Index-Based Similarity Joins

Yasin N. Silva, Spencer S. Pearson
Arizona State University

The Problem

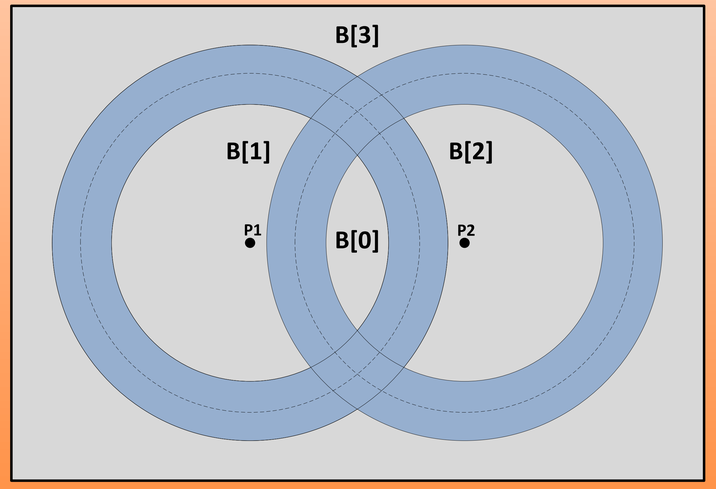
- Similarity joins are a key tool in analyzing and processing data.
- Some standalone Similarity Join algorithms have been proposed.
- Little work on implementing Similarity Joins as physical database operators has been done.

Our Contribution

- Modification of the D-Index to allow for similarity joins
  - Implementation of a similarity join algorithm utilizing successive searches through the index
  - Implementation of a similarity join algorithm in one pass through combining indexes

D-Index Bucket Addressing

- D-index consists of multiple levels
- Levels are partitioned into *n* separable buckets and one exclusion set
- Objects in a separable bucket cannot be within *p* of another separable bucket, where *p* is the parameter used to build the d-index
- All objects not inside a separable bucket are placed in the exclusion set



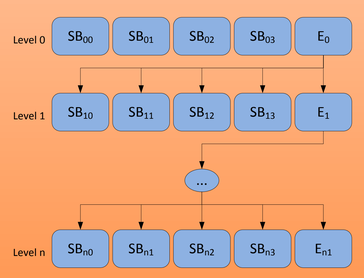
Partitioning Example

Separable Buckets:
- B[0]
- B[1]
- B[2]
- B[3]

Exclusion set is everywhere not included in the separable buckets (the blue areas)

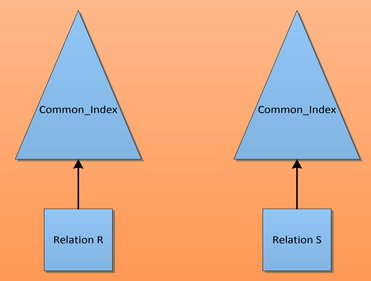
D-Index Structure

- D-index is structured as an array of buckets
- For a level *m*, *m* has n_m buckets
  - *n* can be different for each level
- Each exclusion set is used to build the next level
- The exclusion set of the final level is not partitioned any further



Our Approach – Building the Index

- Build a common index structure for multiple datasets
  - Each level uses the same pivot points
  - Therefore the same bucket structure is generated
- The buckets from each index can then be accessed simultaneously



Our Approach - Querying

- Load both relations using the common index
- Traverse through all buckets in each index simultaneously, reporting matches between the relations in each bucket