Recognition of Grocery Items in a Shopping Cart

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Motivation

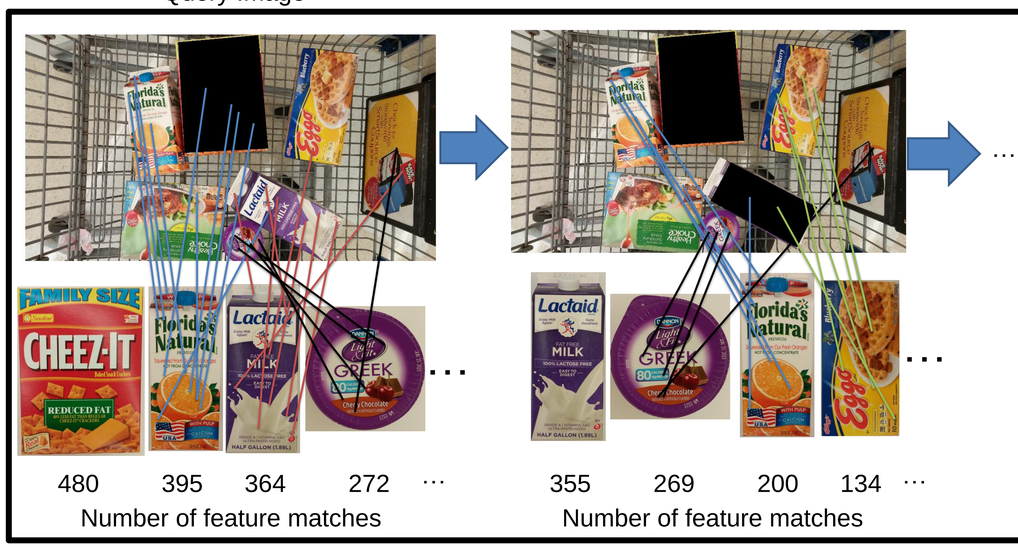
The goal is to have a grocery / department store shopper identify and price the items in the shopping cart by simply taking an image of the shopping cart.

Results

- Algorithm successfully identified numerous combinations of items within a 58 item database
- Algorithm robust against partial overlap of objects
- Accurately detected up to 11 items per shopping cart
- Correct matching of canned items was sensitive to camera angles and distance
- Incorrect matching attributed to outliers due to feature matching method and looping threshold

Algorithm

Query Image



1. Compute query SIFT features

2. Find feature matches between query image and each database image

3. Sort database images by number of matches

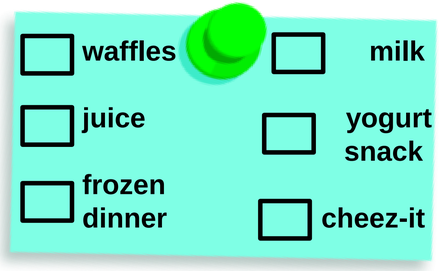
4. Compute RANSAC with homography model on top match. Apply homography to template of top match.

5. Overlay transformed template image on query image

6. Record top database image information, remove from list

7. Remove matched features in overlaid template for remaining database images

Loop until highest number of matches below set threshold



8. Compute total price of detected items

9. Return query image with:
   - -Item name and prices at location in image
   - -Total price of detected items