Spatial Outsourcing for Location Based Services

ICDE 2008

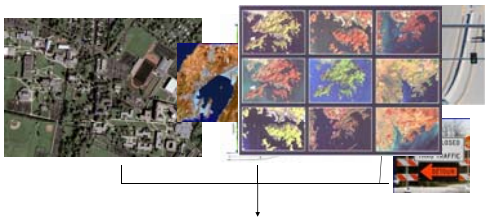
Authors
Yin Yang
Stavros Papadopoulos
Dimitris Papadias
George Kollios

Presented by
Sangeetha U Santharam (Sangy)

Overview

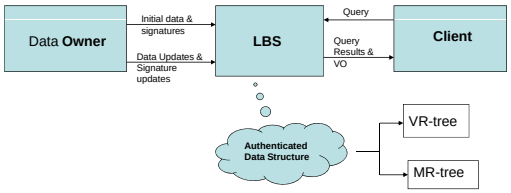
- **General Idea**
- **Framework**
- **VR-tree Vs MR-tree (data structure)**
- **MR-tree**
- **MR-tree Synchronized cache**
- **MR-tree ReduceVO algorithm**
- **MR-tree MergeVO algorithm**
- **MR-tree Vs VR-tree (performance)**
- **Discussion**

General Idea

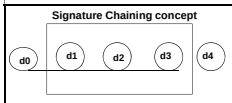
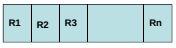


Location Based Servers

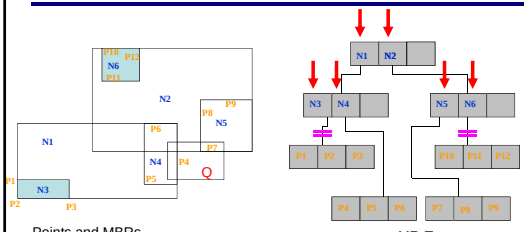
Framework



VR- Tree Vs MR-tree (Data Structure)

VR-tree	MR-tree
Signature Chaining concept 	Hash Vales  H=hash(R1|R2….|Rn
Creates one signature for each entry	**Signature is only for root**
Consumes more space	**Less space overhead as hash values are smaller than signatures**
Client has a verification burden	**Less verification effort for clients**

MR Tree



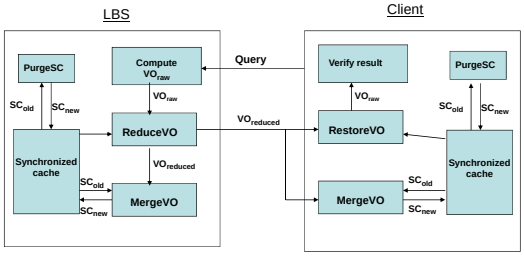
Points and MBRs

MR-Tree

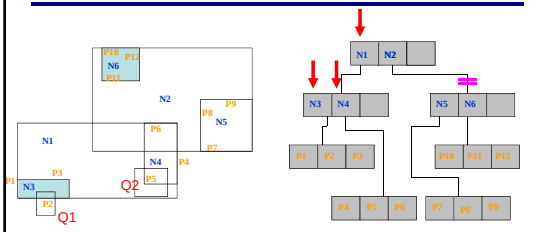
Verification Object (VO)

[[(MBR_N3,hash_N3),(p4,p5,p6)],[p7,p8,p9],(MBR_N6,hash_N6)]

MR Tree – Synchronized Cache



MR Tree – ReduceVO algorithm

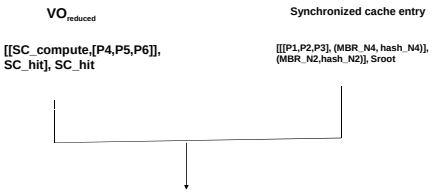


$VO_{reduced}$?

[[SC_compute,[P4,P5,P6]], SC_hit], SC_hit

Query	VO
Q1	[[[P1,P2,P3], (MBR_N4, hash_N4)], (MBR_N2,hash_N2)], Sroot
Q2	[[(MBR_N3,hash_N3), [P4,P5,P6]], (MBR_N2,hash_N2)], Sroot

MR Tree – MergeVO algorithm



MR-Tree Vs VR-Tree (Performance)

Costs	MR-tree	VR-tree
Time for Computing Authentication Data	4 sec	2 hours
Index Size	57 MBytes	511 MBytes
Query Processing Time	2 sec	22 sec
VO size (bytes)	390 KBytes	398 KBytes
Verification (CPU time)	41 *ms*	991 *ms*

Discussion