User Evaluation on Sentiment-based Recommendation Explanations

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OBJECTIVES

1. To investigate how review information could be exploited to generate explanations for multiple recommendations especially in high-investment product domains (i.e., digital camera and laptop).
2. To identify the exact effect of sentiment-based explanations on improving users' decision effectiveness and system perceptions.
3. To investigate how users view information and compare products on the sentiment-based explanation interface.

HIGHLIGHTS

Sentiment-Based Tradeoff-Oriented Explanation Interface Design

- Developed **a novel tradeoff-oriented explanation interface** that particularly takes into account **sentiment features as extracted from product reviews** to generate recommendations and explanations in a **category structure**.
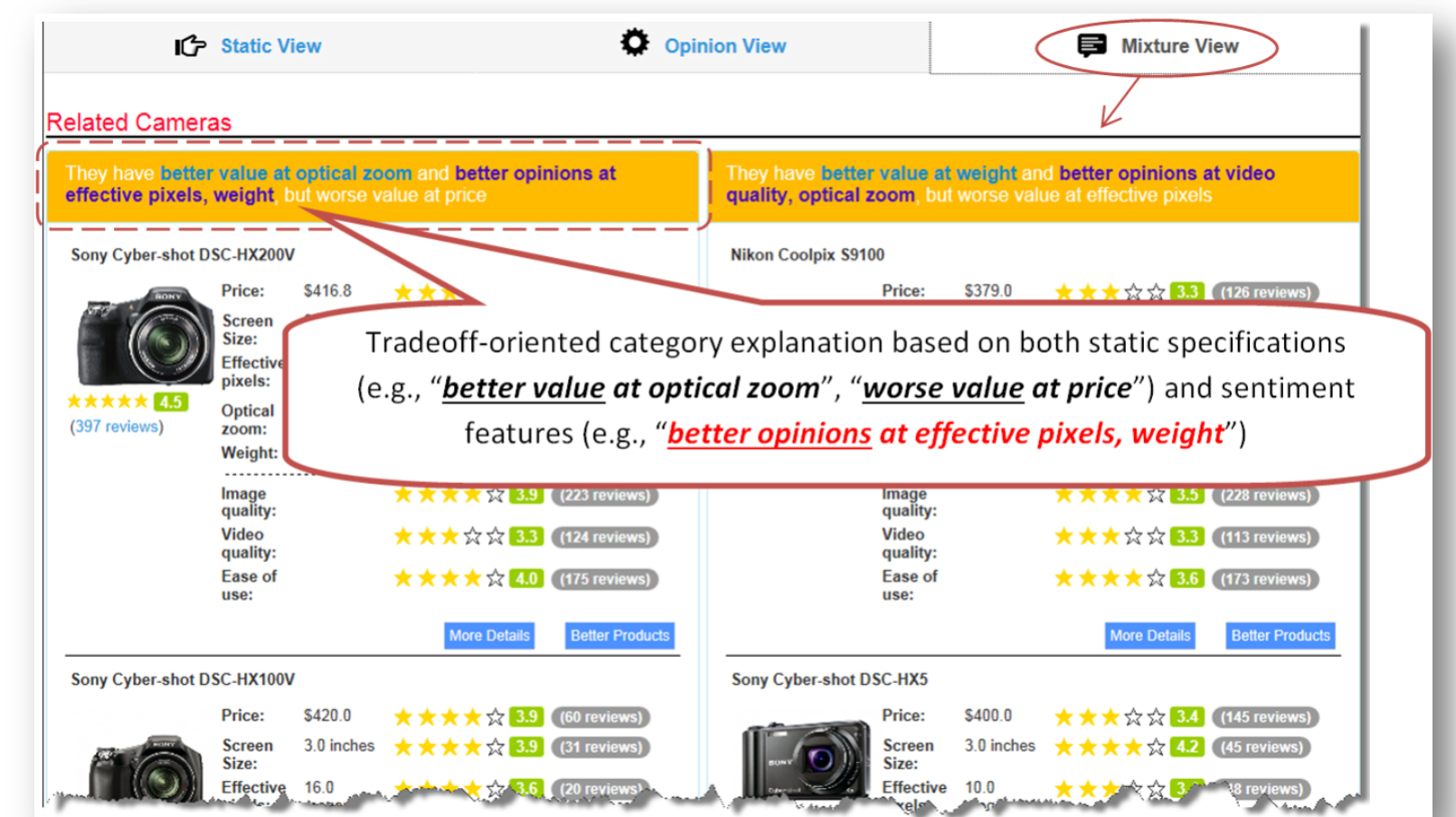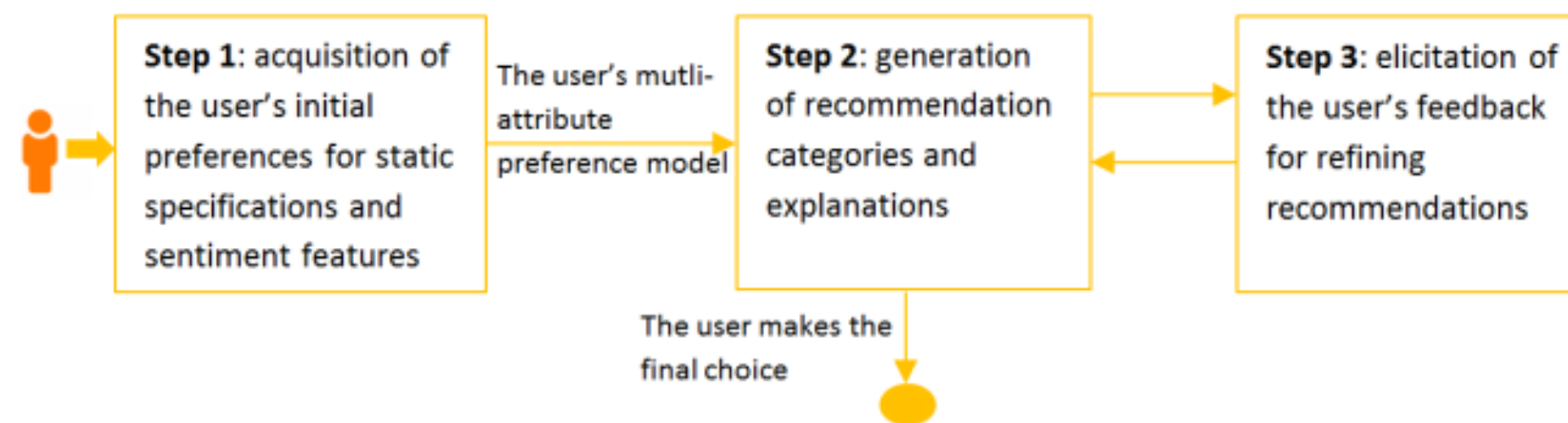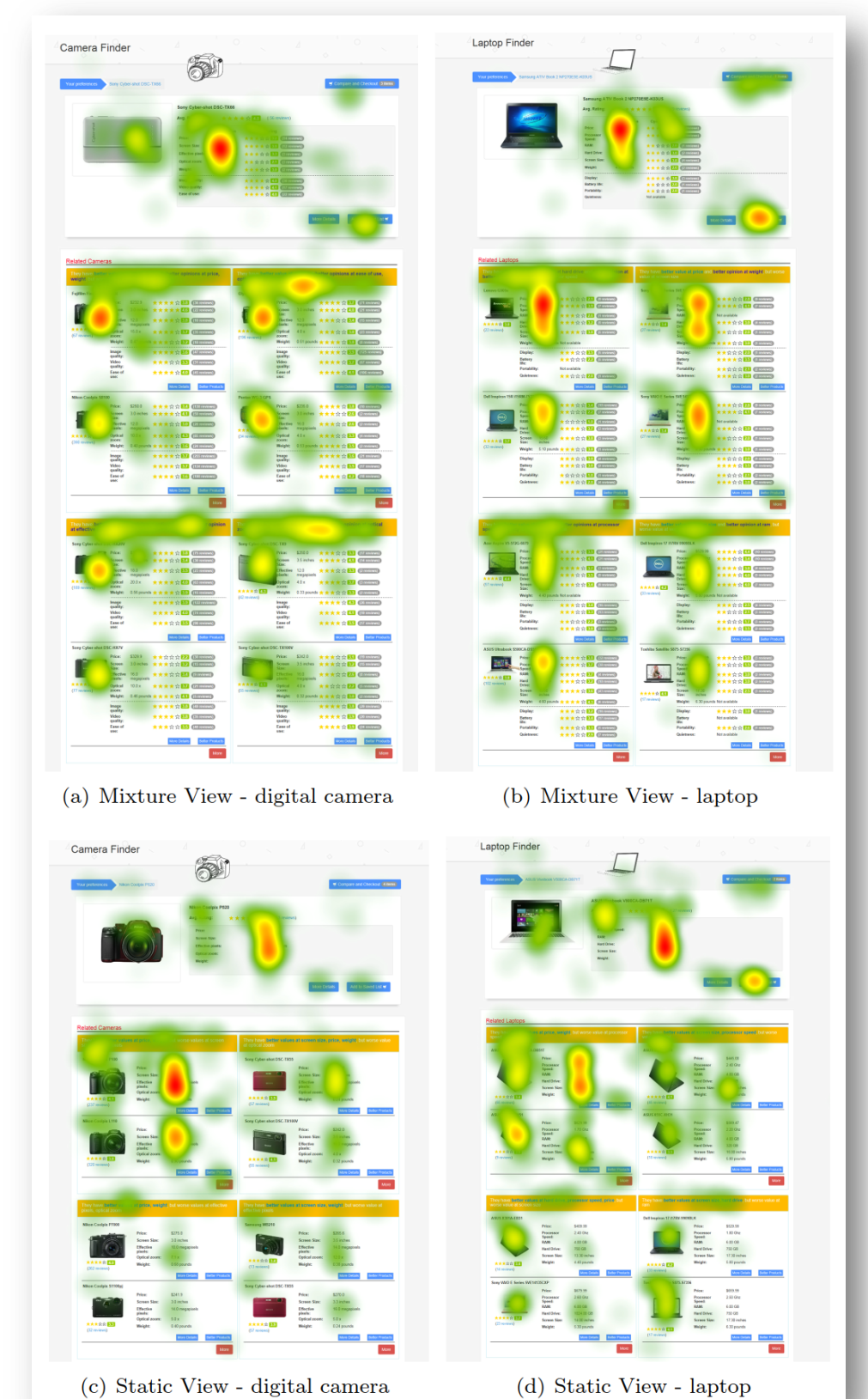

User Evaluation Through Online User Study and Eye-Tracking Experiment

- Online user study (in both before-after and counter-balancing setups) revealed that adding sentiment-based explanations can **significantly increase users'** *product knowledge*, *preference certainty*, *perceived information usefulness*, *perceived recommendation transparency and quality*, and *purchase intention* in comparison with Preference-based organization interface.

Subjective variable	Question (each responded on a 5-point Likert scale from 1 "strongly disagree" to 5 "strongly agree")	Before-after		Counter-balancing	
		Pref-ORG	Senti-ORG	Pref-ORG	Senti-ORG
Product knowledge	*How would you rate your knowledge about xxx?*	3.74 vs. 3.64	**3.88**** vs. 3.64	3.62 vs. 3.52	**3.52*** vs. 3.29
Preference certainty	*I am very certain about what I need in respect of each attribute.*	4.02	**4.24****	3.73	**4***
Perceived info. usefulness	*This system helped me discover some useful info.*	4	**4.33****	3.90	**4.29****
Perceived explanatory ability	*The system explained to me why the products were recommended.*	4.21	4.21	3.88	**4.13****
Perceived recom. transparency	*I understood why the items were returned to me.*	3.86	**4.07****	3.69	**4.04****
Perceived recom. quality	*The system returned to me some good suggestions.*	4.095	**4.33****	3.83	**4.04***
Perceived recom. novelty	*The system helped me discover new products.*	4.14	**4.40****	3.96	**4.23***
Trust	*The system can be trusted.*	3.93	4.07	3.69	**3.87***
Satisfaction	*Overall, I am satisfied with the system.*	4.02	4.19	3.88	**4.12***
Purchase intention	*I would purchase the product I just chose if given the opportunity.*	3.86	**4.12****	3.75	**3.96***

Note: The number is mean value; ** $p < 0.05$, * $0.05 < p < 0.1$ via Paired Samples t-Test (the product knowledge is relative to the user's initially stated knowledge level).

- The lab controlled eye-tracking experiment indicated that incorporating sentiment features into the tradeoff-oriented explanations can **significantly affect users' eye-gaze pattern**. Users were stimulated to not only **notice bottom categories of products**, but also more frequently **compare products across categories**.

(a) Mixture View - digital camera   (b) Mixture View - laptop
(c) Static View - digital camera   (d) Static View - laptop

SELECTED PUBLICATIONS

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4. Dongning Yan and Li Chen. Review-based Screening Interface for Improving Users' Decision Process in E-commerce. In *Proceedings of 19th International Conference on Human-Computer Interaction (HCII'17)*, pages 130-142, Vancouver, Canada, July 9-14, 2017.
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