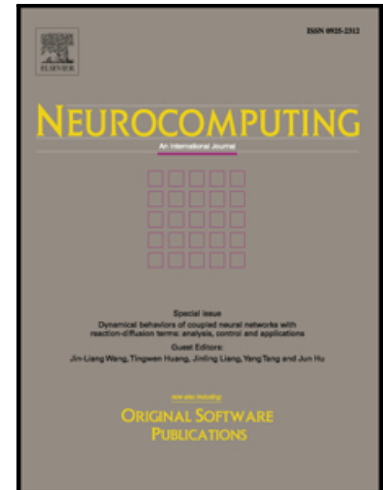


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A Privacy-preserving Approach for Multimodal Transaction Data Integrated Analysis

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Abstract

Multimodal transaction data mining has received a great deal of attention recently. Protection of private information is an essential requirement of data analysis. Existing work on privacy protection for transaction data usually focus on a single mode dataset. The existing privacy-preserving methods cannot be used directly to address privacy issues for multimodal data integration, since information leakage may be caused by data correlations among multiple heterogeneous datasets. In this work, we address privacy protection on the integration of transaction data and trajectory data. We first demonstrate a privacy leakage model caused by integration of multimodal datasets, where integrated data are modeled as a tree. To address the identity disclosure of trajectories, we partition location sequences to meet privacy demands, and copy locations to offset information loss caused by partition; then, to deal with the sensitive item disclosure of transactions, we use suppression technique to eliminate sensitive association rules. Consequently, we propose a k^m -anonymity- ρ -uncertainty privacy model to protect the privacy information in integrating transaction data with trajectory data in a tree-structured data model. Finally, we perform experiments on two synthetic integration datasets, and analyze privacy and information loss under varying parameters.

Keywords: Multimodal data, trajectory data, transaction data, privacy protection

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