Personality-based Recommender Systems: An Overview

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ABSTRACT
Personality is a critical factor which influences people's behavior and interests. There is a high potential that incorporating users' characteristics into recommender systems could enhance recommendation quality and user experience. The goal of this tutorial is to give an overview of personality-based recommender systems and discuss challenges and possible research directions in this topic.

Categories and Subject Descriptors
H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval – *Information filtering*; H.1.2 [**Models and Principles**]: User/Machine Systems – *human information processing*

General Terms
Algorithms, Experimentation, Performance, Human Factors

Keywords
Personality-based recommender system

1. INTRODUCTION
Over the last 20 decade, recommender systems have obtained great success as an intelligent information system to help deal with the information overload problem, especially in the field of e-commerce [1]. Prior studies on recommender systems mainly consider leveraging user preference information (e.g., user ratings, users' past behavior), item properties (e.g., price) , or user demographic information (e.g., gender) [1]. For example, collaborative filtering approaches first build a model from a user's past behavior (e.g., items previously purchased and/or ratings given to those items), then use that model to predict items (or ratings for items) that the user may have an interest in by considering the opinions of other like-minded users. Content-based filtering approaches utilize a series of discrete characteristics of an item to recommend items with similar properties. In recent years, other information (e.g., contexts, tags and social information) has also taken into account in the implementation of recommender system [5]. However, few studies have considered addressing the recommendation problem from the angel of users' psychological characteristics.

Personality can be defined as a set of characteristics possessed by a person that uniquely influences his or her cognitions, emotions, motivations, and behaviors in various situations. That is, personality is a critical factor which influences how people make their decisions. People with similar personality characteristics are more likely to have similar interests and preferences. For example, extraverted people usually like the music genre with positive emotions [4]. The effect of personality has on human behavior has been widely studied in psychology, marketing and behavioral economics.

Personality could help us explain why we prefer one option to the other. It is implied that incorporating personality into recommender systems could help understand the reasons that essentially determine user preferences. Currently, some researchers have considered incorporating personality aspects into recommender systems to personalize recommendations and enhance both recommendation quality and user experience [2, 3]. Furthermore, it could be noticed that commercial recommenders have been starting to implement personality-based recommendation engines in their systems. The successful applications of personality-based recommendation technologies include social matching systems (e.g., online dating systems), gift recommenders, music recommenders and movie recommenders. It is an emerging research field. There are still many challenges, which have not been addressed yet. This tutorial will help catch more attentions on this topic from both academia and industry and form a platform for their discussion and cooperation.

2. OUTLINE
This tutorial will give an overview of personality-based recommender systems (PBRS) covering theories and practices, as well as discuss challenges and possible solutions in implementing personality-based recommender systems.

First, the tutorial will give an introduction to the related theories in psychology, human decision making and affective computing. In particular, the tutorial will present in detail personality theory as well as how exactly personality data look like, how to extract them, how to represent them and how to standardize those definitions to be used as input recommender data towards to improve recommendations.

Next, the tutorial will present the state-of-the-art technologies and applications of personality-based recommender systems and show the examples of existing tools and systems through live demos. Furthermore, user experience issues in personality-based recommender systems will be discussed by showing the results of real user experiments.

The tutorial will conclude with a discussion of challenges in research and practice and an outline of research directions.

The detailed outline of this tutorial is given as follows.

1. Basic Theories and Knowledge
    - A brief introduction to affective computing.

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- Human decision making & Computer decision making.
- A brief introduction to personality theory.
- Computational personality acquisition methods.
- Personality profile representation and standardization.

2. Personality-based Recommender Systems

- A review of the state-of-the-art of personality-based recommender technologies and systems.
- Advantages and disadvantages of personality-based recommendation technologies.
- User perception issues.
- Challenges and new research directions.

3. INSTRUCTORS' BIOGRAPHIES

Maria Augusta S. N. Nunes: in 2008 she finished her PhD in France, her thesis [3] was the starting point to the Personality-based Recommender Systems (as described in many papers published in 2011 at ACM, IEEE, UMUAI). (Available as a book at Amazon or for download at http://professores.dcomp.ufs.br/~gutanunes/hp/publications/Tese.zip. Since her PhD her research focus are Affective Computing and how to model and represent the Human Psychological aspects, mainly personality, in computers aiming improve the personalization of information, products and services for humans during their interaction in e-commerce environment, for instance. From 2009 she is an associate professor and researcher at DCOMP/Universidade Federal de Sergipe (http://professores.dcomp.ufs.br/~gutanunes/). Her more recent projects include how to extract and store human Personality in order to motivate and personalize services in Recommender System considering mainly the user Psychological aspects. In the last years she has been writing many books, book chapters and papers about the use of Affective Computing in order to motivate and personalize information for people. In 2011 we received 3 awards in projects which considering aspects such as accessibility, Recommendation and Personality Traits. Curriculum available at (http://lattes.cnpq.br/9923270028346687). The Personality Portal with her research is available at (http://www.personalityresearch.com.br/).

Rong Hu: She obtained her PhD from the Human Computer Interaction (HCI) group at École Polytechnique Fédérale de Lausanne (EPFL) in 2012. Her research interests concentrate on how to incorporate psychological factors (in particular, personality) into recommender systems to improve recommendation quality and user experience. She has published many papers related to personality-based recommender systems at top-tier international conferences, such as IUI, RecSys and UMAP. She is working as a post-doc in the HCI group at EPFL since March 2012.

4. REFERENCES

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