Estimating XML Query Cardinality

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Issues in Result Size Estimation

- Twigs
  - branch correlation
- Set cardinality (`let ... :=`)
- Predicates

The Framework

- Model independent
- It offers
  - correlation
  - group cardinality estimation
  - predicate selectivity application

Basics

- Estimation functions compute the distribution of data into query result
- Result distribution is expressed by means of sequences of match occurrences
- Sequence of match occurrences are bound to variables

Match Occurrence

- (l,r,m)
  - l: tag of the matching nodes
  - r: region of the database
  - m: multiplicity of the occurrence

Regions

- Intensional regions: types
- Extensional regions: position intervals, etc
- Mixed regions: intensional + extensional

Tagged Regions

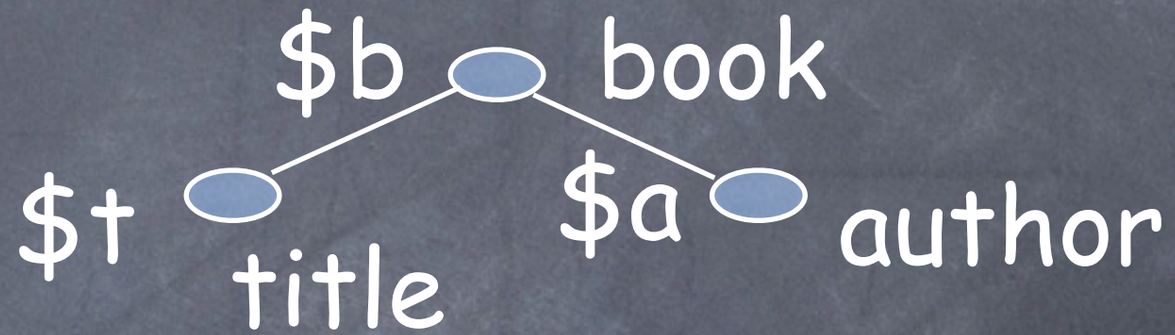
- Regions augmented with tag information
  - (l,r)
- Organized into a graph
  - /-edges, //-edges, etc

Correlation

- (l,r,m) and (l',r',m') are correlated wrt to (l'',r'',m'')
- if (l'',r'') is a common ancestor for (l,r) and (l',r') in the tagged region graph

More on Correlation

- (title,r1,m1) correlated to (author,r2,m2) wrt (book,r3,m3) ?



- Constrained common ancestor problem
- O(n) time complexity (with proper data structures)

Groups

- Estimating the distribution of data into sets created by the `let` clause
  - Distributing match occurrences into sets
  - Correlation-based

More on Groups

- Number of groups determined by the cardinality of the root variable
- Performed in $O(n^2)$ time
- Extensible to future groupby constructs

Predicates

- Predicate selectivity depends on
  - the kind of predicates
  - the semantics of the data being filtered
- `data($y) > 1994`

More on Predicates

- Selectivity factor
  - psf[P]: TaggedRegion -> [0,1]
- Factors propagated to the occurrences of the same twig

Conclusions

- An infrastructure for size estimation models
- Future work
  - groupby
  - more tree-oriented vision