

Rank-at-a-Time Query Processing

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Query Processing

Term-at-a-Time:

- Scan postings linearly term by term
- Accumulate scores for documents

Document-at-a-Time:

- Traverse each term simultaneously
- Match documents as you go

Score-at-a-Time:

- Quantize and impact order index
- Traverse postings based on score
- Accumulate scores for documents

Rank-at-a-Time

From example quantized index largest score possible is 34 (a:10 b:15 c:9)

Descend from 34 generating intersections as needed, intersection equivalent to composition

$(n - 1)$ choose $(k - 1)$ ways to compose n into k parts, $n = \text{score}$, $k = \text{number terms}$

Score-safe & anytime!

Hybrid Rank-at-a-Time

Group postings together

1 group per impact = Rank-at-a-Time
1 group \sim Model-B (Vigna et al.)

Three groups, (high, medium, low)
Could be scores (3, 2, 1) for one term, (255, 254, 253) for another

Depth-first back off for instance: (h,h,h)
-> (h,h,m) -> (h,h,l)

No longer score-safe

Quantized Impact Ordered Index

Term	Score: [docid, docid, ...]			
a	10: [6]	9: [11]	6: [1,5]	2: [2,9]
b	15: [11]	12: [6]	3: [2]	
c	9: [6]	6: [9]	3: [11]	

