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Top-k Query Result Completeness Verification in Sensor Networks

Abstract:

In large scale sensor networks, storage nodes may be placed as an intermediate tier for caching the sensor readings and respond to queries, resulting in reduced power consumption and storage savings for sensors. However if a storage node is compromised, it will create privacy issues and may return fake/incomplete results. Thus we suggest a simple yet effective dummy reading-based anonymization framework, whereby query result integrity can be guaranteed by our proposed Verifiable top-k Query (VQ) scheme. Compared to existing work, VQ schemes have a different design philosophy and achieve the lowest communication complexity, with only constant overhead, at with a small degradation of detection capability. Analysis and numerical examples demonstrate the practicality of our proposed approach.