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Confidentiality Conservation of Privacy in Searchable Symmetric Encryption Cloud Data using Ranked Search

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Abstract: *For the first time we define and solve the problem of effective yet secure ranked keyword search over encrypted cloud data. Ranked search greatly enhances system usability by returning the matching files in a ranked order regarding to certain relevance criteria (e.g., keyword frequency), thus making one step closer towards practical deployment of privacy-preserving data hosting services in Cloud Computing.*
We first give a straight forward yet ideal construction of ranked keyword search under the state-of-the-art searchable symmetric encryption (SSE) security definition, and demonstrate its inefficiency. To achieve more practical performance, we then propose a definition for ranked searchable symmetric encryption, and give an efficient design by properly utilizing the existing cryptographic primitive, order-preserving symmetric encryption (OPSE). Thorough analysis shows that our proposed solution enjoys "as-strong-as possible" security guarantee compared to previous SSE schemes, while correctly realizing the goal of ranked keyword search. Extensive experimental results demonstrate the efficiency of the proposed solution.

Keywords: Ranked Search, Encrypted Cloud, Privacy-Preserving Data, Order-Preserving Symmetric Encryption, Cryptographic Primitive Accesses