

# Masterarbeit/ Forschungsarbeit

## Design and development of an optical sensor system for object recognition at a medical products disposable unit

Each year there are roughly a total of around 419,200 tons of waste generated in the healthcare sector in Germany. Of this, 91% (Approx. 381,500 t) are textiles, dressings and similar materials, but cannot simply be recycled, but must be separated again. Since this is where most single-use instruments (that can actually be recycled) are found, these wastes carry significant importance. The Institut für Medizingerätetechnik is investigating a project regarding design and development of an optical sensor system for object recognition at a medical product disposable unit. This project focuses on developing a sensor-based system that recognizes the objects so that the correct instruction regarding their disposal could be given to the personnel. Accordingly, sensors are required to be selected to recognize the type of medical product waste, data to be generated, and Artificial Intelligence (AI) to be trained on this data. Consequently, instruction regarding how to dispose the recognized medical product waste could be given to the personnel. Below there some object recognition systems:

Aim of your thesis:

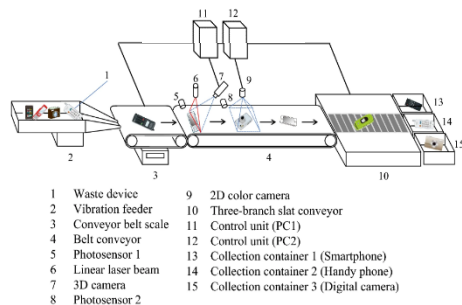


Figure 2 Schematic diagram of a sensor-based sorting system, Shigeki Koyanaka et al. 2023



Figure 2 Intelligent scales: Camera detects the item laid out, Google image

- to design and develop suitable sensor technology
- to develop a deep learning method for the recognition of waste medical products
- to train and test the AI and evaluate the entire system

The following requirements would be ideal for the prospective student:

- first experience of AI methods and signal processing in medicine
- basic knowledge of programming languages

Supervision will be provided in English. Hence, the thesis should be written in English.

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