TU Clausthal
Clausthal University of Technology

Material Information Extraction for Conveyor Belt Sorting

Type	Research track, Bachelor Thesis, Master Thesis
Credits	30 CPs
Start date	01.11.2023

Description

In this project, we delve into computer vision and artificial intelligence to enhance the efficiency of material sorting on a conveyor belt. We aim to develop an intelligent system that accurately extracts valuable information from diverse materials, including plastics, metals (copper, aluminum), glass, wood, and paper, ranging from 1mm to 4mm. The wanted information is the moving materials' size, colour, shape and edge.

Prerequisites

- <u>Programming Skills:</u> Python
- <u>Computer Vision Fundamentals:</u> Basic image processing techniques, edge detection, histogram equalization, and image segmentation.
- <u>Machine learning Basics:</u> Supervised learning, classification, and model evaluation.
- <u>Deep Learning Concepts:</u> Neural networks, layers, activation, and loss functions.
- <u>Hardware:</u> Raspberry Pi, installation of camera, sensors.

Tasks

1. Data Collection and Preprocessing
2. Model Selection, any of (CNNs, YOLO, Segmentation, Custom model)
3. Model Training
4. Attribute Extraction Algorithms: Implement algorithms to extract critical attributes (size, colour, shape, texture) from the images processed by the model and validate the accuracy of attribute extraction through visual inspection and analysis.

Resources

1. D Ellis (1989). A behavioural approach to information retrieval system design- Link.
2. CD Manning (2009). An introduction to information retrieval- Link.
3. J Cowie, W Lehnert (1996). Information extraction- Link.
4. A Picon, O Ghita, A Bereciartua (2012)- Link.

Contact

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