Identifying Packaging: Recognizing Packaging Components in Consumer Goods.

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According to the UK Department for the Environment Food and Rural Affairs (DEFRA), in 2018, contamination meant councils in the UK sent 500,000 tonnes of recycling to landfill. The burden has fallen to consumers to properly dispose of their purchases and its packaging. Unfortunately, poorly documented packaging and confusing regional recycling rules causes an extremely broken system, riddled with contamination in the recycling stream. In 2018 the Canadian city of Toronto estimated that every 1% decrease in contamination would lead to savings of over 1 million dollars (~£744,000). At Scrapp Ltd., we've devised a system to determine correct, local, and easy-to-follow waste guidance to guide consumers toward more sustainable waste disposal.

Our system has several key pieces of information collected for each product, with the packaging data divided into Containers, Product Categories & Types, and Packaging Parts (made up of ***parts***, or the "shape" of the part, and ***materials***, or what the part is made of).

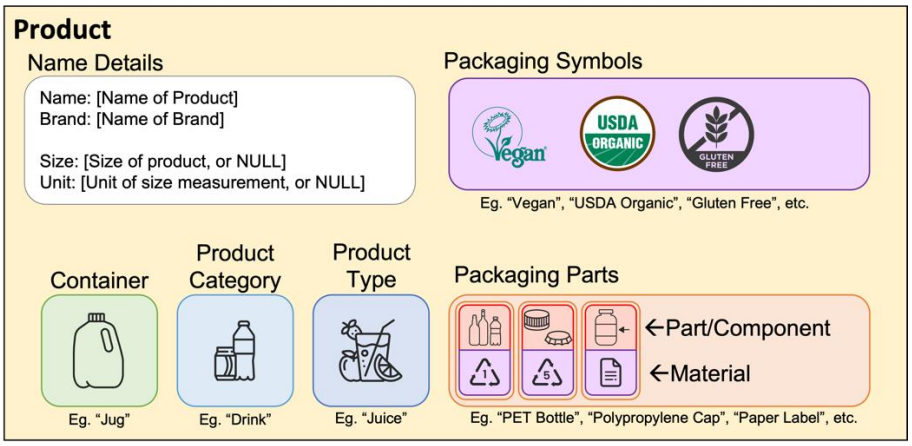

Figure 1. The information collected for each product.

Our largest challenge is collecting accurate packaging information for the billions of existing GTIN-enabled products across the globe. Right now, we gain the information from direct brand partnerships with product manufacturers and crowdsourced reporting of unknown products. In order to maximize our positive impact on the waste stream, we need to have an exhaustive catalogue of products and packaging information in our system.

The aim of this project is to use our collected product packaging data and build a model that can accurately assume missing packaging information, given an incomplete product packaging profile. Given ***potential*** inputs:

- Container: what container the product is made of?
- Category: what overall product category applies to the product?

- Type: what type of commoditized product is the product?
- Packaging Parts: What parts are present in the packaging?
    - Part: what part is present? (i.e.- cap, label, bottle, etc.)
    - Material: what material is a part made of?
- Size: what is the size (number & unit (i.e.- KG, mL, etc.) of the product?

Targeted outputs:

- Container: what container the product is made of?
- Category: what overall product category applies to the product?
- Type: what type of commoditized product is the product?
- Packaging Parts: What parts are present in the packaging?
    - Part: what part is present? (i.e.- cap, label, bottle, etc.)
    - Material: what material is a part made of?

If students express further interest or would like to build a more complex model, the following additional information may be considered in addition to the main inputs:

- Product Name: using natural language processing to recognize keywords for assigning product type & product category (i.e.- “Frozen” and “Pizza” in the name may suggest “food” category and “frozen/refrigerated” type, etc.)
- Symbols: What (if any) packaging symbols have been associated with the project?
- Images: An image of the product, to weigh into consideration for all previous outputs to consider and, optionally:
    - Name
    - Brand
    - Symbols present on packaging

The additional inputs should only be considered for interested students and is purely optional.