

## HOMEZILLA: ATTRACTING HOMEBUYERS THROUGH BETTER PHOTOS

*Hongmei Sun wrote this case under the supervision of Professor Greg Zaric solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.*

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In November 2014, Sandy Ward, the founder and chief executive officer of HomeZilla in Toronto, Canada, was considering how to provide value-added services to his business. One of the company's main businesses was to work with real estate agents to provide web-listing services to attract home shoppers. Real estate agents used multiple channels to advertise their properties, such as yard signs, open houses, print newspaper advertisements, real estate magazines, and, more recently, the Internet. Because home shoppers were increasingly searching for home information on the Internet before going to an open house or contacting a real estate agent, the company's website had become a crucial research source for home shoppers. Ward knew that many Internet companies were analyzing web-browsing data in an effort to better understand user behaviour and improve their business. Inspired by this trend, Ward considered how his company could use web-browsing data to better attract home shoppers on the company's website and, thereby, add value to his business.

### HOMEZILLA'S WEB-LISTING SERVICE AND WARD'S BUSINESS IDEA

HomeZilla was a Toronto-based company that mainly provided web-listing services for real estate agents to attract home shoppers in Canada. Ward was leading the small but growing team, and seeking opportunities to improve the business.

The company received property information from real estate agents and posted it on the company's website. Home shoppers (users) searched for properties on the website. They could use area, price range, number of bedrooms, and other features to filter the properties, and then access the information page of any property of interest (see Exhibit 1). Property information included address, price, basic property features (e.g., the building type, square footage, age of building, number of rooms), contact information, and photographs of the property.

Users opened the photo page to view images of a property by clicking on any thumbnail on the property information page (see Exhibit 2). Users used the left and right arrows next to the full image to access the full images to the left and right, respectively. They also used the arrows next to the thumbnails to navigate within the thumbnails. The thumbnail of the current full image was highlighted with a frame. Over the

course of browsing, users moved back and forth among photos by clicking on the left and right arrows next to the full image, or by directly clicking on any thumbnail listed below the full image. They could leave the property listing at any time, or contact the real estate agent for a further inquiry or to arrange for a property showing.

Real estate agents were able to choose photos to better attract users. Usually they took and chose photos that made properties look bright and spacious, in the belief that these views would attract the most interest and generate the highest contact rates from users.

The company's server recorded web-browsing data for each user, including the web ID of the property viewed (the unique identifier for each property in the company's database), the user's Internet protocol (IP) address, the operating system (OS) and web browser information, and photo-viewing data. Ward had not used the data to provide any analytical service to his clients in the past. As real estate agents had, in the past, chosen photos based on their own judgment and that of the owners, Ward decided to analyze user-browsing data to reveal users' preferences on the attractiveness of photos. He felt that the duration of the time a photo was viewed should be a good measure of the attractiveness of a photo because users tended to stay longer on those photos that they were more interested in.

## THE DATA

The file "Photo Viewed Data.csv" contained web-browsing data from July 14, 2014, to October 31, 2014, for 62 properties in British Columbia listed on the website (see Exhibit 3). Originally, the browsing data showed six columns of information: Web ID, Timestamp, Direction, Photo ID (i.e., the unique file name for each photo in the company's database), User Agent (i.e., the user's device OS and browser), and IP (i.e., the user's IP address). Data were grouped according to "access," which began when a user opened a property's photo page and extended until the same user closed the photo page.

The server recorded all entry timestamps (i.e., the time when the full image of a photo was opened). Each cell in the Timestamp column showed the entry timestamp for the next full-image photo viewed in one access by the same user (identified by the IP address, device OS, and browser) and was treated as the exit timestamp for the currently viewed photo. Because the last photo viewed in an access had no entry timestamp for the viewing of a subsequent photo, the Timestamp cell for the last photo was always empty. In the Timestamp column, the consecutively populated cells and the empty cell that followed constituted the entire browsing data for an access. Subtracting the time shown in a focal cell in the Timestamp column from the time shown in the cell above yielded the number of seconds shown in the Time Viewed cell for the focal photo.

However, it was impossible to obtain the "Time Viewed" information for the last-viewed photo in each access, as it had no timestamp. Ward wondered how to deal with this issue in the analysis phase, and tentatively filled the Time Viewed cells with zeros for all last-viewed photos.

To determine which factors contributed to the attractiveness of photos (i.e., a longer time viewed), Ward asked his staff to tag the contents of each photo and listed them in the columns "Photo Tag 1" to "Photo Tag 8." These tags had three levels: "Photo Tag 1" was the first-level tag (i.e., the most general level), which indicated whether the photo content showed an interior, an exterior, or a floor plan. "Photo Tag 2" was the second-level tag, which indicated the room or space functions (e.g., bedroom, living, kitchen). "Photo Tag 3" to "Photo Tag 8" were the third-level tags, which listed the items in the photo such as fridge, dishwasher, and fireplace. Ward's staff chose among three first-level tags, 20 second-level tags, and 38 third-level tags (see Exhibit 4). Each photo had one first-level tag, one second-level tag, and up to six third-level tags. In the future, Ward hoped to add more dimensions to the photo tags such as the style

(e.g., traditional, contemporary, or another style) and the quality of the photos in an effort to better analyze the attractiveness of the photos.

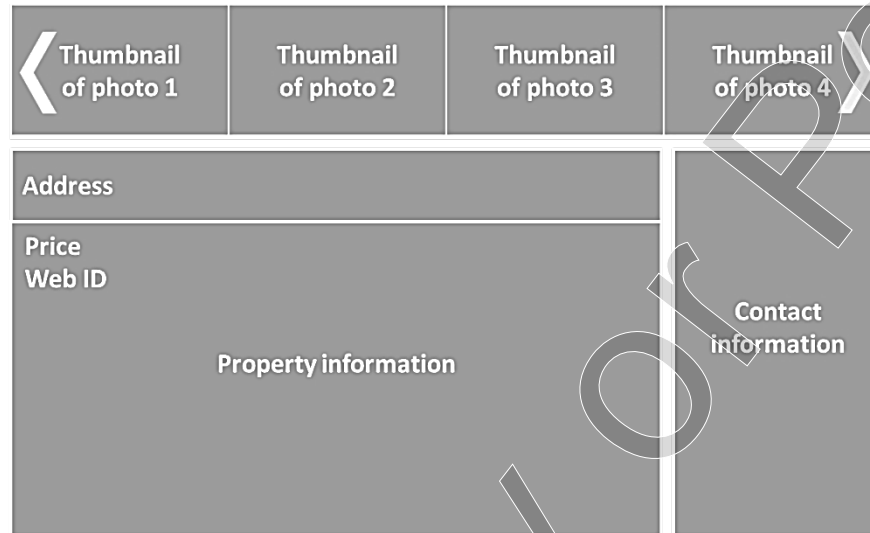
The “Direction” column (see Exhibit 3) indicated the direction that each photo was accessed relative to the previously viewed photo. Therefore, the first viewed photo in an access had no direction information. Usually, a user clicked the first thumbnail on the property information page to open the photo page and viewed the photos in either a single direction (either left or right), or moved back and forth among photos by using the arrows and thumbnails. In an access, if the direction of a photo viewed differed from the direction of the other photos viewed, it meant that the user moved back to a photo that the user was interested in or wanted to view again. Therefore, Ward believed that the direction could be another indicator of the attractiveness of photos.

## THE DECISION

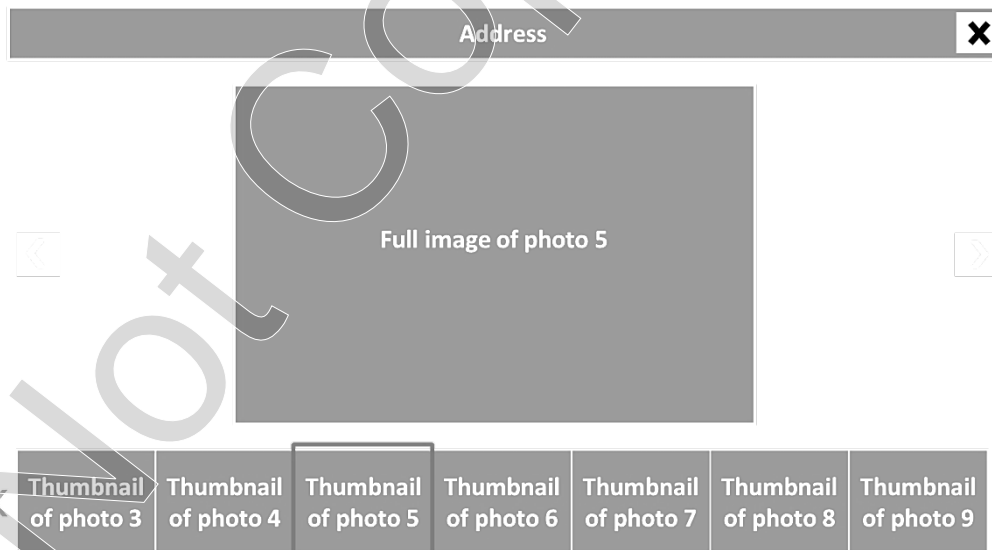
Ward wanted to analyze the browsing data in an attempt to learn which photos were considered to be the best and worst photos and how to keep users’ attention on the photos as long as possible. Based on some preliminary analysis, Ward believed that if the time viewed was greater than or equal to three seconds, then it was a good sign that the user was interested in the photo, which increased the attractiveness of the property.

He also wondered about the following issues:

- Was the sequence of photos important?
- Was the type of photo important?
- Which photos were the most attractive?

**EXHIBIT 1: SCHEMATIC OF HOMEZILLA'S PROPERTY INFORMATION PAGE**

Source: Case author.

**EXHIBIT 2: SCHEMATIC OF HOMEZILLA'S PHOTO PAGE**

Note: An example of the user viewing the full image of Photo 5.

Source: Case author.

## EXHIBIT 3: A SAMPLE FROM HOMEZILLA'S PHOTO VIEWED DATA FILE

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Web ID	Time Viewed	Timestamp	Direction	Photo ID	Photo Tag 1	Photo Tag 2	Photo Tag 3	Photo Tag 4	Photo Tag 5	Photo Tag 6	Photo Tag 7	Photo Tag 8	User Agent	Customer ID	
1	F1410261	16	10/12/2014 21:46:41	http://images.hi exterior	waterfront	sunview	fridge	counters	cabinets	dishwasher			Mozilla/5.0 (iPh	239898	
2	F1410261	2	10/12/2014 21:46:43	left	other-exterior	other-exterior	sunview						Mozilla/5.0 (iPh	239898	
3	F1410261	0	10/12/2014 21:46:43	left	other-exterior	other-exterior							Mozilla/5.0 (iPh	239898	
4	F1410261	1	10/12/2014 21:46:50	left	other-exterior	other-exterior	sunview						Mozilla/5.0 (iPh	239898	
5	F1410261	1	10/12/2014 21:46:51	right	other-exterior	other-exterior	sunview						Mozilla/5.0 (iPh	239898	
6	F1410261	0	right	http://images.hi exterior	waterfront	waterfront							Mozilla/5.0 (iPh	239898	
7	F1410261	29	10/12/2014 22:06:57	http://images.hi interior	kitchen	kitchen	fridge	counters	cabinets	dishwasher			Mozilla/5.0 (iPh	461260	
8	F1410261	4	10/12/2014 22:07:01	right	living	living	living-tv	living-chair					Mozilla/5.0 (iPh	461260	
9	F1410261	3	10/12/2014 22:07:04	right	bedroom	bedroom	master-bed						Mozilla/5.0 (iPh	461260	
10	F1410261	2	10/12/2014 22:07:06	right	bathroom	bathroom	bath-sink	bath-storage	bath-tub	bath-shower	bath-faucets		Mozilla/5.0 (iPh	461260	
11	F1410261	3	10/12/2014 22:07:09	right	bathroom	bathroom	bath-tub	bath-shower					Mozilla/5.0 (iPh	461260	
12	F1410261	3	10/12/2014 22:07:12	right	http://images.hi interior	bedroom							Mozilla/5.0 (iPh	461260	
13	F1410261	3	10/12/2014 22:07:15	right	http://images.hi interior	laundry	bath-tub	bath-sink	machines-visible				Mozilla/5.0 (iPh	461260	
14	F1410261	3	10/12/2014 22:07:18	right	http://images.hi interior	bedroom							Mozilla/5.0 (iPh	461260	
15	F1410261	2	10/12/2014 22:07:20	right	http://images.hi interior	other-interior	other-interior						Mozilla/5.0 (iPh	461260	
16	F1410261	2	10/12/2014 22:07:22	right	http://images.hi interior	other-interior	other-interior						Mozilla/5.0 (iPh	461260	
17	F1410261	4	10/12/2014 22:07:26	right	http://images.hi exterior	back							Mozilla/5.0 (iPh	461260	
18	F1410261	2	10/12/2014 22:07:28	right	http://images.hi exterior	back-yard	back-yard						Mozilla/5.0 (iPh	461260	
19	F1410261	3	10/12/2014 22:07:31	right	http://images.hi exterior	back-yard	back-yard						Mozilla/5.0 (iPh	461260	
20	F1410261	2	10/12/2014 22:07:33	right	http://images.hi exterior	other-exterior	deck						Mozilla/5.0 (iPh	461260	
21	F1410261	2	10/12/2014 22:07:35	right	http://images.hi exterior	other-exterior	street						Mozilla/5.0 (iPh	461260	
22	F1410261	2	10/12/2014 22:07:37	right	http://images.hi exterior	other-exterior							Mozilla/5.0 (iPh	461260	
23	F1410261	1	10/12/2014 22:07:38	right	http://images.hi exterior	other-exterior	sunview						Mozilla/5.0 (iPh	461260	
24	F1410261	0	right	http://images.hi exterior	waterfront	waterfront							Mozilla/5.0 (iPh	461260	
25	F1410261	7	10/12/2014 22:15:57		http://images.hi exterior	waterfront							Mozilla/5.0 (iPh	379747	

Notes: This screen shot shows an excerpt from a total of 29,491 entries. Customer IDs are based on unique IP addresses but disguised to protect customer privacy.  
Source: Company files.

## EXHIBIT 4: HOMEZILLA'S PHOTO TAGS

<u>1st-Level Tags</u>	<u>2nd-Level Tags</u>	<u>3<sup>rd</sup>-Level Tags</u>
exterior floor interior	back back-yard basement bathroom bedroom dining empty front front-yard garage kitchen laundry living office other-exterior other-interior picture-floor pool side waterfront	balcony bath-faucets bath-shower bath-sink bath-storage bath-toilet bath-tub cabinets counters deck dishwasher driveway entrance fireplace fridge garden hallway layout living-bookcase living-chair living-couch living-fireplace living-tv living-window machines-not-visible machines-visible master-bed nursery shed sink spare-bed staircase stove street sunporch sunview tableview wine

Source: Company files.