



467th INTERNATIONAL CONFERENCE ON VERY LARGE DATA BASES

3-min Teaser Talk of Paper Accepted in VLDB Journal

# Time Series Indexing by Dynamic Covering with Cross-Range Constraints

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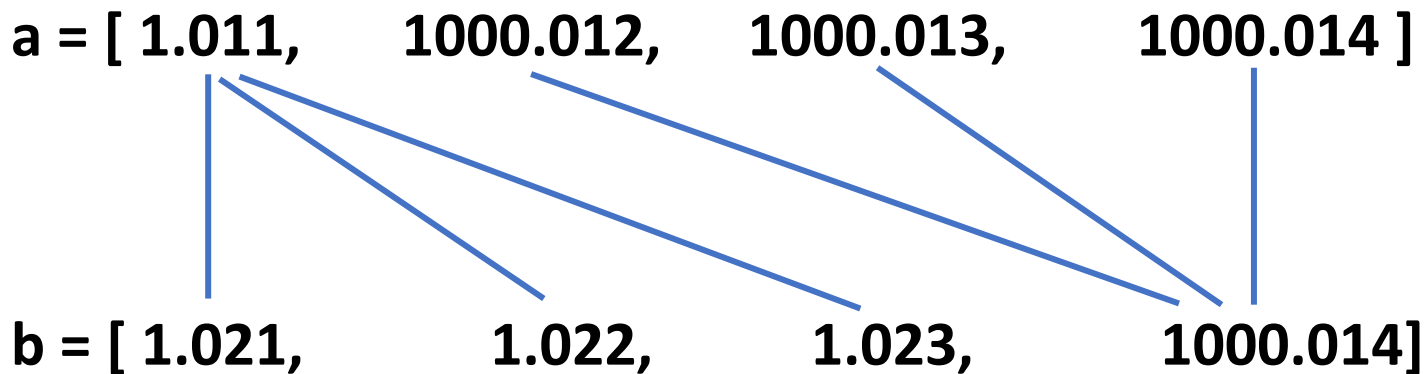
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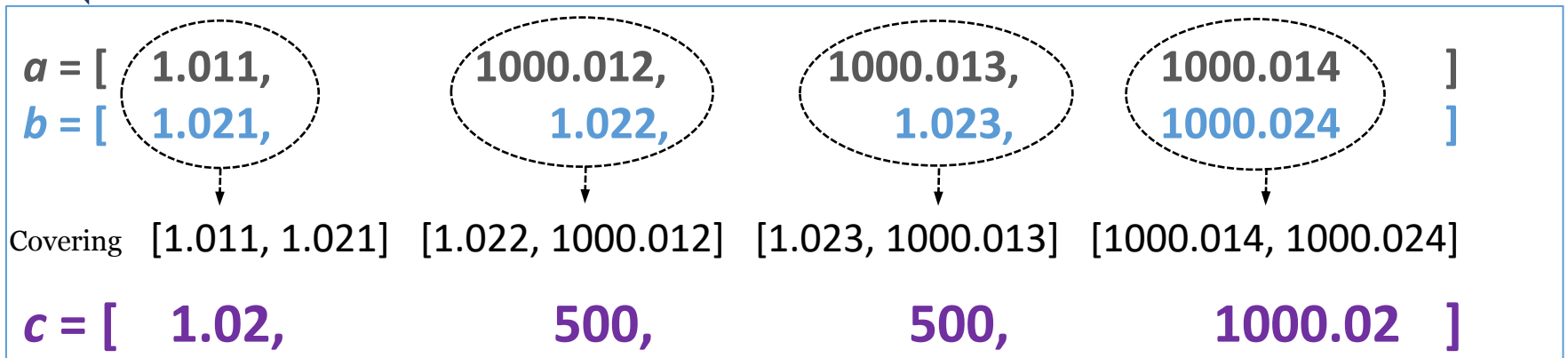
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# Dynamic Time Warpping

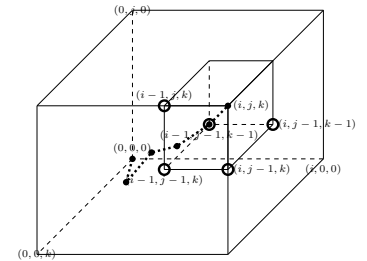
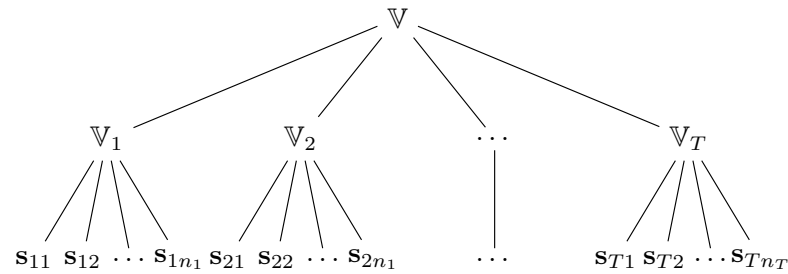
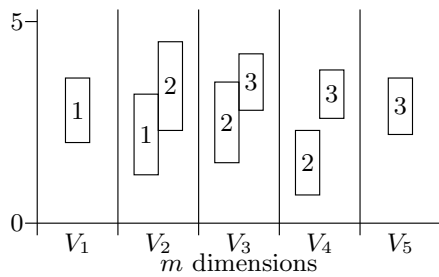


Two time series  $\mathbf{a}$  and  $\mathbf{b}$ , under DTW distance, but not Euclidian distance, they are similar.

# Traditional Covering of Time Series



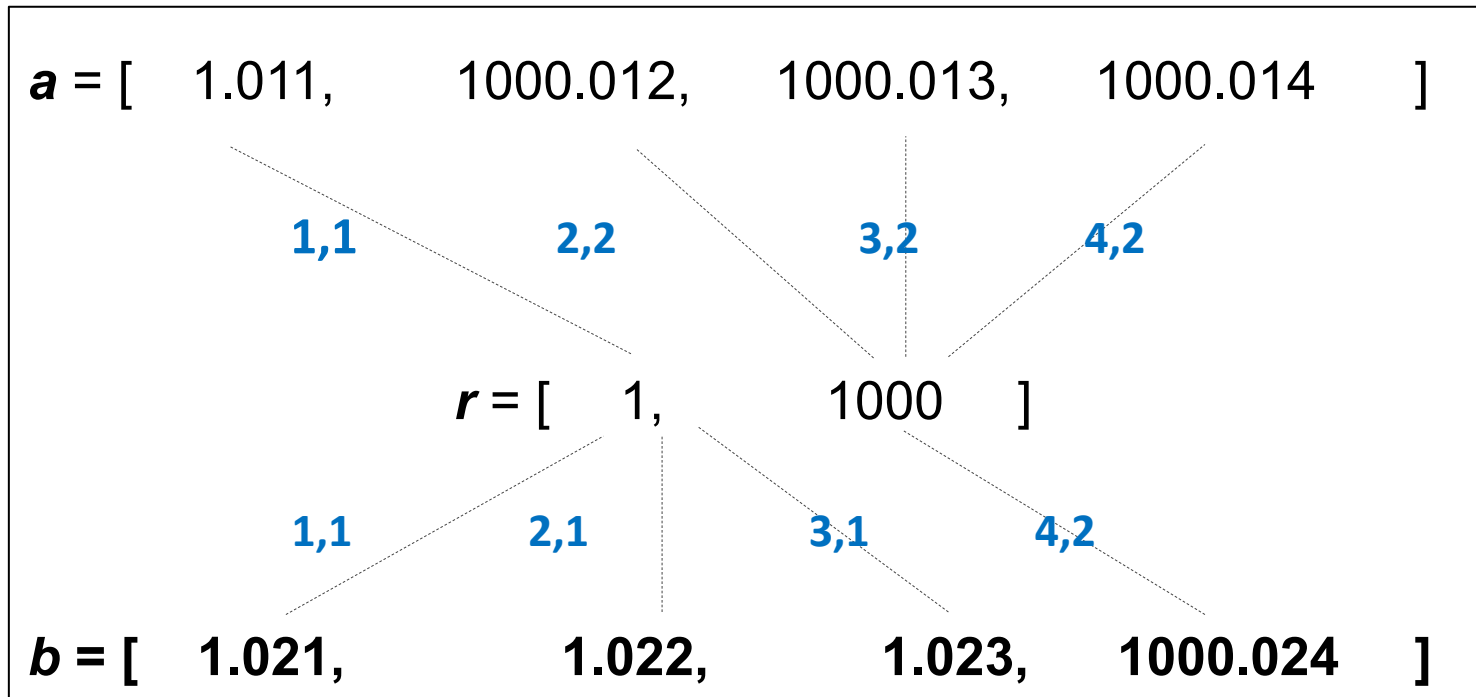
- The hypercube is not an efficient covering structure.
- For example,  $c$  is far away from either  $a$  or  $b$  under DTW distance.



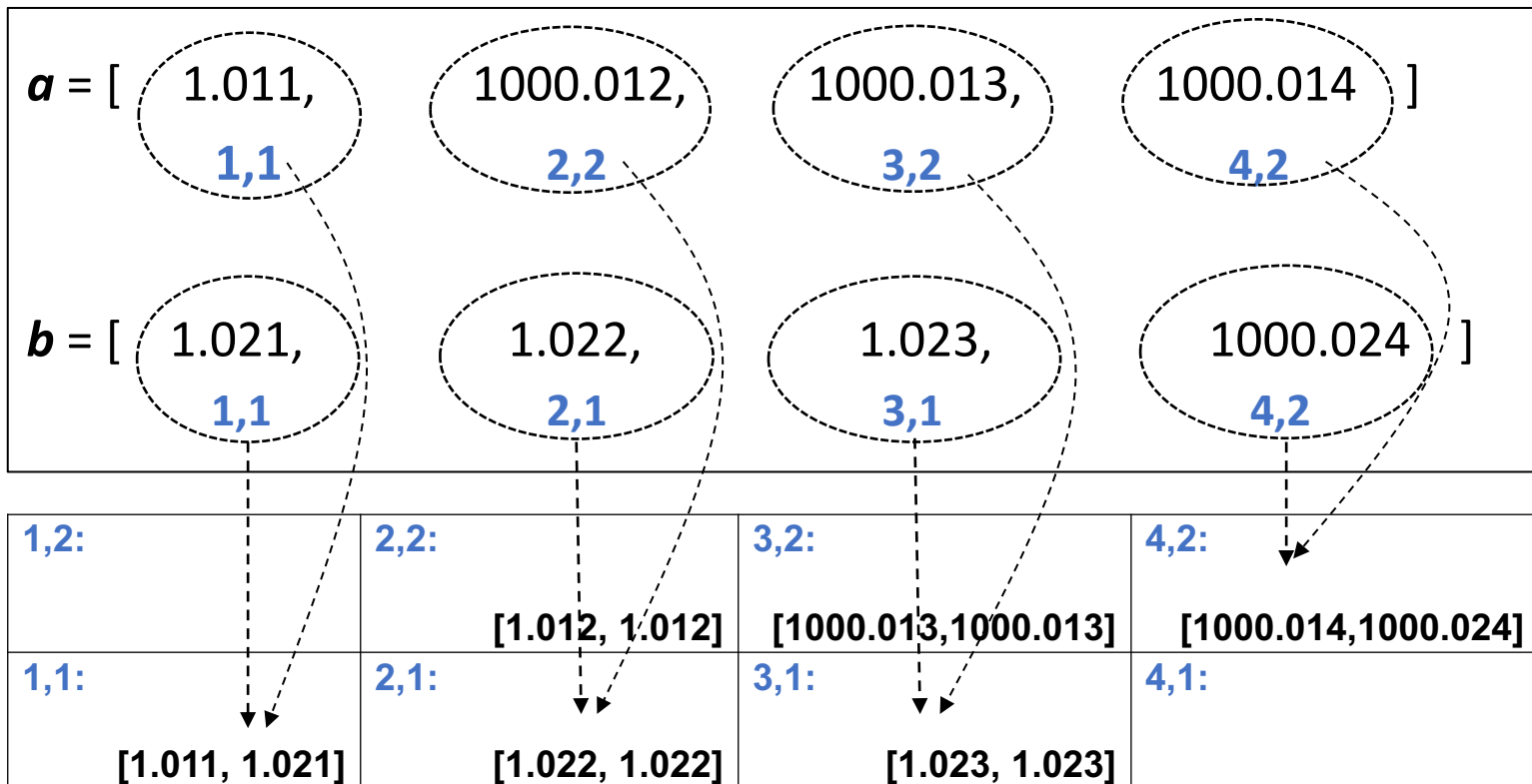
# Dynamic Covering with cross-Range Constraints (DCRC)

# Reference and Matching

$r$  is a 2-length reference time series, which represents the common shape of  $a$  and  $b$



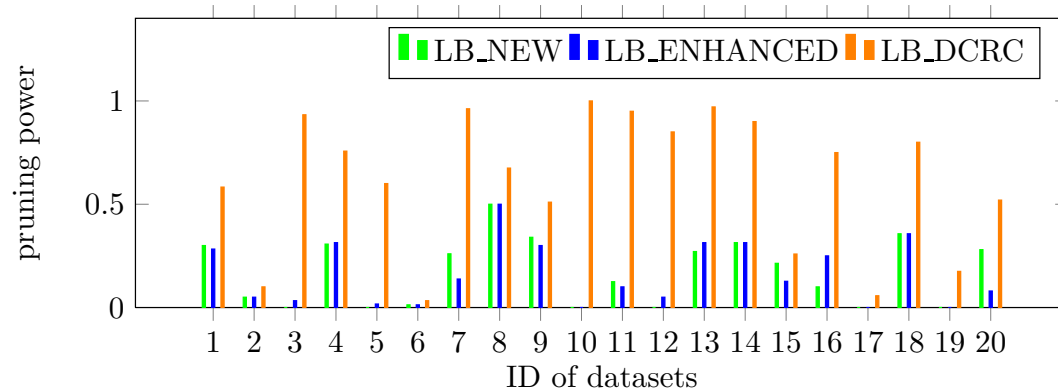
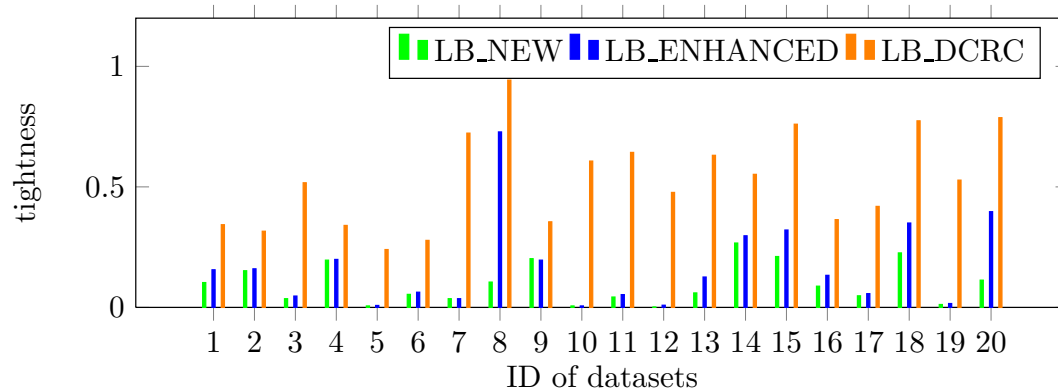
# Covering Structure of Time Series



# Feasible Paths of DCRC

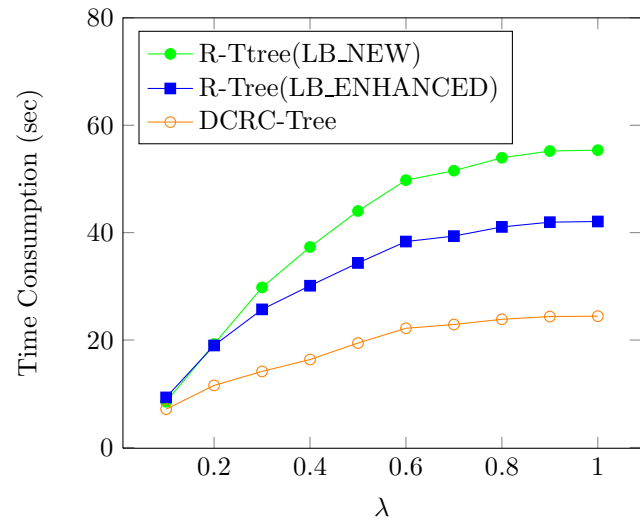
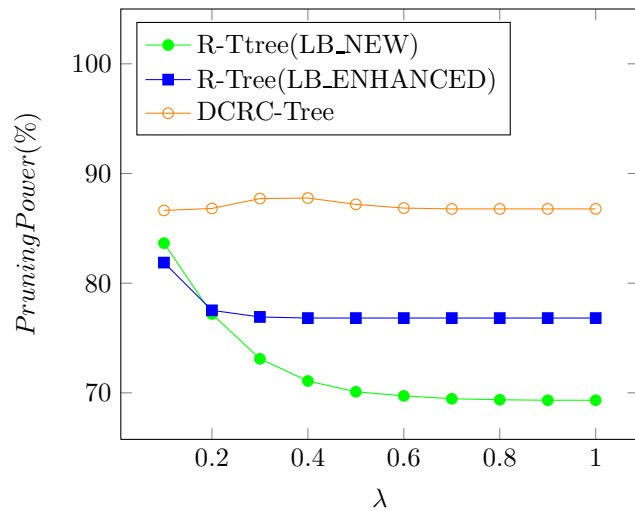
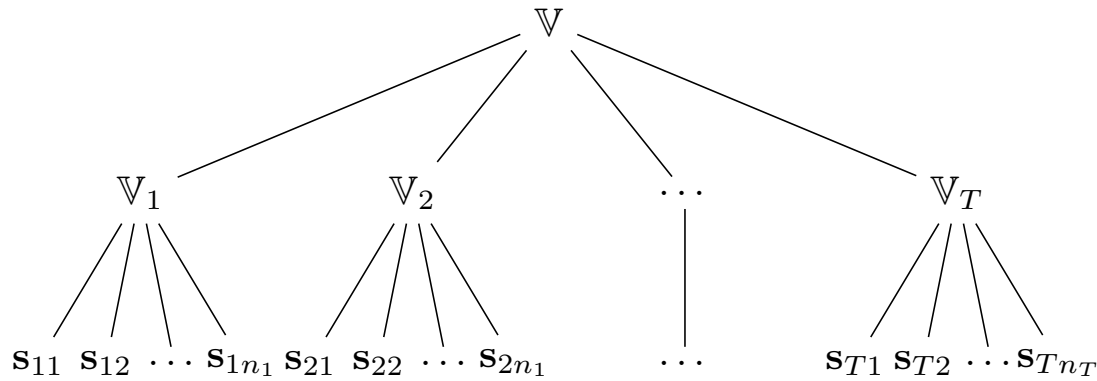
1,2:	2,2: [1.012, 1.012]	3,2: [1000.013,1000.013]	3,2: [1000.013,1000.013]
1,1: [1.011, 1.021]	2,1: [1.022, 1.022]	3,1: [1.023, 1.023]	4,1:
1,2:	2,2: [1.012, 1.012]	3,2: [1000.013,1000.013]	3,2: [1000.013,1000.013]
1,1: [1.011, 1.021]	2,1: [1.022, 1.022]	3,1: [1.023, 1.023]	4,1:
1,2:	2,2: [1.012, 1.012]	3,2: [1000.013,1000.013]	3,2: [1000.013,1000.013]
1,1: [1.011, 1.021]	2,1: [1.022, 1.022]	3,1: [1.023, 1.023]	4,1:

# Lower Bound DTW between Time Series and DCRC





# DCRC-Tree



# Thank You!

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 <https://bit.ly/DCRC-Tree>