



Mathematics > Probability

Partial match queries in random quadtrees

Nicolas Broutin, Ralph Neininger, Henning Sulzbach

(Submitted on 12 Jul 2011)

We consider the problem of recovering items matching a partially specified pattern in multidimensional trees (quad trees and k-d trees). We assume the traditional model where the data consist of independent and uniform points in the unit square. For this model, in a structure on n points, it is known that the number of nodes $C_n(x)$ to visit in order to report the items matching an independent and uniformly on $[0,1]$ random query x satisfies $E\{C_n(x)\} \sim \kappa n^\beta$, where κ and β are explicit constants. We develop an approach based on the analysis of the cost $C_n(x)$ of any fixed query $x \in [0,1]$, and give precise estimates for the variance and limit distribution of the cost $C_n(x)$. Our results permit to describe a limit process for the costs $C_n(x)$ as x varies in $[0,1]$; one of the consequences is that $E\{\max_{x \in [0,1]} C_n(x)\} \sim \gamma n^\beta$.

Comments: 12 pages, 2 figures

Subjects: **Probability (math.PR)**; Data Structures and Algorithms (cs.DS); Combinatorics (math.CO)

MSC classes: 05A16, 05A15, 05C05, 60C05

Cite as: **arXiv:1107.2231 [math.PR]**

(or **arXiv:1107.2231v1 [math.PR]** for this version)

Submission history

From: Nicolas Broutin [[view email](#)]

[v1] Tue, 12 Jul 2011 10:08:58 GMT (119kb,D)

Which authors of this paper are endorsers?

Link back to: [arXiv](#), [form interface](#), [contact](#).

Download:

- [PDF](#)
- [Other formats](#)

Current browse context:

math.PR

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

Change to browse by:

cs

[cs.DS](#)

math

[math.CO](#)

References & Citations

- [NASA ADS](#)

Bookmark (what is this?)

