



Credit: kuka

# 4 MUST-HAVE MOBILE COBOT CAPABILITIES FOR USE IN FULFILMENT CENTERS

# ABOUT THIS eBOOK

With increased adoption of automation by large online retail enterprises, robots and deep learning based solutions are being deployed with the intention of streamlining logistics and improving efficiency right from the stage of procurement to last mile delivery.

As the global collaborative robot market is forecasted to grow at a Compound Annual Growth Rate (CAGR) of 60% by 2030, next gen Autonomous Mobile Robots (AMRs) called mobile cobots or mobile manipulators pave the way for collaborative, safe and productive warehouse automation. They are equipped with high degrees of autonomy, efficient navigation and unrivaled flexible robotic manipulation. These robots can be made to work in conjunction with employees, processing bulk orders with zero error in the shortest amount of time.



ER-FLEX by Enabled Robotics

This ebook aims to educate the reader about the 4 key capabilities that every mobile cobot must have to operate in the highly dynamic world of fulfillment centers and warehouses.

# 4 KEY CAPABILITIES

## 1 ROBOT NAVIGATION

Effective navigation of AMR in the narrow aisles and low-light spaces of fulfillment centers is critical for the success of AMR navigation.

To find out more, read our blog here 

## 2 COLLABORATIVE ROBOT (COBOT) SAFETY

As robots and humans must work together in a restricted space to perform similar or complementary functions, safety for both robots and humans must be reimagined, planned, and implemented.

For more details, read our blog here 

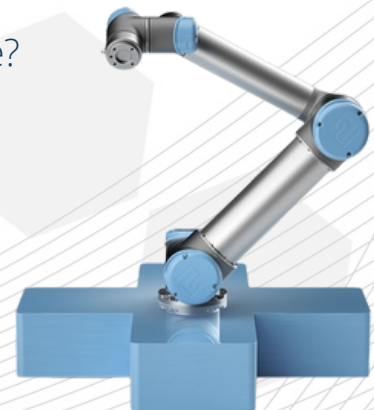
## 3 ROBOTIC MANIPULATOR

The performance of AMRs is enhanced with mounted robotic arms (as represented in Fig. ER-FLEX). Receiving, sorting, and packing of retail orders, thus replacing the labor-intensive order fulfillment process with an effectively automated object picking procedure.

The following factors provide efficient understanding to facilitate manipulator selection.

- What is the operating environment and the corresponding task?
- What is the maximum weight and size of the objects?
- Does the gripper need to work with CPGs (Consumer Packaged Goods)?
- What are the requirements in terms of gripper's cycle time?

Recent market disruptors for collaborative robots like UR5e and UR3e, are easy to program with a faster set up. For instance, UR3e is a compact table-top cobot with a weight of 11 kg, payload of 3 kg and has 360-degree rotation on wrist joints with a reach of 500 mm (about 1.64 ft).



UR3e ARM by Universal Robots

## 4 COMPUTER VISION

Retail fulfillment centers deal with two variations of object picking application.


**PICK** – Picking an object from the shelf and placing it in a bin.

**STOW** – Picking an object from the bin and stowing the same in the desired shelf.

Challenges in camera placement, object localization and type of objects (variations in size, shape & reflection) are common to both tasks.

Object localization brings in complexities in the case of the latter than the former, because of the involvement of cluttered scenes. The localization procedure involves identifying the location of the desired object in the scene, to facilitate object grasping by the robotic arm.

The object location is calculated in terms of its position and orientation, also called pose estimation.

To learn more about the implementation of Pose estimation for PICK and STOW operations, read our blog here 

As cobots are being touted as the next wave in warehouse automation, the need for intelligent mobile cobots is a necessary technology for automating tasks like pick and stow, packaging, and many others in warehouses which (otherwise) would have simply not been possible.

With the advent of mobile cobots in retail fulfillment centers, there is an increased need for adding intelligence to robots.

CONCLUSION

# LOOKING TO BUILD THESE CAPABILITIES FOR YOUR MOBILE COBOT?

With our expertise in 3D computer vision, mobile cobot navigation and manipulation, and synthetic dataset generation, we work alongside robotics companies to adapt cobots for different use cases.

Schedule a complimentary consultation with our experts to see how we can help you with customizing your robots for specific use cases. Together, we can chart your path forward.

## **YOUR TAKE-AWAYS FROM THIS CONSULTATION:**

1. How we can accelerate the development and deployment of your mobile cobots
2. Leverage our expertise to develop bespoke mobile cobot software
3. Learn how our Rapid Prototyping Platform can fast-track validation and choice of :
  - Sensors (2D and 3D)
  - Algorithms & Deep Learning models
  - AI Compute Hardware

**SCHEDULE A COMPLIMENTARY  
CONSULTATION**

