

Advanced Balanced Search Tree

2d-Tree

Beyond 2D

肉眼看不清细节，但他们都知道那是木星所在的位置，这颗太阳系最大的行星已经坠落到二维平面上了。

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kd-Tree

❖ Can 2d-tree be extended to kd-tree and help higher dimensional GRS?

If yes, how efficiently can it help?

❖ A kd-tree in k-dimensional space

is constructed by

recursively divide \mathcal{E}^k

along the $1^{\text{st}}, 2^{\text{nd}}, \dots, k^{\text{th}}$ dimensions

$$\mathcal{O}(r + n^{1 - 1/d})$$

❖ An orthogonal range query on a set of n points in \mathbb{E}^d

- can be answered in $\mathcal{O}(r + n^{1 - 1/d})$ time,
- using a kd-tree of size $\mathcal{O}(n)$, which
- can be constructed in $\mathcal{O}(n \log n)$ time