to your door

10 years
Peak Challenge – actual customer example

Peak to Mean - Sizing the Church for Easter Sunday

Peak volume: 184,200 lines/day

9 : 1 peak-to-mean

Off-peak peak volume: 74,000 lines/day

Current G-T-P: 60,000 lines/day
Labor

Supply is short
- Not enough hourly associates
- Not enough management
- Skill sets aren’t developed

Demand is long
- Jobs are being left unfilled
- Demand increasing 20-25% a year

Wages are increasing
- Jobs 2008 - $9/hr
- 2018 - $20/hr
Systems Overview
Software

Fragmented market
- Little has changed in 20 years
- 100s of solutions out there
- Slow moving and expensive

Not tech forward
- Jobs “Cloud” what?
- Most use printed pick lists
- Difficult to change/modify
Traditional Approaches

Advantages
• Well understood, lots of vendors
• Used for a wide-range of products
• Deployed out quickly (2-6 months)

Disadvantages
• “High amount of manual labor
• Takes a long time to train
• 4-5 year payback
Modern Approaches

Advantages
- Improve performance (2-4x)
- Reduce dependency on labor
- Fewer touches of product

Disadvantages
- Take up a lot of space
- Lengthy implementations (12-18 months)
- Very costly ($5-$100M)
System Evaluation

Decisions driven off of three factors
- Time to implement
- Cost to implement
- Return on Investment (ROI)

Challenges for evaluation
- Bigger systems → big benefit
- Bigger systems → longer roll-out
- Bigger systems → more expense

Operator Challenges
- Use what they know
- Don’t like being the first

Simple ROI = \frac{Gains - Investment Costs}{Investment Costs}

\begin{align*}
\text{Simple ROI} & = \frac{700,000 - 500,000}{500,000} \\
& = 40\%
\end{align*}
What if you could get rates comparable to traditional automation at 20% of the cost?
A Better Way

1. Empower your associate
   keep your best people
2. Flexibility then productivity
   maximize utilization
3. No new infrastructure
   Keep existing layout and systems
The Magic Cart

Eliminates long walks
Brings work to the associate
Reduces in aisle walking
Intelligent order allocation
Speeds up picking
Directed workflow, 3x rates, 15 minute training
Cut time per pick in half → 2x pick rates

Eliminate the long-walk, delivering work to the operators in the active area

Artificial Intelligence and Machine Learning manages work in real-time, reducing steps in aisles

Speed up the task and training with a directed workflow
FIFO work allocation leads to extended walking in typical cart-pick operations.

Intelligent work allocation groups like work together to reduce steps between tasks.

Shorten the In-Aisle Walk.
Productivity Analysis - Example

251% improvement over batch pick vs manual cart pick

<table>
<thead>
<tr>
<th>Carton Batch Picked</th>
<th>Manual</th>
<th>6RS</th>
<th>UOM</th>
<th>6RS Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push cart to the aisle</td>
<td>50.0</td>
<td>27.4</td>
<td>Cart</td>
<td>6RS picker goes to meeting point</td>
</tr>
<tr>
<td>Walk</td>
<td>2,080.0</td>
<td>121.1</td>
<td>Cart</td>
<td>Optimized batch picking, sku commonality and zone picking</td>
</tr>
<tr>
<td>Find bin</td>
<td>4.0</td>
<td>3.0</td>
<td>Stop</td>
<td>Chuck display the bin location ID</td>
</tr>
<tr>
<td>Search item</td>
<td>2.0</td>
<td>1.0</td>
<td>Stop</td>
<td>Chuck facilitates this using pictures on screen</td>
</tr>
<tr>
<td>Grab item</td>
<td>5.0</td>
<td>6.0</td>
<td>Stop</td>
<td>Grab more items for batch picking</td>
</tr>
<tr>
<td>Confirm pick</td>
<td>5.8</td>
<td>6.0</td>
<td>Stop</td>
<td>Hands free scanning. Confirm multiple puts</td>
</tr>
<tr>
<td>Put item</td>
<td>4.0</td>
<td>3.0</td>
<td>Stop</td>
<td>Chuck has put-to-light to facilitate put-items task</td>
</tr>
<tr>
<td>Transition</td>
<td>4.0</td>
<td>3.0</td>
<td>Stop</td>
<td>Follow Chuck instead of re-positioning and pushing cart</td>
</tr>
<tr>
<td>Cart drop off</td>
<td>150.0</td>
<td>3.0</td>
<td>Cart</td>
<td>Chuck autonomously travels to takeoff</td>
</tr>
<tr>
<td>Seconds per stop</td>
<td>67.9</td>
<td>33.0</td>
<td>—</td>
<td>Reduce in-aisle times by 35 seconds per pick</td>
</tr>
<tr>
<td>Stops per hour</td>
<td>53.0</td>
<td>109.1</td>
<td>—</td>
<td>Increase rates by 106%</td>
</tr>
<tr>
<td>LPH equivalent</td>
<td>53.0</td>
<td>185.8</td>
<td>—</td>
<td>Increase rates by 251%</td>
</tr>
</tbody>
</table>
Total Project Time to Payback (months)

- CART: 16 months
- TRANSPORT ROBOT: 23 months
- CONVEYOR: 46 months
- 6RS: 18 months
- GOODS-TO-PERSON: 44 months
Wrap Up

Industry is changing

Technology has caught up

Software and hardware differentiates solutions
For more information

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