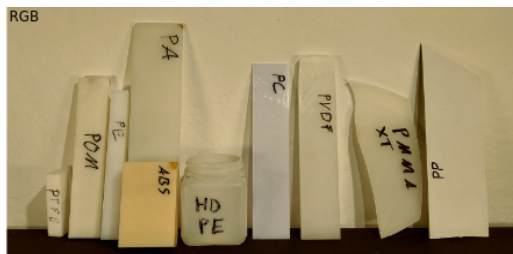


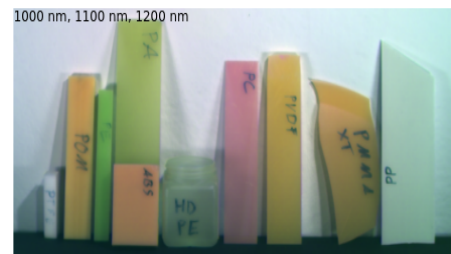
## Proposal for a Research Internship/Project Thesis

**Topic:** Evaluation of Spectral Variance within the same Plastic Classes

**Description:** Today, the majority of plastic waste is thermally recycled (burned), since it is often not possible to separate it by type using conventional methods. Multi-spectral imaging (MSI) however allows a clear recognition and identification. By using multi-camera systems, each of them with different filters mounted, multiple images of the same scene are recorded, capturing different spectral bandwidths. Especially for plastic recycling, those images can be superimposed to obtain information about the plastic type, since the carbon structures of objects absorb and reflect light in different ways, which results in different colors in the false color image.



(a) RGB image.



(b) false color image of 1000nm, 1100nm and 1200nm.

In order to ensure a good classification in the end, it is important to first determine the spectral variance of each material. Therefore the goal of this work is to use the existing multispectral plastic material database to calculate the spectral variance of its samples. Special emphasis is put on the exclusion of labels or attachments of different material as well as spectral reflections in order to obtain the variance for just the specific material type.

**Tasks:**

- Investigation of existing spectral variance estimation algorithm
- Adjustment of database to specific requirements
- Evaluation and comparison of results

**Prerequisites:** Knowledge of Python programming

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**Professor:** Prof. Dr.-Ing. André Kaup

**Available:** Immediately (October 2024)