



Material Information Extraction for Conveyor Belt Sorting

Type	<Project Type: Research track, Bachelor Thesis, Master Thesis>
Credits	<Project Credits (30)>

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Description

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

Prerequisites

Programming skills: **Python**

Computer Vision Fundamentals: basic **image processing techniques**, **edge detection**, histogram equalization, and image segmentation.

Machine learning Basics: supervised learning, **classification**, and model evaluation.

Deep Learning Concepts: **neural networks**, **layers**, activation functions, and loss functions.

Hardware: **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 key attributes (size, color, shape, texture) from the images processed by the model and validate the accuracy of attribute extraction through visual inspection and analysis.

Resources

<<https://www.analyticsvidhya.com/blog/2021/08/beginners-guide-to-convolutional-neural-network-with-implementation-in-python/>>

<<https://towardsdatascience.com/yolo-you-only-look-once-real-time-object-detection-explained-492dc9230006>>

<<https://huggingface.co/tasks/image-segmentation>>

Contact

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