Research project
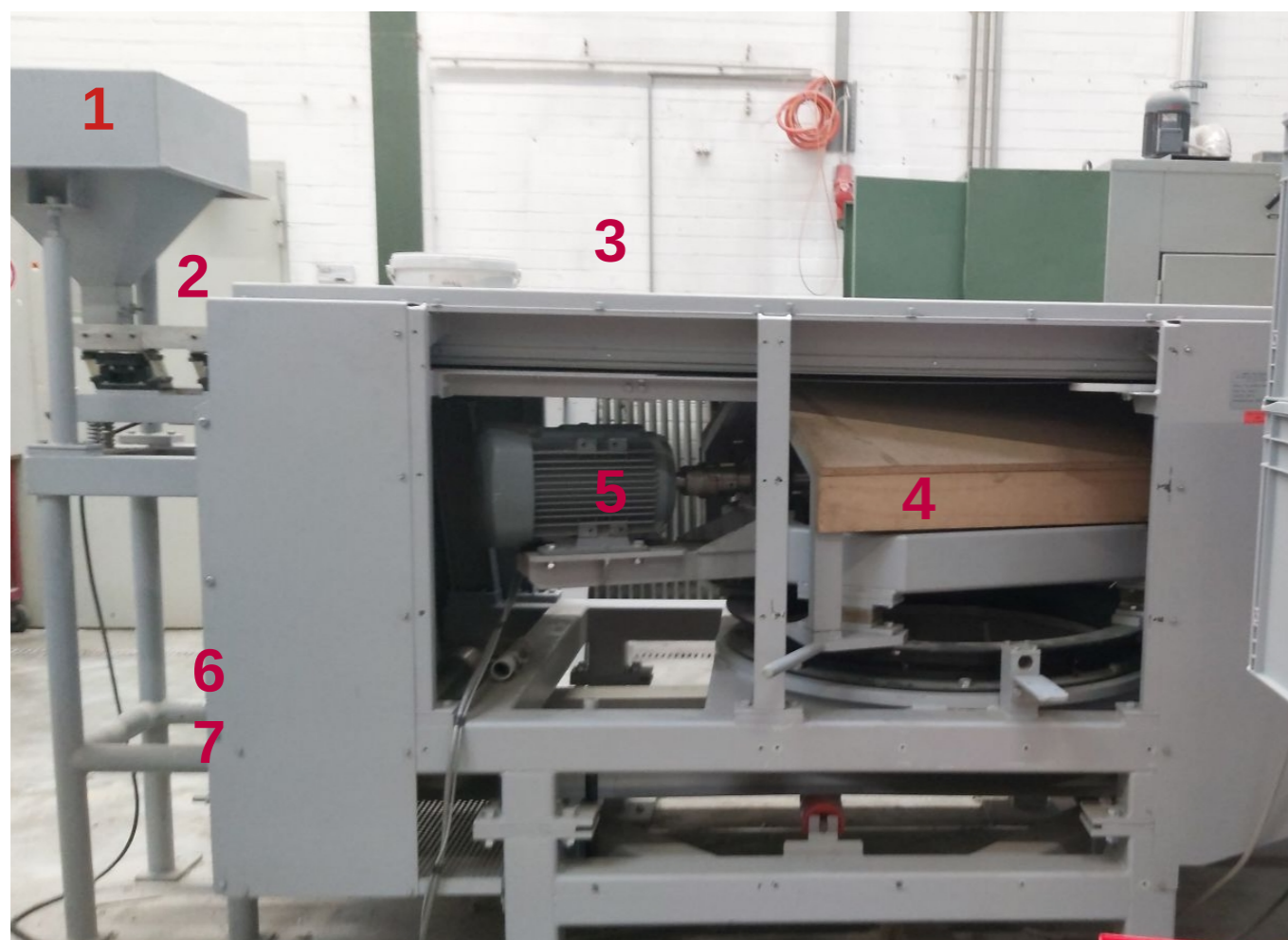
SoRec

Smart Eddy Current Separator Machine

MOTIVATION

SoRec aims to transform the recycling industry by using AI to enhance separation technologies (focused on eddy current separation).Current challenges of the recycling industry that will be addressed in this project are the working conditions, which can be harmful and hazardous, and process efficiencies. Digitalization of the processes in combination with AI will enable remote machine monitoring and controlling, reducing the need for human resources to run the process. This technology will also improve operational efficiency by monitoring and controlling the process using AI Models. SoRec is setting a new benchmark for industrial automation in the recycling industry, leading towards a safer, more efficient, and eco-friendly future.

Solution Approach

The state-of-the-art is integrating AI models, specifically SAM. It enables precise feature extraction of materials as small as 1-4 mm across various attributes such as size, colour, and texture—even in multi-layered scenarios on a conveyor belt. The model's output will inform a programmable logic controller (PLC) system, transforming the eddy current separator into a remotely controlled, digital entity.. The model includes intelligence adaptations for other machine components, such as realigning the conveyor belt through visual misalignment detection and optimizing the drum's vibration and speed with advanced sensors.
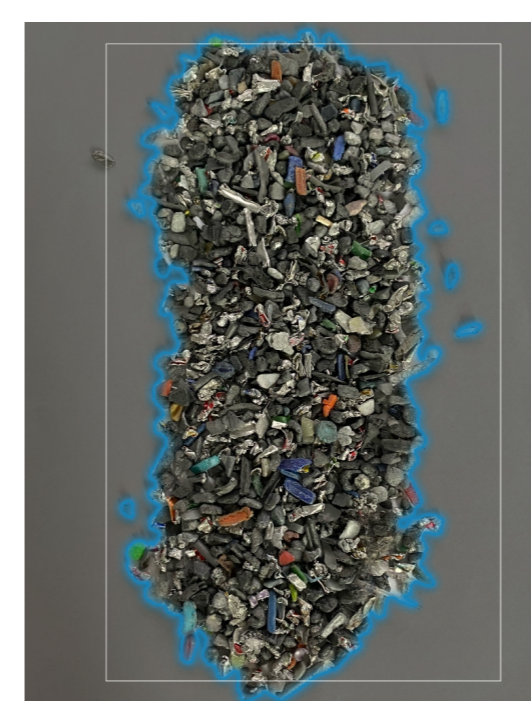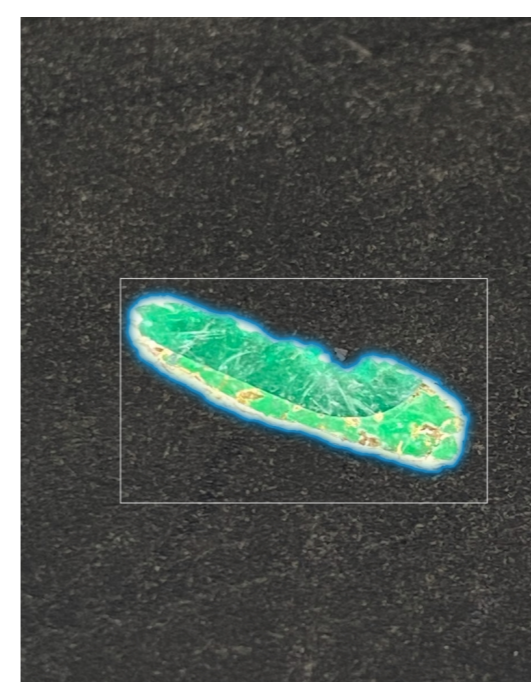
Eddy Current Separator

1. Container
2. Vibration Feed
3. Conveyor Belt
4. Drum
5. Drum's engine
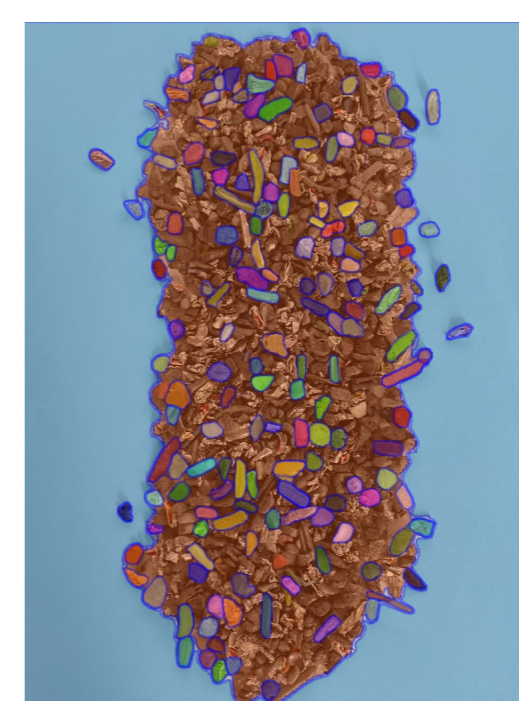6- Belt's stepper motor-1
7. Belt's stepper motor-2

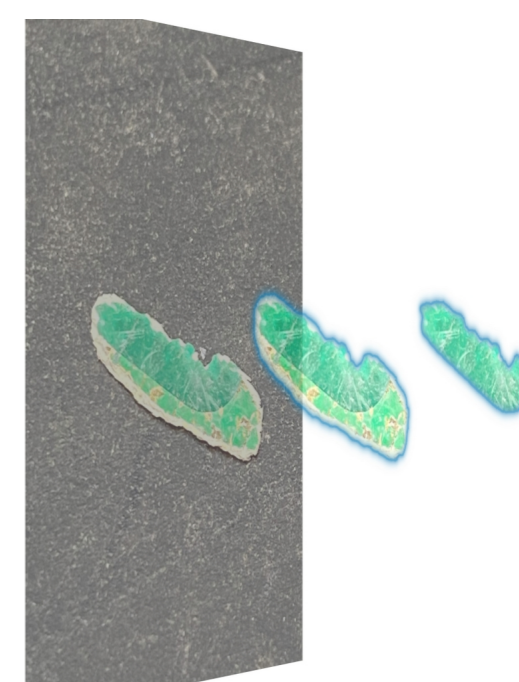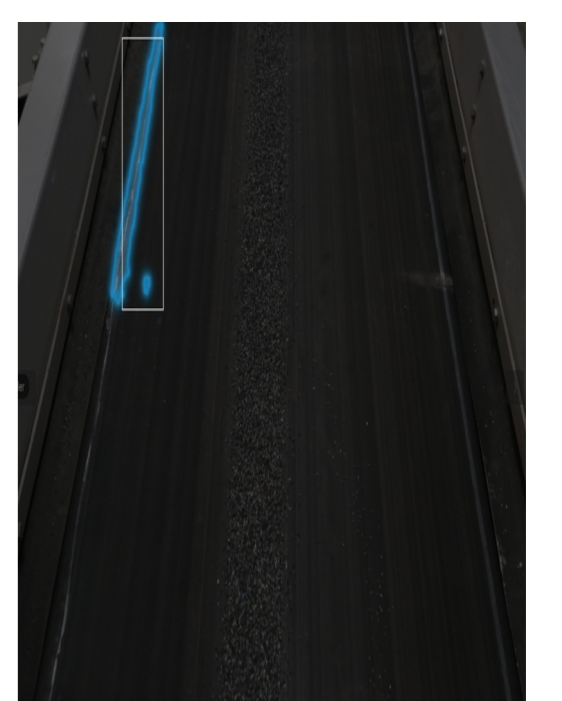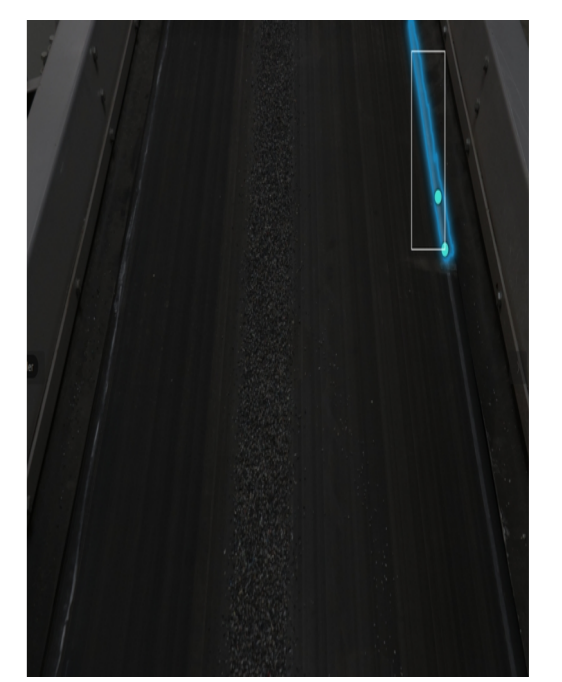**Original Image** | **Masked Image** | **Segmented Image** | **Digitized Belt**

The ETCE Lab conducts interdisciplinary research at the interface between computer science and sustainability. Our research focuses on resilient food production as adaptation to climate change, the development of educational offerings in the area of sustainability and digitalization solutions in the context of the circular economy.

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