**INTRODUCTION**

WITH the widespread of personal mobile devices and the ubiquitous access to the internet, the global number of digital buyers is expected to reach 2.14 billion people within the next few years, which accounts for one fourth of the world population. With such a huge number of buyers and the wide variety of available products, the efficiency of an online store is measured by their ability to match the right user with the right product, here comes the usefulness of a product recommendation systems. Generally speaking, product recommendation systems are divided into two main classes: (1) Collaborative filtering (CF), CF systems recommend new products to a given user based on his/her previous (rating/viewing/buying) history.

Far from that, with the popularity of online social networks such as Face book, Twitter and Instagram , many users use social media to express their feeling or opinions about different topics, or even explicitly expressing their desire to buy a specific product in some cases. Which made social media content a rich resource to understand the users’ needs and interests [1]. On the other hand, the emerging of personality computing [2] has offered new opportunities to improve the efficiency of user modeling in general and particularly recommendation systems by incorporating the user’s personality traits in the recommendation process. In this work, we propose a product recommendation system that predicts the user’s needs and the associated items, even if his history does not contain these items or similar ones. This is done by analyzing the user’s topical interest, and eventually recommend the items associated with the theses interest. The proposed system is personality-aware from two aspects; it incorporates the user’s personality traits to predict his topics of interest, and to match the user’s personality facets with the associated items. As shown in Figure 2 the proposed system is based on hybrid .

Since we have multiple types of nodes (users, items and topics), the system is modeled as a heterogeneous information network (HIN), which includes multiple types of nodes and links. In our case, product recommendation could be formulated as link prediction in HIN [3]. For example, in Figure 2, given the user’s previous rating and topical interest represented in a HIN, the problem is to predict whether or not a link exists between the user and the product (the ball). One of the main challenges of link prediction in HIN is how to maintain a reasonable balance between the size of information considered to make the prediction and the algorithm complexity of the techniques required to collect that information. Since in practice, the networks are usually composed out of hundreds of thousands or even millions of nodes, the method used to perform link prediction in HIN must be highly efficient. However, computing only local information could lead to poor predictions, especially in very sparse networks. Therefore, in our approach, we make use of meta-paths that start from user nodes and end up in the predicted node (product nodes in our case), and try to fuse the information from these meta-paths to make the prediction.

The contributions of this work are summarized as follows:

1) Propose a product recommendation system that infers the user’s needs based on her/his topical interests.

2) The proposed system incorporates the user’s Big-Five personality traits to enhance the interest mining process, as well as to perform personality aware product filtering.

3) The relationship between the users and products is predicted using a graph-based meta path discovery, therefore the system can predict implicit as well as explicit interests. The remainder of this paper is organized as follows. In Section 2 we review the related works, while in Section 3 the system design of the proposed system is presented. In Section 4 we evaluate the proposed system. Finally, in Section 5 we conclude the work and state some of the future directions.