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**Application of user attributes and location tag similarities to handle the cold start problem in travel recommendation systems**

S. Ahangama and S.S. Wijenayake

*Faculty of Information Technology, University of Moratuwa*

Travel recommendation systems that suggest top tourist attractions in a city to a user are a currently trending research topic. Since travel planning is time consuming and exhausting, researchers are experimenting with the possible applications of collaborative filtering in making recommendations to suit a user's personal travel preferences and context, to make travel planning easier. However, the existing travel recommenders implementing collaborative filtering do not pay much attention to robust approaches that can handle the cold start problem, which leads to limitations in their accuracy and usability. A major challenge in travel recommenders with regard to the cold start would be identifying a method to determine semantic similarities between users and locations in order to handle the new user and new location problems, respectively. Current solutions utilize pseudo users, random recommendations, and limiting recommendations within a predefined location set to overcome the above issues. This paper introduces a novel approach where the user travel histories are identified as check-ins on Facebook and used to recommend unvisited locations to a user via user-based collaborative filtering. Moreover, this approach resolves the new user problem based on the assumption that users belonging to similar age and gender groups, and will rate a given location similarly. The required user profiles including age and gender of the user can be extracted from the Facebook profile of the user. The new location problem is also resolved based on the assumption that a specific user will display similar preference towards similar locations. Similarities between locations are determined using "tag similarity" between two locations derived from the "types" tag given by Google Places API for any location in the world. The proposed solution was tested for accuracy using standard error metrics, and demonstrated that the novel approach introduced to handle the cold start is capable of providing recommendations with significant accuracy and robustness. The demand for the solution is apparent, as experiments established that the cold start problem is predominant in travel recommenders.