Getting Ahead of the Game: What changes when you deploy robotic piece-picking

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Key Takeaways

- If you’ve been on the fence with regard to using robots for piece-picking (item level handling), there are compelling solutions to consider.

- The transition from all manual to a mix of robot and manual processing requires managing through a punch list of considerations before deploying robotic piece-picking within a warehouse.

- Robotic picking systems are becoming more plug and play, so your system integrators should be able to work with you to address overall needs.

- As robots become part of the team, it’s important to think about how you will operationalize their use to maximum benefit.
the accuracy and timeliness of the supply chain is critical for a company’s brand

- items you need
- convenience of buying
- delivered at speed
Growth in online commerce means fewer lines and units per order

Item handling is lower productivity than pallet or case picking

Finding the required warehouse labor is already challenging

Robotic automation provides an option to meet your customers’ demand cost-effectively and reliably
A sampling of piece-picking bots

100s of millions of picks by EOY 2020
Still more piece-picking bots

- Swisslog
- GreyOrange
- InVia Robotics
- Soft Robotics
- Kindred
- Magazino
- Iam Robotics

• Range
• Rate
• Reliability
A vision for lights-out order fulfillment
Adopting robotic piece-picking systems

• With options to choose from, understand your picking needs:
  • strategic pillar or cost savings
  • range, rate, reliability (3Rs)
  • picking machine (Hand, Eye, Coordination) vs DIY
  • brownfield and / or greenfield designs
• Talk with your provider about
  • item set
  • operation model
  • workflow
  • physical workspace
  • software integration and routing
Item set
Many items are pickable

Grocery
Health & Beauty
Pharma
Electronics & Consumer
Apparel
Some are not

- Items that Tangle (should be packaged)
- Items with packaging that opens (should fix packaging)
- Porous, Complex Items (tend to multi-pick)
Guidelines for Robot Pickable Items

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- Bottles
- Boxes
- Bags
- Blister Packs
Operation model
Handling pickable and “non-pickables”
Performance – a tale of two pie charts

- Pickable Order Volume
- Throughput (pieces/hr)
Handling unpickable and unclassified items

Robot Stations + Manual Stations
Robot items routed to robot
Manual items routed to person

Robot Master
Most items picked by robot
Manual operator handles exceptions
Solution Design

**Promise**: throughput, labor overhead, order integrity

**Design**: exception-handling (overseer, material flow, workstation features)
Solution Design

Number of stations
Solution Design

Number of stations
Solution Design

Number of stations
Workflow
goods-to-picker
Physical workspace
Robot-friendly workspace

1 source: 4 destinations
1 source: 1 destination

Within Robot Reach

Open Order Container
Workstation design - overview
Example concept

Overhead View

Arm Mount Arch

Storage Conveyor  Takeaway Conveyor  Storage Conveyor

Source 1  Source 2  Destination 1  Destination 2

Cameras ~1 m above totes

Front View

Arm Mount Arch

Storage Conveyor  Takeaway Conveyor  Storage Conveyor

Source 1  Source 2  Destination 1  Destination 2
Software integration
Software API – Mission Control Protocol

• Pick Mission is a set of instructions for a pick and place
• Each mission includes:
  • Pick information (source, destination, item, item metadata)
  • Place information (location, timing)
  • Result information sent from the robot
  • Status information sent back and forth every minute and as needed
Mission Control Flow: Exceptions

Start Mission → Pick Item → Place Item → End Mission

- Mission Invalid
  - No Item
    - Failed To Pick
  - Cannot ID
    - Put Back Item
  - No Place Location
    - Failed To Place
Solution Design

Overseer labor, routing
Field example – multi-robot installation
Putting it all together

- At the pace with which the technology is maturing, now is the time to plan for robotic piece-picking
- Define business objectives, 3R needs, whether you want to make or buy and whether you benefit most from retrofits or greenfield projects
- Understand what’s robot pickable and what really shouldn’t be and work with your provider(s) to decide how you will manage some likely mix
- Select a workflow that is significant to your business and collaborate on workspace design, software integration and exception handling.
- Define a practical operational model and provide training for the team
- Track key metrics and iterate or adjust as needed – it may take some tuning to maximize the benefit
Thank you

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