**Abstract**

Research in recommender system has matured in the last two decades. The emphasis in recent research is more focused on Location Based Services (LBS) due to the advancement of wireless communication devices and location acquisition technologies like Global Positioning Systems (GPS). The mobile and handheld devices are the primary mode of communication and information access in this era. The research issues in the field of recommender system for mobile devices are more challenging as compared to traditional web based recommender systems. The techniques applied to the web based recommender system cannot be straight away used for such devices because of several reasons such as dissemination of relevant information in small screen as the size of devices are small, dissemination of information in real time as the users are mobile, etc.

The proposed research work aims to design and develop various techniques required for personalized location based recommender systems. Such systems will increase the usability of mobile device to many folds during their journey. Tourism is one of the largest industries in the world. We restrict our focus to tourism domain in order to facilitate the users with the interesting tourist spots, enriched tour details and so on.

The research work broadly addresses the following challenges in the field of the location based tourist spot recommender systems.

Firstly, it addresses the problem of automatic discovery of new popular tourist spots in a geographical region and semantic annotation of point of interests. Location semantics are gathered by crawling the web in a focused way using domain ontology. Our experiment shows that 20-23% of the locations retrieved from the hierarchical graph based approach presented in (Zheng Y. a.-Y., 2009) and relational algebra based approach presented in (Khetarpaul, 2011) are not interesting location from tourist point of view.

Secondly, the problem of automatic discovery of user preferences and personalized location based recommendation is discussed. Past travel histories and genetic algorithm based approach is exploited for the personalization problem of the tourist spot recommender system. The proposed approach is compared with Matrix Factorization based approach presented in (Berjani, 2011) and the proposed approach shows an improvement in average RMSE of (approx.) 4.63%. The recommendation accuracy is 94% (approx.).

The third problem is to propose, the semantic user similarity measure for recommender system. The proposed approach for user similarity is based on semantic stay trajectories using Earth Mover’s Distance
(EMD). The proposed approach performs better than the popular user similarity measures such as Pearson’s correlation, Jacard and Dice. It shows an average percentage improvement of 10.7% in RMSE and 5.73% in MAE as compared to the above mentioned approaches.

Finally, the problem Information enrichment of recommender system is addressed. This technique used the concept of location based crowdsourcing with the aim of improving the quality of the recommendation. Here, fuzzy inference system is used to convert the contextual information obtained from the crowd to an appropriate rank of the recommended spot. The experimental evaluation demonstrates the better satisfaction level of users with enriched information.