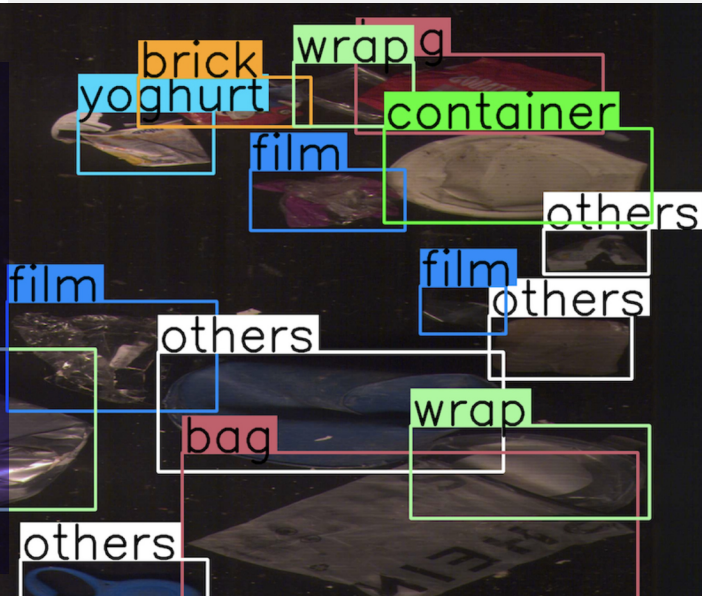


Case Study AI-Waste Engine

Digitizing Waste Management:
How AI Drives the Circular
Economy



1. Overview

Pixelabs partnered with a Materials Recovery Facility (MRF) to **enhance waste management processes using our product AI-Waste Engine**.

The plant processes approximately 200 tons of municipal solid waste daily, operating with two treatment lines: one for mixed waste and another dedicated to the selective collection of packaging and paper. **AI-Waste Engine plays a pivotal role in the digitization of the circular economy, particularly in the characterization of waste materials.**

2. Challenges

A significant challenge faced by many MRFs is the reliance on manual waste separation, which is less efficient and limits recovery rates. Modernization with automated systems and advanced AI visual technology is essential to meet EU recycling objectives for 2035. Additionally, proper management of organic waste, stronger citizen participation in selective collection, and investment in new infrastructure are critical for advancing Spain toward a sustainable circular economy.

MRFs are challenging environments for equipment deployment. Pixelabs team had to ensure that AI-Waste Engine could operate effectively in such conditions. Deep learning algorithms were implemented **to classify waste based on material typology and composition, with real-time data displayed on a dashboard.**

3. Solution

AI-Waste Engine uses next-generation computer vision to identify materials like PET, PE, paper, brick, PP, and metal in real time. Despite challenges in deploying cameras and integrating the system into the plant, its precision imaging technology—combining color and hyperspectral cameras with molecular analysis—can classify dense waste streams and distinguish visually similar materials. **This automation improves efficiency, reduces manual labor, and increases sorting accuracy.**

4. Results

The implementation of AI-Waste Engine led to measurable improvements in the MRF's operations. The most significant results include **reduced operational time, higher classification accuracy, and cost savings.** By enhancing processes, infrastructure, and operational efficiency, the solution contributes directly to more effective waste management and supports the broader goals of the circular economy.

80%
time reduction

75%
in savings

95%
accuracy

