

On Location-Optimized Data Systems: Challenges and Opportunities

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Abstract: Location data systems are systems that store the geographic locations of objects as they move in space. These systems are very popular nowadays due to the ubiquitous use of location-detection devices, e.g., GPS, and they offer many location services. However, these systems are not optimized for geo-location data. They are usually extensions to existing relational data systems that have been designed and optimized for different goals in mind.

In this talk, I will highlight several challenges related to supporting natively-optimized location data systems and techniques and opportunities to address these challenges. In specific, I will present techniques for (1) Indexing geo-location data with frequent updates, (2) Addressing the problem of non-deterministic performance (the phenomenon of waves of misery in location data indexing), and (3) LSM-based techniques for handling location updates in big location data systems.

Short Bio: Walid G. Aref is currently a professor of computer science at Purdue University. His research interests are in extending the functionality of database systems in support of emerging applications, e.g., spatial, spatiotemporal, graph, and sensor databases. His focus is on query processing, indexing, data streaming, and infrastructure support for geographic information systems (GIS). Walid's research has been supported by the US National Science Foundation, the National Institute of Health, Purdue Research Foundation, Purdue CERIAS, and some industrial affiliates, e.g., Panasonic and Microsoft. He is the Editor-in-Chief of the ACM Transactions of Spatial Algorithms and Systems (ACM TSAS) since 2018, and has served as an editorial board member for the ACM Transactions of Database Systems (ACM TODS) and the VLDB Journal. Walid has won several best-paper awards including a VLDB ten-year best paper award. Between 2011 and 2014, He has served as the chair of the ACM Special Interest Group on Spatial Information (SIGSPATIAL). Walid is a Fellow of the IEEE, and a member of the ACM.