Enhancing Cross-Domain Recommendations through User Convergence and Contrastive Learning

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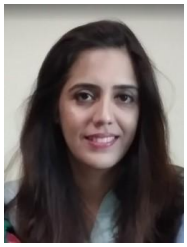
***Abstract*—Cross-domain recommendation aims to leverage user behavior across multiple domains to alleviate data sparsity and enhance personalization. However, inconsistencies in user preferences across domains and the lack of aligned representations often hinder effective knowledge transfer. In this work, we propose a novel framework that employs contrastive learning to enable user convergence, aligning user representations across diverse domains. Our method utilizes contrastive objectives to bring semantically similar user behaviors closer in the shared representation space while preserving domain-specific nuances. By integrating both shared and domain-sensitive user features, the framework effectively captures latent preferences that span multiple domains. Experimental evaluations on benchmark cross-domain datasets demonstrate significant improvements over existing baselines in terms of recommendation accuracy and user embedding consistency. The proposed approach not only enhances cross-domain generalization but also offers a scalable solution for real-world recommendation systems where users interact with heterogeneous content.**

***Keyword*— cross-domain, recommendation, collaborative filtering, contrastive learning**

Rabia Khan is a lecturer from National University of Sciences and Technology (NUST), Pakistan. She is currently doing her PhD in Software Engineering from the same institution and has more than 8 research publications in international journals and conferences to her credit. She has organized many workshops and symposiums related to Data Mining and Machine Learning in her department. Her research interests include Data Mining, Natural Language Processing and Machine Learning



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