

**Product Adoption Rate Prediction in a Competitive Market**

**Abstract:**

As the worlds of commerce and the Internet technology become more inextricably linked, a large number of user consumption series become available for online market intelligence analysis. A critical demand along this line is to predict the future product adoption state of each user, which enables a wide range of applications such as targeted marketing. Nevertheless, previous works only aimed at predicting if a user would adopt a particular product or not with a binary buy-or-not representation. The problem of tracking and predicting users’ adoption rates, i.e., the frequency and regularity of using each product over time, is still under-explored. To this end, we present a comprehensive study of product adoption rate prediction in a competitive market. This task is nontrivial as there are three major challenges in modeling users’ complex adoption states: the heterogeneous data sources around users, the unique user preference and the competitive product selection. To deal with these challenges, we first introduce a flexible factor-based decision function to capture the change of users’ product adoption rate over time, where various factors that may influence users’ decisions from heterogeneous data sources can be leveraged. Using this factor-based decision function, we then provide two corresponding models to learn the parameters of the decision function with both generalized and personalized assumptions of users’ preferences. We further study how to leverage the competition among different products and simultaneously learn product competition and users’ preferences with both generalized and personalized assumptions. Finally, extensive experiments on two real-world datasets show the superiority of our proposed models.

**Existing System:**

The traditional buy-or not binary-valued adoption representation only captures the fact that both users have consumed the two smart devices in the past. Actually, in a specific competitive market (*e.g., mobile devices*), it is nature for a user to switch among different products over time after she consumes these products (*e.g., iPhone, Samsung, and Windows*). Compared to the traditional

static buy-or-not adoption representation, the merchants care more about users’ loyalty and commitment to the products over time after users consume the products. To better capture users’ loyalty to the frequently used products after puchase over time, we argue, the measure of *adoption rate*, i.e., the usage rate and regularity that consumers use a product at a particular time, is more appropriate to describe users’ preference changes to different products.

**Proposed System:**

Our proposed problem is complementary to the recommender systems as we put emphasis on predicting the future likelihood of adopting the products users have already adopted in the past.

The social influence usually presents in two forms: the global crowd influence shows the herding effect among the population level while the local social neighbors influence argues that users are more likely to be influenced by the social neighbors’ decisions than others.