Mobile Robots

AGV and AMR's

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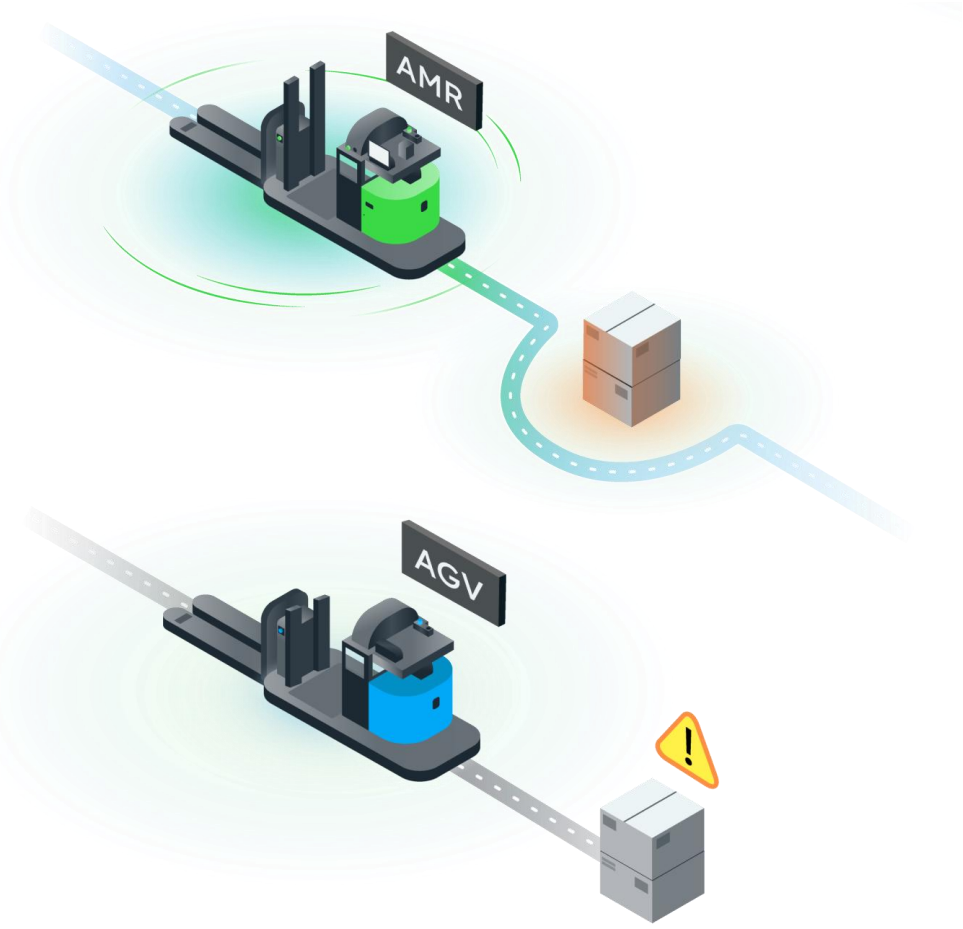
Introduction

- In modern manufacturing and logistics, mobile robots are essential for automating material transport.
- The two main types are:
  - AGV – Automated Guided Vehicle
  - AMR – Autonomous Mobile Robot
- Both move materials, but they differ in intelligence, navigation, and flexibility.



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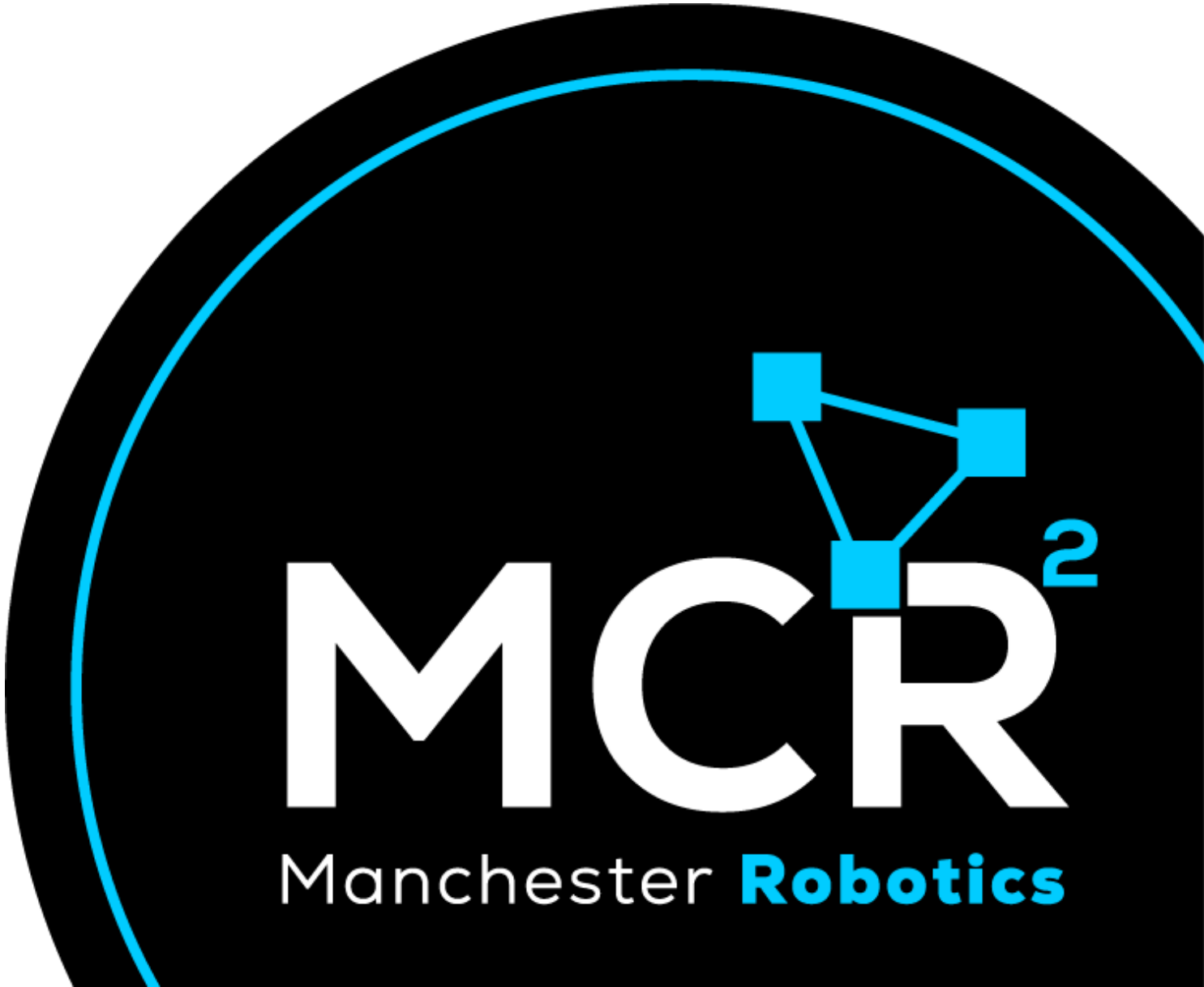
AGV's



AGV

Automated Guided Vehicle (AGV)

- Automated Guided Vehicles (AGVs) have been around since the 1960s.
- AGVs are used to transport goods for larger and heavier payloads without the need for a human driver.
- The transported items can be stored on the vehicle on an onboard platform or sometimes on a roller, which can automatically load and unload the items.

AGV

Automated Guided Vehicle (AGV)

- AGVs are self-driving vehicles that follow pre-determined paths.
- Use physical or visual guides such as:
  - Magnetic tape
  - QR codes
  - Wires embedded in the floor
  - Lasers reflecting off markers
- Usually AGVs stop if their path is blocked and cannot plan alternate routes.

AGV

- AGV's are generally less flexible and require physical changes to their paths when modifications are needed in the environment.
- AGV's require more extensive setup, including installation of guiding infrastructure (make the tracks , etc.) which makes this technology less scalable.
- AGV's are less expensive as an initial investment but may become a more costly solution to maintain and modify due to infrastructure changes.
- AGV's are suitable for repetitive tasks with fixed routes, material transport and manufacturing facilities.

AGV

- One common type of an Automated Guided Vehicle is a tugger that pulls a “train” of un-powered carts behind it.
- AGV forklifts and pallet jacks are frequently used for transporting entire pallets of goods, and a manual forklift can be retrofitted to become an AGV.
- AGV systems are often used for jobs that would usually be handled by conveyor systems, forklifts, or manual carts.
- They are best suited for environments that don’t change very often because the route the robot travels is the same every time.

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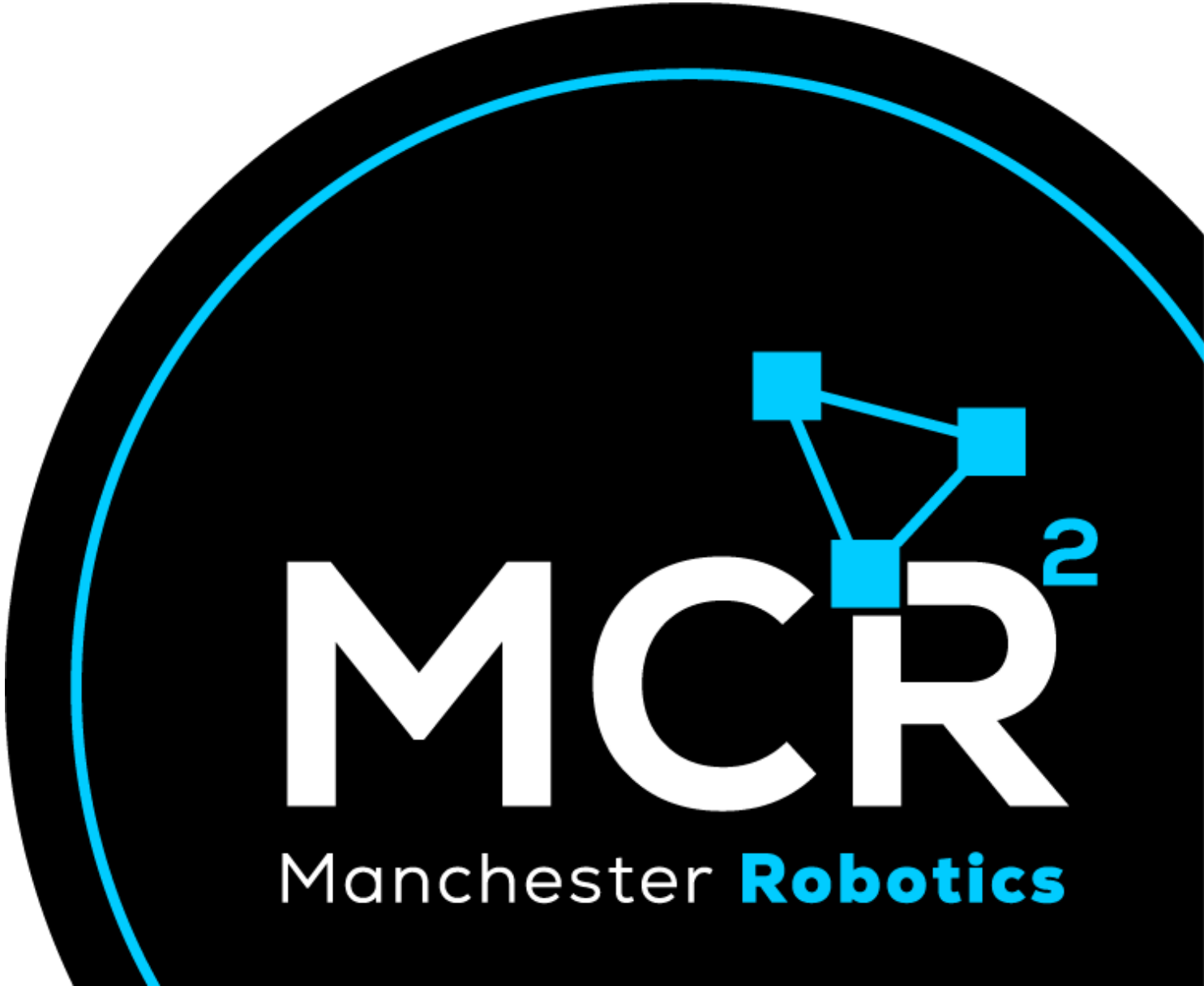
AMR's



AMR

Autonomous Mobile Robots (AMR)

- AMR;s have existed for two decades, with comprehensive commercial implementation only in the last ten years.
- As the AGV's, AMR's AGVs are used to transport goods for larger and heavier payloads without the need for a human driver.

AMR

Autonomous Mobile Robots (AMR)

- Autonomous Mobile Robots (AMRs) are self-driving robots that use advanced sensing and navigation technology to flexibly navigate their environment without being limited to fixed paths.
- They are equipped with multiple sensors (LiDAR and cameras) that enable them to detect obstacles, people, or other objects in their environment and adjust their paths accordingly or reroute in real-time.

AGV

- AMR's are generally more flexible since they can autonomously drive and adapt to changing environments and plan their own paths.
- AMR's have a quicker installation process and can be easily scaled up or sown based on the changing needs of the facility.
- AMR's have a higher initial investment but may offer savings on the long run due to their adaptability and ease of reconfiguration.

AGV

- AMR's are more versatile than AGV's and can be used in different applications such as logistics, warehousing, manufacturing lines where environments are dynamics and tasks are diverse.
- AMR's forklifts and pallet jacks are frequently used fc transporting entire pallets of goods.
- AMR's as AGV's can be used for jobs that would usually be handled by conveyor systems, forklifts, or manual carts.
- AMR's can reduce order picking time by minimizing warehouse order picking time (when picking things from shelves).

Feature	AGV	AMR
Navigation	Fixed paths (magnetic/wire)	Dynamic SLAM-based
Environment	Structured	Semi/unstructured
Flexibility	Low	High
Obstacle handling	Stops	Plans new route
Setup cost	Lower	Higher initially