Implicit Acquisition of User Personality for Augmenting Recommender Systems

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Introduction and Research Questions

Basic Concepts
- **Recommender system (RS):** can eliminate online information overload and provide personalized services [Ricci et al., 2011]
- **Personality:** can inherently affect users' attitudes, tastes and behavior [John and Srivastava, 1999]
- **Personality-based RSs:** can enhance the nearest neighborhood in collaborative filtering RSs [Tkalcic et al., 2009; Hu and Pu, 2011]; adjust the degree of diversity within a set of recommendations [Chen et al., 2013; Wu et al., 2013]; produce preference-based recommendations in some commercial web sites (e.g., Whatzorent)

Limitations: existing studies have mostly relied on personality quiz to explicitly acquire users' personality (with two problems: user effort and privacy concern)

Research Questions

RQ1: How to accurately derive users’ personality from their behavior data?
RQ2: How to utilize the implicitly acquired personality to improve the existing recommender systems?

Research Framework

**Step 1: Feature identification**
- Identify features based on correlation analysis

**Step 2: Personality prediction**
- Integrate the significant features into an inference model to infer users’ personality

**Step 3: Recommendation based on the inferred personality**
- Develop personality-based recommender system, for which the personality is implicitly inferred from user behavior

Research to Date (Cont.)

Recommendation based on Implicit Personality
The recommendation process with three variations

- Hybrid CF
- Pure Personality-based CF
- Rating-based CF

Recommendation performance

- Hybrid CF > Pure Personality-based CF > Rating-based CF

Ongoing and Future Work

Apply the Framework in Single-Domain Scenario
A more complex domain: Douban interest group
- including both user-item interaction and user-user interaction

Implication features
- Users’ preference for topic and/or group: type, content, hotrank, creator’s popularity, etc.
- Users’ activity: number of creating group, joining group, creating topic, commenting on topic, like topic, and following group members
- Users’ willingness to share: numbers of recommending group and topic
- Users’ demographic properties

Personality-based recommendations

Personality visualization interface

Main idea:
- Recommend the groups which own similar “personality” with the target user
- The group “personality” will be derived from the behavior of all the group members.

Apply the Framework in Cross-Domain Scenario

User behavior data in one domain (e.g., Douban interest group)
Infer users’ personality
Recommend items in another domain (e.g., movie)