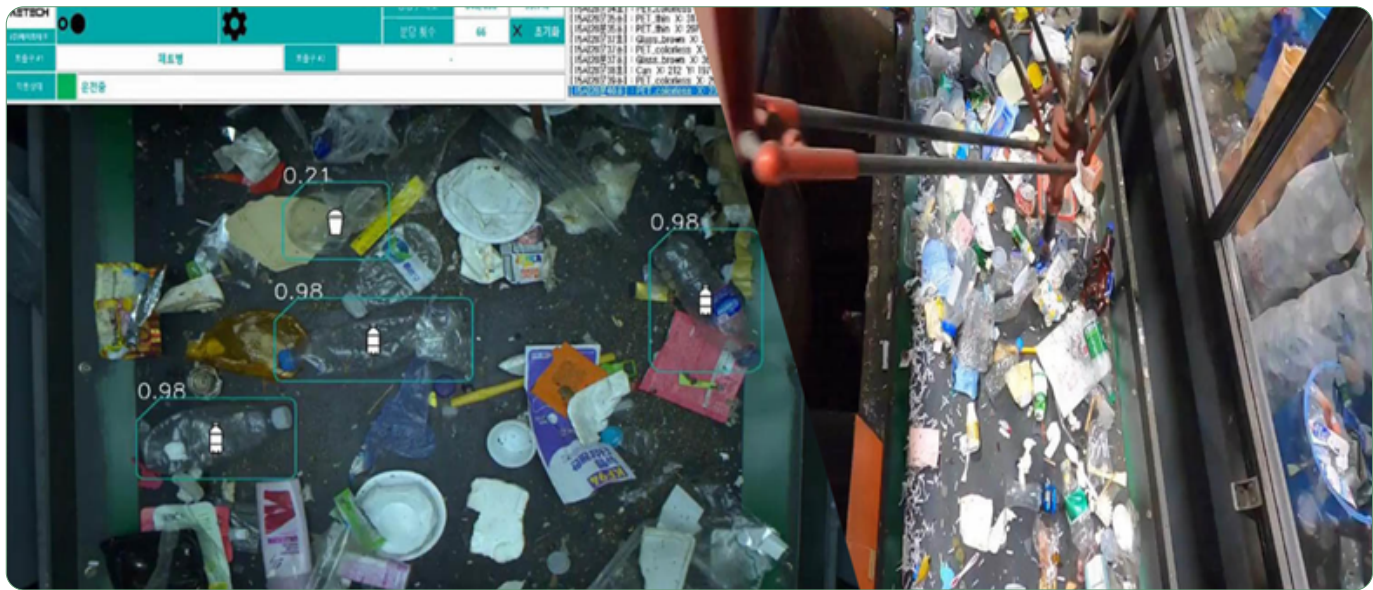


AI-based Waste Sorting Robot

AI-based Waste Sorting Robot uses video analysis to identify and separate recyclable materials from waste. It is equipped with an integrated system that manages robotic arm control for material transfer and classification.

Compared to traditional manual sorting methods, this technology improves sorting efficiency, reduces environmental pollution, and contributes to sustainable circular economies.



▲ The AI-Based Waste Sorting Robot identifies different types of waste on the conveyor belt, then suctions and transfers recyclable PET plastic bottles. Source : AETECH

Issues to Tackle

- ☑ Environmental pollution arises when recyclable materials are not sorted from waste and end up in landfills or incinerators.
- ☑ Low productivity caused by the harsh working conditions of waste sorting facilities and the manual separation of recyclable materials.

Expected Benefits

- ☑ Reduces air, soil, and water pollution caused by waste burial and incineration.
- ☑ Contributes to a sustainable circular economy by establishing an efficient resource recycling system.
- ☑ Enhances sorting efficiency and reduces industrial accidents by utilizing robotic systems for waste sorting.

Key Services

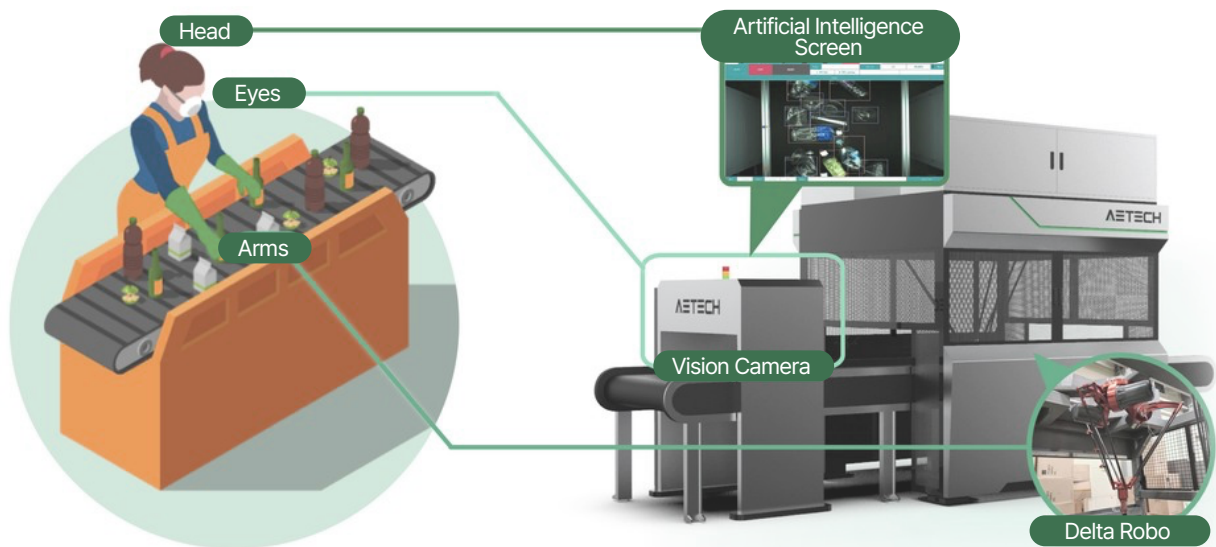
- Identifies recyclable materials from waste piles using cameras equipped with vision AI systems.
- Detects and classifies objects from mixed waste images based on contamination levels.
- Uses robotic arms for precise picking and transferring of recyclable items, utilizing deep learning and advanced suction grip technology.
- Digitizes operational results and provides real-time monitoring and system control for efficient operations.

Use Cases

- Daegu Metropolitan City (2021–2022): Introduced the "AI Resource Recycling Robot" as part of a data-driven citizen-participation city project. Installed at a national industrial cluster waste sorting facility, the robot system was piloted in offline labs.
- Jeju Island (2023): Launched an AI-powered recycling assistance center at Jocheon Port ; Equipped with AI waste sorting robots, the center sorts six types of recyclable materials, including transparent and colored PET bottles and cans, transmitting real-time data on sorted quantities and conditions to collection vehicles.

Key Components

Configuration



Key Technologies

1. Deep Learning-Based Waste Detection and Analysis

- Utilizes deep learning algorithms and vision cameras to identify waste materials based on material type, color, and texture, determining whether they are recyclable.

2. Real-Time Data Tracking and Maintenance

- Continuously tracks and maintains data values for each object, enabling recognition of moving objects on a conveyor belt even when their positions change.

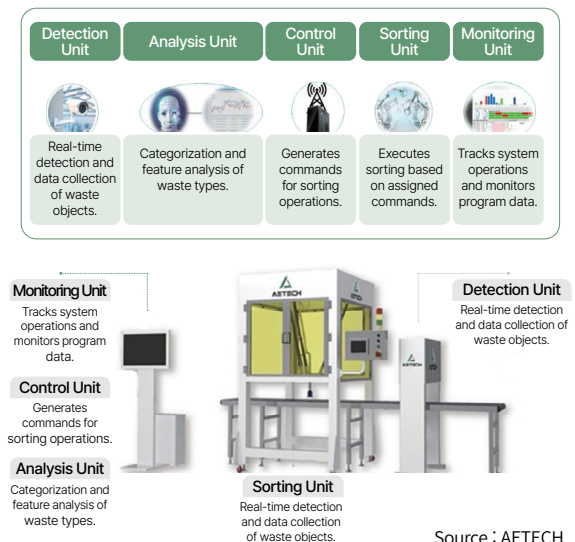
3. Object Transfer and Signal Synchronization

- Synchronizes the position of targeted objects on the conveyor belt to the system's grip points for accurate picking and transfer.

4. Big data

- Monitors waste in real time by category and contamination level, creating a comprehensive waste database to improve sorting accuracy.

Smart Sorting Robot Operation Process



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