

Manual Optimization Decisions

Problem 1 (Physical Visualization Design Problem) *Given an interface I , and a set of constraints, and a user interaction trace, identify the optimal placement policy P^* that will minimize the response time for the trace.*

Notations:

M_c : Client memory size

M_s : Server memory size

D_s : Server disk size

Let:

$$x_{ij} = \begin{cases} 1 & \text{if place result of } query_i \text{ on } storage_j \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where storage 0, 1, 2 are client memory, server memory, server disk respectively. Suppose r_{ij} is the delay we can reduce by placing the result of $query_i$ on $storage_j$ given by some cost model. We can solve the matrix x using integer programming:

$$\text{Maximize } \sum_{i=1}^n \sum_{j=1}^3 x_{ij} r_{ij}$$

subject to:

$$\sum_{j=1}^3 k_{ij} \leq 1, (i = 1, 2, \dots, n) \quad - \text{Placement is non-inclusive}$$

$$\sum_{i=1}^n k_{i0} s_i \leq M_c \quad - \text{Client memory size}$$

$$\sum_{i=1}^n k_{i1} s_i \leq M_s \quad - \text{Server memory size}$$

$$\sum_{i=1}^n k_{i2} s_i \leq D_s \quad - \text{Server disk size}$$