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A Two-stage Locality-Sensitive Hashing Based Approach for Privacy-Preserving Mobile Service Recommendation in Cross-Platform Edge Environment[1]

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Abstract. With the increasing popularity of service computing paradigm, tremendous resources or services are emerging rapidly on the Web, imposing heavy burdens on the service selection decisions of users. In this situation, recommendation (e.g., collaborative filtering) has been considered as one of the most effective ways to alleviate such burdens. However, in the mobile and edge environment, the service recommendation bases, i.e., historical service usage data are often generated from various mobile devices (e.g., Smartphone and PDA) and stored in different edge platforms. Therefore, effective collaboration between these distributed edge platforms plays an important role in the successful mobile service recommendation. Such a cross-platform collaboration process often faces the following two challenges. First, a platform is often reluctant to release its data to other platforms due to privacy concerns. Second, the collaboration efficiency is often low when the data in each platform update frequently. In view of these two challenges, we introduce MinHash, an instance of Locality-Sensitive Hashing (LSH), into service recommendation, and further put forward a novel privacy-preserving and scalable mobile service recommendation approach based on two-stage LSH, named $SerRec_{two\text{-}LSH}$. Finally, extensive experiments are conducted on *WS-DREAM*, a real distributed service quality dataset, and the evaluation results demonstrate that both the service recommendation accuracy and the scalability have been significantly improved while privacy preservation is guaranteed.

Keywords: Mobile Service Recommendation, Distributed Edge Platform, Collaborative Filtering, Privacy-preservation, Locality-Sensitive Hashing, MinHash.

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