

Retail Product Recognition on Supermarket Shelves

Computer Vision (CS6350)

TPA - 15

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1 Problem Statement

Using image recognition and suitable statistical learning models, convert images of supermarket shelves into finer insights for data analysis. The solution should recognize similar or identical products such as branded drinks or shampoo bottles whilst also being able to differentiate between them based on variety and size. As the model is fed with more images from varied environments, the better it gets at maintaining size and shape invariance under various illumination conditions.

2 Input

- Images of supermarket shelves containing products of various sizes and colors from different brands.
- Video data from in-store surveillance or cellphone cameras in supermarkets (See **BONUS** output requirements below).
- approximate idea of dimensions of supermarket floor-plan.

3 Assumptions

- Sufficiently large number of image samples for products are available for training.
- Video shots are taken from a sufficient range (i.e. not unrestricted video).

4 Output

- A list of all the identified products along with their brand tags (as specified in training samples), visible as a group in racks/shelves.

- Detect, identify and visualize the location of each of the products in the input image using bounding boxes.
- Calculate the approximate quantity of particular items in the shelves (also detect if the shelf is partially vacant).
- **BONUS.** Number of customers visiting a shelf/section within the last few minutes (from video data).
- **BONUS.** Build a panorama from the panned videos (may contain jitter or blur and moving objects).

5 Datasets

- **GroceryProducts.** M. George and C. Floerkemeier. *Recognizing products: A per-exemplar multi-label image classification approach.* In ECCV, 2014.
- **Grocery Dataset.** <https://github.com/gulvarol/grocerydataset>.
- **WebMarket.** <http://yuhang.rsise.anu.edu.au/>.

6 References

- **TraxTMImage Recognition** engine. Used by Coca-Cola Hellenic for increased store execution coverage. <https://traxretail.com/customer/coca-cola-hellenic/>.
- Baz, Ipek, Erdem Yoruk, and Mujdat Cetin. **Context-aware hybrid classification system for fine-grained retail product recognition.** Image, Video, and Multidimensional Signal Processing Workshop (IVMSP), 2016 IEEE 12th. IEEE, 2016.
- Marian George, Dejan Mircic, Gabor Soros, Christian Floerkemeier, Friedemann Mattern. **Fine-Grained Product Class Recognition for Assisted Shopping.** Proceedings of the IEEE International Conference on Computer Vision Workshops. 2015.
- Baz, Ipek, Erdem Yoruk, and Mujdat Cetin. **Retail product recognition with a graphical shelf model.** Signal Processing and Communications Applications Conference (SIU), 2017 25th. IEEE, 2017.