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非结构化对等计算系统中多维范围搜索

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Abstract
It is an important problem to efficiently support similarity search for multi-dimensional data spaces in peer-to-peer (P2P) data management environment. Current unstructured P2P data sharing systems provide only a very rudimentary facility in query processing, i.e., matching-based query processing. This paper therefore presents a simple, yet effective index structure called EVARI (extended vector approximation routing index) to address the problem of multi-dimensional range search in unstructured P2P systems, by means of both data approximation and routing index techniques. With the aid of the EVARI, each peer can not only process range queries with its local dataset, but also route queries to promising peers with the desired data objects. In the proposed scheme, each peer summarizes its local content using space-partitioning technique, and exchanges the summarized information with neighboring peers to construct the EVARI. Furthermore, each peer can reconfigure its neighboring peers to keep the relevant peers nearby so as to optimize system resource configuration and improve system performance. Extensive experiments show the good performance of the proposed approach.

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摘要
对等计算数据管理中的一个重要问题是如何有效地支持多维数据空间上的相似性搜索.现有的非结构化对等计算数据共享系统仅支持简单的查询处理方法,即匹配查询处理.将近似技术和路由索引结合在一起,设计了一种简单、有效的索引结构EVARI(扩展近似向量路由索引).利用EVARI,每个节点不仅可以在本地共享的数据集上处理范围查询,而且还可以将查询转发给最有希望获得查询结果的邻居节点.为了建立EVARI,每个节点使用空间划分技术概括本地的共享内容,并与邻居节点交换概要信息.而且,每个节点都可以重新配置自己的邻居节点,使得相关节点位置相互邻近,优化了系统资源配置,提升了系统性能.仿真实验证明了该方法的良好性能.

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