



Ontology-based Conversational Recommender System for Recommending Camera

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Abstract

The camera is a product that has developed very quickly in terms of specifications and functions. In addition, the cameras available on the market are becoming increasingly varied, so customers need more time to find a camera that suits their needs. Currently, many recommender systems have been developed to assist users in finding suitable products, especially the conversational recommender system (CRS). CRS is a recommender system that recommends products through conversations between the user and the system. However, many developed CRS still forces users to have knowledge of the product's technical characteristics. In the real world, many people are not familiar with the technical features of products, especially cameras. People interact more easily with CRS by stating what the function of camera that they want. In this study, we call that statement as functional requirements. Therefore, we proposed a CRS for recommending cameras that interact with users using functional requirements. This CRS uses semantic reasoning techniques on ontologies. To evaluate system performance, we use two parameters, i.e., user satisfaction, and recommendation accuracy. The evaluation results show that the accuracy of the recommendations is at a value of 82.35%, and the level of user satisfaction reaches 0.66. With these results, the system can provide recommendations accurately and satisfy users.

Keywords: Camera, Conversational recommender system, Knowledge-based recommender system, Ontology

1. Introduction

In the last three years, shopping activity has increased quite significantly [1]. This activity becomes a user requirement in meeting their needs [2]. In addition, the products available on the market are becoming more varied, so customers need more time to study the specifications, especially products that have many technical features [3]. This problem causes difficulties for customers in choosing a product that suits their needs. Therefore, many recommender systems have been developed to make it easier for users to get the right product [4].

Recommender systems can assist users in making decisions by analyzing user preference information and recommending products according to their preferences [5], [6]. To get user preferences, recommender system can take two approaches: implicit and explicit [7]. The implicit approach recommends items based on the user's similarity to the rating data [8]. However, this approach can cause data sparsity and cold start problems. An explicit approach can avoid these problems [9]. The knowledge-based recommender system is an example of an explicit approach. Knowledge-based

recommender systems look for solutions that suit user needs based on domain knowledge [10].

CRS is a knowledge-based recommender system that utilizes user-system conversations to get user preferences [11]. To get user preferences, CRS repeatedly asks several questions to users until they get the desired product [12]. Previously a CRS framework had been developed whose interactions were based on functional requirements [13]. This framework is multi-domain, meaning it can be developed for various domains.

There are two types of navigation in CRS: Navigation by asking (NBA) and navigation by proposing (NBP). This navigation strategy determines the interaction mechanism in the CRS. Baizal et. al. [13] utilize ontology and semantic reasoning to combine NBA and NBP in building interactions. The study proposes a knowledge-based recommender system. The combination of NBA and NBP can mimic a conversation between a potential buyer and a professional salesperson. Moreover, Cai et. Al. [14] develop CRS with NBP strategy. He incorporates