Survey of User Trust for the Video-Recommendation Function in YouTube

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Abstract. In this paper, we investigate the users' trust against the video recommendation function of YouTube, the most popular video sharing service. The perceived usefulness and the perceived ease of use, which are used in TAM (a model of the user's acceptance of new products implemented with novel technologies), are also investigated in order to clarify which factor of trust is correlated. We conducted a crowdsourcing survey of 631 users and found that the perceived usefulness and the perceived ease of use are highly correlated with the intention to reuse the recommendation function and the degree of overall trust on it.

Keywords: Recommender system, Trust, TAM, YouTube.

1 Introduction

Recommendation has become indispensable for many commercial sites. However, the success or failure of a recommendation service depends on whether or not users accept the recommendation results. It is said that several factors, such as the accuracy, freshness, and popularity of the recommendation, affect the user's acceptance of the recommendation results [1]. User's trust in the recommender systems might also affect the user's acceptance of the recommendation. The accuracy and diversity of the recommendation results have been found to affect the user's trust in the recommender system [2]. In addition, user experiments have shown that including unknown items in the recommendation results increases users' satisfaction, although it is necessary to maintain the accuracy of the recommendation results [3].

The interface used to present the recommendation results has also been found to affect the user's trust in the recommender system. Berkovsky et al. clarified the relationship between the interface type and user trust through user experiments [4]. A presentation style of listing by genre affected the user's trust. They also conducted a cross-cultural comparison in four countries: the United States, Russia, France, and Japan. As a result, they identified interface components that are commonly associated with trust regardless of culture, and those that may or may not affect trust differently depending on culture [5].

Thus, there have been many studies on user trust in recommender systems, but most of them have been conducted on recommender systems originally implemented for the experiment. In other words, users evaluate the system they encounter for the first time in these studies. In commercial recommendation services, there are some services that have already gained a large number of users and have been used for long time. Examples include Amazon.com, YouTube, and Twitter. YouTube, in particular, always shows the recommended videos on the right side of the screen while users are viewing videos. It can be said that users use the recommendation function on a daily basis. However, it is not clear to what extent users trust the recommender system that have already acquired a sufficient number of users.

In this study, we investigate the trust that users have in the recommendation function in YouTube, one of the large-scale commercial systems. The success of a large-scale service like YouTube lies in the fact that the users accept the service and decide to use it. In the field of psychology, the Technology Acceptance Model (TAM) [6] is popular for analyzing whether or not users will accept and use a product that employs a new technology. TAM presents that the user's perceived usefulness and perceived ease of use for a product influence the acceptance of it. A short user experiment with a content-based recommender system implemented for the experimentation shows that the perceived usability of the recommender system affects the user's trust [7]. However, the relationship between each perception factor in TAM and trust in the recommender system has not been clarified. In this study, we also clarify whether these two users' perceived factors in TAM are related to their trust in the recommender system.

2 Method

We conducted a large-scale crowdsourced survey to find out the level of trust, the perceived usefulness and the perceived ease of use that users have in the recommendation function of YouTube. The survey was conducted on April 22, 2021. A total of 501 users after eliminating 130 unreliable users responded to the survey. They were paid 150 yen for their responses.

As a measure of trust in the recommender system, we used Berkovsky et al.'s index, which was developed to evaluate trust in recommender systems from multiple perspectives [4]. This index presents the user's perceived quality of the system from the following six perspectives: competence ("recommender most knowledgeable about video"), benevolence ("recommender best reflecting my interests"), integrity ("recommender providing most unbiased suggestions"), transparency ("I understand best the reasons for the recommendations"), intention to re-use ("I would like to keep using the recommender"), and overall trust ("out of these, the most trustworthy recommender"). Respondents responded to these items on a 7-point Likert scale. For the TAM index, the perceived usefulness (PU) and the perceived ease of use (PE) of the users to the system were also asked on a 7-point Likert scale.

3 Result

We analyzed the response data of 501 respondents. Figure 1-(a)-(f) show the histogram of trust, and Figure 1-(g) and (h) show the histogram of the perceived usefulness (PU) and the perceived ease of use (PE) for YouTube's recommendation function. The means and standard deviations of the trust are shown in Table 1. In the evaluation of trust, it was found that relatively high evaluation was obtained for benevolence (recommendation accuracy), while relatively low evaluation was obtained for integrity (recommendation fairness). The overall trust was slightly positive, and the intention to re-use gains relatively high scores. These results show that the recommendation function in YouTube obtains relatively high trust from users.

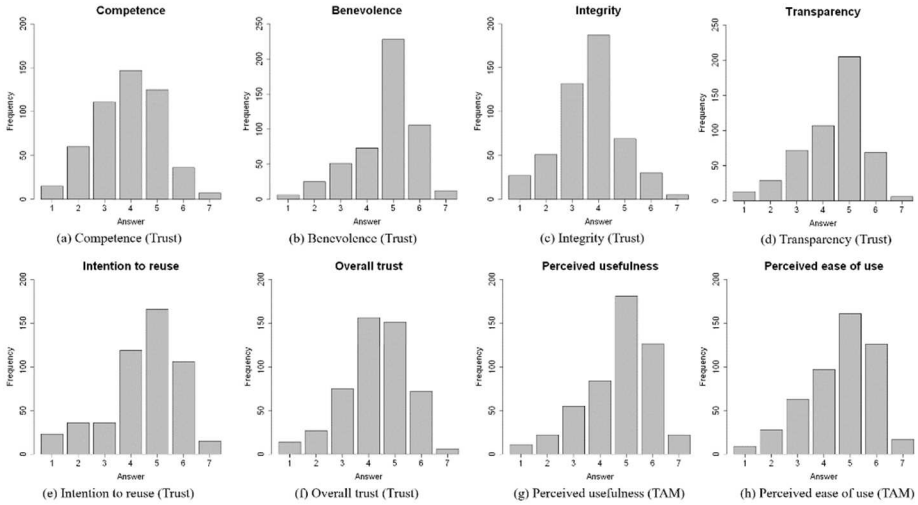

Fig. 1. Histograms of each factor of trust and TAM

Table 1. Mean and standard deviation of each factor of trust and the Spearman's rank correlation with the perceived usefulness (PU) and the perceived easy of use (PE).

	Competence	Benevolence	Integrity	Transparency	Reuse	Overall
mean	-0.12	0.71	-0.34	0.38	0.49	0.28
SD	1.27	1.19	1.23	1.24	1.41	1.23
cor PU	0.36**	0.52**	0.27**	0.35**	0.66*	0.60**
cor PE	0.35**	0.50**	0.34**	0.36**	0.63**	0.59**

** $p < .01$

The means (the standard deviations) of PU and PE are 0.73 (1.31) and 0.63 (1.32) respectively, indicating positive evaluation. Spearman's rank correlation coefficient between PU and PE was 0.75 ($p < .01$). Those including the results of non-correlations test between each trust factor and PU (PE) are shown in Table 1 ("cor PU" and "cor

PE" rows). The results show that both PU and PE are highly correlated with both intention to reuse and overall trust. The recommendation accuracy is expected to affect the willingness to use the system and the trust in the system. This might cause the fact that benevolence had the third highest correlation with PU and PE. On the other hand, competence (the knowledge of the system), integrity (fairness of the recommendation) and transparency (explainability of the recommendation) had relatively low correlation with PU and PE, although they had significant correlation. Since these factors are not directly related to the usefulness or the ease of use of the system, it is likely that the correlation was not as high as the intention to reuse and the overall trust.

4 Conclusions

In this study, we investigated how much trust users have in the recommendation function in YouTube, which is used by many users. The correlations among the perceived usefulness, the perceived ease of use, and each factor for trust were investigated. The results of the study showed that the recommendation function of YouTube is relatively highly trusted. In addition, the perceived usefulness and the perceived ease of use in TAM were found to be highly correlated with intention to reuse and overall trust in the recommendation function. One of the challenges of this study is that user behavior on YouTube have not been measured, and we have not obtained data to predict which users are likely to have trust in the recommendation function. In the future, we will investigate users' video selection behavior in response to YouTube's recommendation results to clarify how trust affects the response to recommendations.

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