Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M18-221P^
Published: 2/26/2020

Inventors

Kai Shu
Suhang Wang
Jiliang Tang
Yilin Wang
Huan Liu

Contact

Shen Yan
shen.yan@skysonginnovations.com

CrossFire: Cross Media Joint Friend and Item Recommendations

Background

Recommendations of user-to-user relationships ("friends") and items (e.g., products, services) have become integral to the social media experience. When implemented effectively, both the user and the platform gain value. Unlike established sites however, newly launched social media sites lack the historical data typically necessary for generation of relevant recommendations.

To address this issue, auxiliary information from more mature sites is often exploited. For example, profiling users common to both a new and a mature site may yield actionable information for the former, especially if the mature site features similar items. In practice unfortunately, these methods are difficult to apply successfully owing to their costs and underlying assumptions. Conventional recommendation methods using auxiliary information are also fairly limited in terms of scope: Although influencing item recommendations based on user-to-user relationships is common, recommending friends by virtue of user-to-item interactions has been less explored. Hence, a system that bridges this gap and improves the practical utility of auxiliary information stands to accelerate the productivity of social media platforms.

Invention Description

Researchers at Arizona State University have developed a novel framework, CrossFire, that jointly characterizes both (1) cross-platform knowledge transfer and (2) intra-platform correlations between user-to-user relationships and user-to-item interactions. The method operates under the assumptions that user item ratings and user network structures are similar across sites.

To achieve migration of item information in decoupled social media platforms, a sparse transfer learning technique is used. An optimization function then combines three terms, (1) Item Sparse Transfer Learning, (2) Cross-media Item Recommendation, and (3) Cross-media Friend Recommendation. Upon solving, joint recommendations for items and friends are made simultaneously. Experiments with real-world data sets show clear advantages of CrossFire compared to other state-of-the-art methods and variants.

Potential Applications

- Social media
- Machine learning
- Data mining

Benefits and Advantages

- Practical – Provides a novel solution to a common problem for new social media sites
- Coherent – Jointly processes networks of friends and items all within a single framework
- Effective – Outperforms similar methods with real-world data

Related Publication (PDF)

Homepage of Professor Huan Liu