RECLAIM PROJECT – Javier Grau Forner - AIMPLAS

Recently, robotic technology has been greatly involved in waste separation providing a powerful, robust solution for the processing of the constantly increasing amounts of post-consumer waste. Existing solutions are installed in large -scale Material Recovery Facilities (MRFs) that target high waste volumes and are not cost-effective for smaller, less accessible areas. In contrast to bulk processing, close to source waste sorting has shown to improve material recovery in terms of quality and quantity, however lacking the exploitation of available high-tech solutions. To bridge this gap, the recently started RECLAIM project aims to develop a portable, robotic MRF (prMRF) tailored to small-scale material recovery. RECLAIM adopts a modular multirobot/multi-gripper approach for material recovery and an AI-powered computer vision module for material categorization. Furthermore, the project puts forward a novel Recycling Data-Game that encourages citizens to participate in project RTD activities by providing annotations to be used in training the AI modules used for recyclable categorization. To develop the objective of increase in the waste management capabilities RECLAIM is focused in the next four technologies:

Advanced AI for material identification, localization and categorization (AI-ILC) - exploit and improve existing AI technologies to develop effective solutions combining visual and hyperspectral information to accomplish high-performance recyclable waste identification, localization and categorization, applicable in real and harsh environments to support material recovery.

Modular, low-cost, high performance, multi-robot/multi-gripper recyclable recovery - RECLAIM promotes a new modular architecture for robotic recyclable recovery based on high productivity Robotic Recycling Workers (RoReWos) equipped with different grippers specializing in different material types. The use of RoReWo Teams installed in the prMRF is expected to double the "picks per invested euro" rate for the composite system.

Portable robotic Material Recovery Facility (prMRF) - the combined placement of established recycling processing mechanical equipment and the AI-powered robotic sorters in a container box that can be easily transported to points of interest, is ready for operation within few hours, is capable of efficient recovery of recyclable materials with a minimal number of recycling workers, is functional and sustainable for several years after the project end.

Environmental gaming for social awareness and data collection - increase social awareness to recycling via a novel Recycling Data-Game (RDG) that highlights the related challenges and encourages citizens to participate in project activities through a citizen science approach for providing data to AI-ILC training. Orthogonal to the above, RDG will provide the means to communicate the general principles of AI and Data Science to the public.