Database Research @ UC Merced

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Exact Selectivity Computation (ESC) for In-Memory Query Optimization

[Shin, Rusu, and Suhan @ CIDR 2019 & arXiv]
Synopses-Driven Selectivity Estimation

SELECT R.A, S.B, R.C, R.D
FROM R, S, T
WHERE R.A = S.A AND S.B = T.B AND
    R.B = x AND R.C BETWEEN (y1, y2) AND
    (R.D = z1 OR R.D > z2) AND udf(R.B,R.D) > w
Exact Selectivity Computation (ESC)
SELECT COUNT(*) FROM R
WHERE R.B = x AND R.C BETWEEN (y1, y2) AND (R.D = z1 OR R.D > z2) AND udf(R.B,R.D) > w
Selection Materialization

- When to materialize?
  - Large tables
  - High selectivity

- Interaction with query compilation
  - Code generation
  - Operator fusion up to blocking operator
Join Selectivity Estimation

- Build single F-AGMS sketches during ESC
  - One pass
  - Mergeable
- Graph-based join order enumeration
Experiments on SSB 80GB

- MapD+ESC (now OmniSci)
- 2 x 14-core Intel Xeon E5-2660 v4 CPUs (56 threads, 256 GB memory)
- NVIDIA Tesla K80 GPU (2496 cores, 32-wide SIMD, 24 GB memory)
- Ubuntu 16.04 SMP with CUDA 9.1
PrivateJobMatch: A Privacy-Oriented Deferred Multi-Match Recommender System for Stable Employment

[Saini, Rusu, and Johnston @ EconMatch]
Job Recommender Systems

Candidate recommendations for every job independently

Job recommender system
- decentralized
- best-fit optimization

Candidate profile$_1$
- explicit data
- implicit feedback

Job description$_1$

Candidate profile$_2$
- explicit data
- implicit feedback

Job description$_2$

Job description$_3$

Job recommendations for every candidate independently
PrivateJobMatch

- Candidate\(_1\) - ranked jobs
- Candidate\(_2\) - ranked jobs

PrivateJobMatch
- centralized
- deferred acceptance
  matching

- Job description\(_1\) - ranked candidates
- Job description\(_2\) - ranked candidates
- Job description\(_3\) - ranked candidates

Set of stable matching pairs
  (Candidate - Job description)
Multi-Match Deferred Acceptance
Vacancy Reduction
Questions ????