Social Recommendation Engine for Digital Markets and multiple user recognition

**Introduction**

We introduce a social recommendation engine where recommendations are based around the user and created through their network of trusted friends, thus providing improved confidence in recommendations, and expanding users' shopping habits through discovery of new products. In the second aspect of our project, we focus on user recognition in cases where a single account is used by multiple users. This will provide a better way to tailor recommendations towards the original user as well as the secondary users.

**System Design**

We designed the recommendation engine based on Iterative Deepening Search algorithm combined with user-friends graphs. Overview of updating user-friends graph over time:

- **A** Generate recommendations based on user graph
- **B** Update user graph
- **C** Record browsing and purchasing history
- **D** Calculate performance coefficients

**User Study**

- The process of evaluation involved participants regular interaction with the system for browsing recommendations and recording mock purchases.
- Each user created their own network of friends with similar interests.
- The participants were asked to treat the system as a rating mechanism for curating recommendations and potential favorite items.
- New products were added every alternate day to simulate the cold-start problem.
- The study was carried out over the course of 40 days changing the type of digital markets at every milestone.
- 40 user profiles tested against two digital markets – Amazon and Netflix

**Results**

- An average of 40% increase in users’ browsing time was observed. Also, the amount of time required for generation of satisfactory recommendations was reduced by approximately 15% as compared to traditional recommendation engines.
- We found that purchasing habits of users were on par with current recommendation systems based on collaborative filtering with an advantage to the traditional systems.
- Approximately 60% increase was observed in browsing and purchasing habits of users related to discovery of new products.
- Cold start problem related to introduction of new products in the market decreased considerably with only 20% of new products.

**User Recognition**

Testers were provided with surveys outlining their media consumption habits across three markets – Amazon, Netflix, Spotify. The results from the same were used to create 40 different user profiles based on personal features like, play times of different media, location of the users, subset of favorite genres and 50 different sub-faces. Different user profiles were overlapped with each other to similar multiple users within the same account. Expectation maximization algorithm was used for the machine learning aspect of this project to get maximum likelihood estimation of multiple users.

**Conclusion**

We presented a recommendation engine based on social aspects of the users and giving them more control over what they see. A considerable increase in discovery of new products and interests for the users was discovered. This helps solve the cold start problem related to new products in digital markets. A faster and more trusted recommendation system was built.

**References**