

# Section 1 Introduction

Recommender system has become an effective tool to help users for buying products [1]. Information about user preferences is needed by the recommender system in order to provide recommendations. There are two approaches to getting user preferences. The first one is the implicit approach. The approach derives user preferences through similarity between users or similarity between items. However, this implicit approach raises the cold start problem [1], [2]. The second one is explicit approach. Knowledge-based recommendation systems is the technique that get user preference explicitly. This technique recommends products to user based on domain knowledge [3], [4]. However, the bottleneck problems often occur when developing knowledge in knowledge-based recommender systems [5].

At this time, many products are launched quickly by various companies with different target markets. Users may face challenges when exploring or comparing a product to find the most relevant product according to their needs [6]. Moreover, many users do not understand the technical specifications of a multi-functional product that has many features, such as smartphones, laptops, camera, etc. Naturally, it will be easier if users can find products that suit their needs by expressing high-level requirements. In this study, we refer to them as functional requirements. An example of a functional requirement is, “user wants to find a smartphone with a standard camera for normal capture”. The user does not need to know the technical specifications of the camera on the smartphone. There have been several previous research that developed a CRS framework based on functional requirements [7]–[10]. The CRS framework consists of ontology and method for generating interactions. CRS is a recommender system with a repetitive interaction approach between the user and the system, where the system will ask some questions and propose some products to refine the user preferences [8], [11]. Generating interaction means that the system will provide questions that aim to get information, service, or specification of product the user wants [9]. However, in this framework, ontology is a static knowledge. Meanwhile, the smartphone technology continuously changes every year, and functional requirements as well.

In this study, we propose the updating of knowledge ontology and implementing the CRS framework [9] on smartphone domain based on the functional requirements, with form-based conversational interactions. To avoid questions about technical specifications, we use an ontology as knowledge to map functional requirements to the technical features of smartphone. Ontology will be the basis for forming user model [10].

The following sections defines the related work and methodology in developing CRS, after this, we describe the experiments conducted and the result acquired, finally we present the conclusions from this study.