



LiveCompare: Grocery Bargain Hunting Through Participatory Sensing

Linda Deng
Duke University
Durham, NC
linda@cs.duke.edu

Landon P. Cox
Duke University
Durham, NC
lpcox@cs.duke.edu

Presented by Kevin Lo





Motivation

- People still prefer purchasing grocery and household items from brick and mortar stores
- No way to easily compare prices between 2 nearby stores
 - Same roll of toilet paper cost twice as much at CVS
- Some price comparison services exist, but mostly for online merchants



Related Work

- Micro-Blog: platform for sharing geotagged multimedia blogs; no incentives for sharing.
- ShopSavvy: rely on online databases so not suitable for items not found online (false now)
- MobiShop: participatory sensing through receipt scanning
 - Receipt scanning: optical character recognition (OCR) error prone & hard to insert into database
 - No incentives

Design

- Uses the camera on the phone to take a picture of the price tag, which also contains the item's UPC barcode



Design (p2)

- Decode the barcode from the photograph using barcode libraries such as ZXing
- LiveCompare transfers a smaller lower-quality image to the server (faster transfer) for database update





Design (p3)

- It also sends its GPS or GSM cell information to the server for location/store identification
- Presents the raw photographic data to users
 - Optical character recognition (OCR) is bad
 - No manual inputs needed thus better data integrity
- Incentives: users can query for cheaper prices by submitting data at the same time



Design (p4)

- Data Integrity
 - Reduces operator error by submitting product identification and pricing in the same photograph.
 - Users can flag malicious entries for removal
- Limitation
 - Does not scale down well; could use online DBs for small scale deployment
 - Generic-brand products cannot be easily compared
 - Privacy concerns; use pseudonym & anonymity network to hide IP address

Evaluation

Table 1: Price ranges of 10 grocery items, each found at 3-5 local stores on October 5, 2008.

Item	Price range	Low price store	High price store	Other stores
Ben & Jerry's ice cream	\$3.00-\$4.49	Food Lion	Harris Teeter	Target, Whole Foods
Coca-Cola soft drink	\$1.11-\$1.59	Harris Teeter	Kroger	Kmart, Target
Colgate toothpaste	\$3.99-\$4.99	Target	Harris Teeter	CVS
Cottonelle toilet paper	\$5.99-\$11.99	Harris Teeter	CVS	Target
Gillette power razor	\$7.94-\$11.99	Target	CVS	Harris Teeter
Herbal Essences shampoo	\$2.49-\$3.79	Food Lion	Harris Teeter, Kmart	CVS, Target
Kashi cereal	\$2.66-\$4.59	Target	CVS	Food Lion, Kroger, Whole Foods
Kraft cheese slices	\$3.59-\$4.69	Target	Kroger	Harris Teeter
Tide laundry detergent	\$10.00-\$16.49	Target	CVS	Food Lion, Kmart
Tropicana orange juice	\$2.99-\$3.99	Kroger, Target	Whole Foods	Food Lion, Harris Teeter

- CVS has its own set of barcodes

Evaluation (p2)

- 3 thumbnails automatically generated on Nokia N95 8GB; largest one used (320x320)

Table 2: HSDPA transfer rates for uploading 18.3 KB and downloading 71.3 KB across 20 trials.

	Average	Standard deviation
Uploading 18.3 KB image	4.08 seconds	1.04 seconds
Downloading 71.3 KB in images	3.57 seconds	1.39 seconds
Total latency of upload/download operation	7.65 seconds	1.88 seconds



Evaluation (p3)

- Feasibility of GPS, Wi-Fi, and GSM localization:
 - Assisted GPS is able to quickly attain accurate coordinates for all of the stores in either the checkout area or just outside the entrance of the store, but useless deep within the store
 - Wi-Fi localization is not guaranteed, since not all stores have access points.
 - Using GSM is also insufficient at the granularity of single stores if they are close to each other
 - Best strategy is a hybrid approach

Questions?

