A Moving-Object Index for Efficient Query Processing with Peer-Wise Location Privacy

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This paper proposed the so-called Policy-Embedded $B^\sharp$-tree (PEB-tree), which organized objects based on both spatial proximity and privacy policy compatibility, and the $B^\sharp$-tree structure is the former work [1] of the authors. The location privacy part of this paper is as the same as other works, and the difference is the works of $B^\sharp$-tree structure. The $B^\sharp$-tree structure is based on the Peano Curve or Hilert Curve, i.e., transforming two dimensional or higher dimensional to linear function.

1 Positive/Strong Points

1. The paper is well structured and the idea is clear.
2. The technique has good effectiveness with the $B^\sharp$-tree structure.
3. $B^\sharp$-tree is based on $B^+$-tree which is widely used in commercial database system.
4. $B^\sharp$-tree reduces the update frequency compared to having to update the positions of all objects at each timestamp when only some of them need to be updated.
5. They propose efficient algorithms that uses the PEB-tree for processing privacy aware range and kNN queries.
6. They defined “Location Privacy Policy” that combines the location and time.

2 Negative/Weak Points

1. The key part of this paper is the $B^\sharp$-tree structure which is the former work of the authors.
2. The authors may need to discuss how a location privacy policy is assigned by $u_1$ for $u_2$.
3. The article may not technically sound.
4. The paper could be better if the authors compare the different Curves.

3 Research Questions and Points for Discussion

Compare with $R$-tree, what’s disadvantages?

References