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## Recommender System for Group of Users Using Matrix Factorization for Tourism Domain (Case Study: Bali)

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**Abstract** — Choosing a product that suits a customer's needs requires a recommendation system to provide suggestions on a collection of items of interest to the user. Recommendations can be applied in various fields such as entertainment, shopping sites, social networking, job portals, discovery of relevant web pages, and so on. There are many circumstances where recommendations are needed for a group such as in tourism and entertainment purposes. The development of a Group Recommendation System (GRS) was carried out in response to the need to provide several recommendations to a group of users. We conducted this research to build a GRS that can provide item recommendations using the Collaborative Filtering (CF) method with Matrix Factorization Technique, as well as three approaches, i.e., After Factorization (AF), Before Factorization (BF), and Weighted Before Factorization (WBF). Determine the best approach for the three categories of groups formed, i.e., small groups (three members), medium groups (five members), and large groups (ten members). The focus of this research is the tourism destination domain in Bali. The evaluation methods used are Precision and Recall for various group sizes. In the evaluation results of the precision calculation, the medium group obtained the highest score for the AF, BF, and WBF approaches of 0.944. Meanwhile, in calculating recall, the small group achieved the highest scores for the AF, BF, and WBF approaches of 0.294, 0.259, and 0.259. From the results of this study, it appears that small groups are suitable for using the BF approach, while the AF method is more effective for large groups, and the best approach for medium groups is the WBF. The precision and recall score are presented on a scale from 0 to 1, where 1 signifies perfect performance.

**Keywords** – Group Recommender System, Tourism Recommender System, Matrix Factorization, After Factorization, Before Factorization, and Weighted Before Factorization

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