A Cache-based Approach to Dynamic Switching between Different Dataflows in Crowdsourcing

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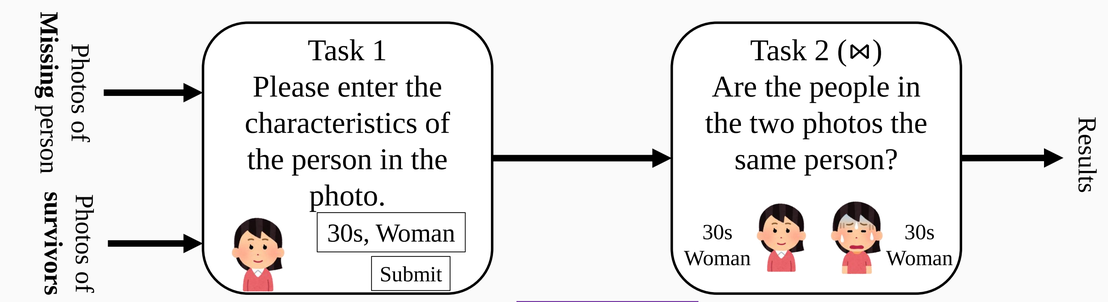
Background

We may want to change dataflows halfway.

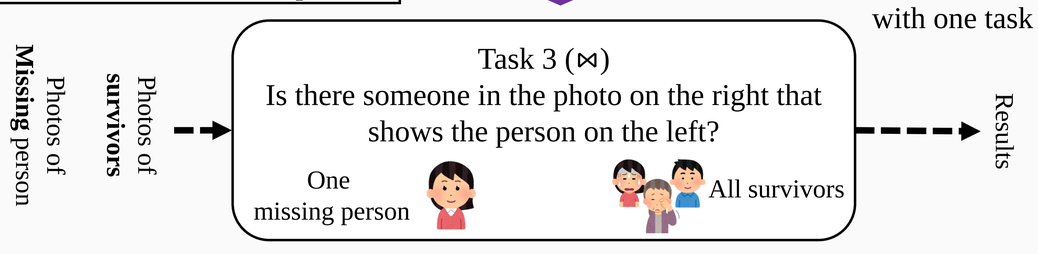
Dataflow Example:
Identifying the missing and survivors when a disaster occurs



Example: Change to an efficient method because the number of survivors was less than expected.

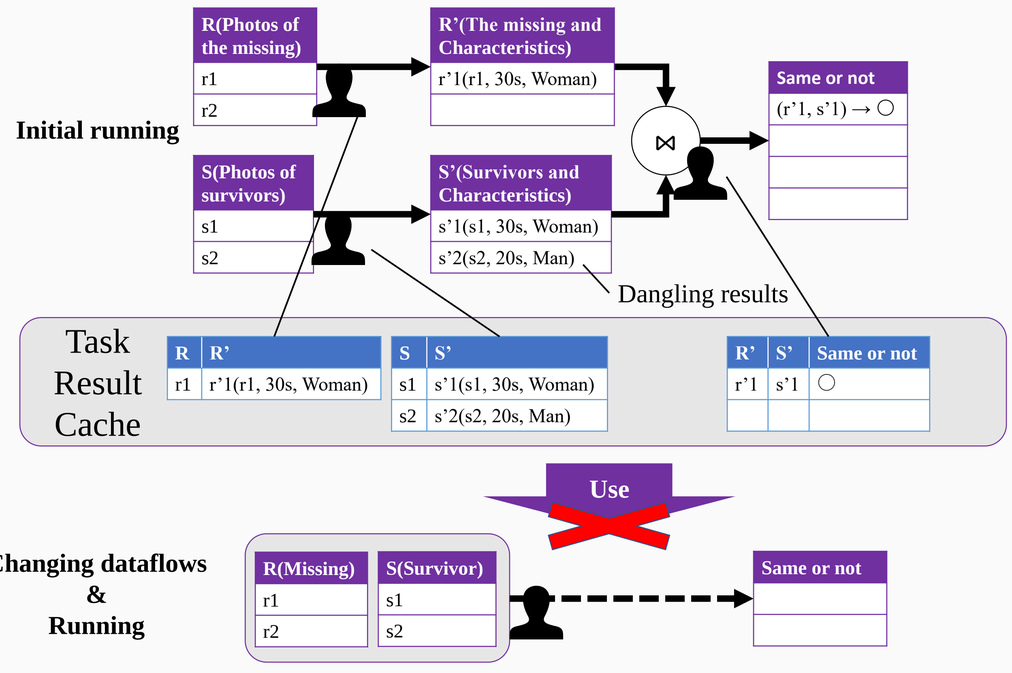
Change

Multiple answers can be obtained with one task



Problem & Purpose

Existing method cannot cope with the changing dataflows[1].



Purpose

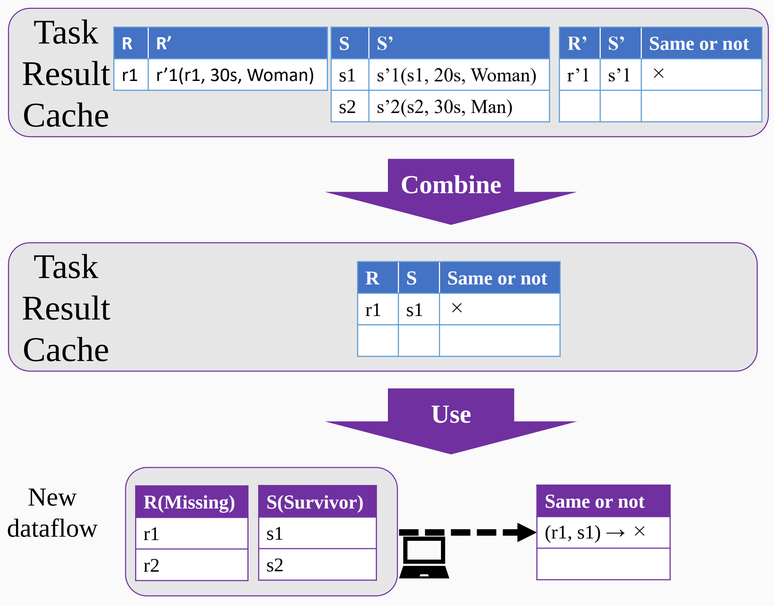
To reduce the total monetary cost in the dataflow change process

[1] G. Little, L. B. Chilton, M. Goldman, and R. C. Miller, "Turkit: human computation algorithms on mechanical turk," in Proc. of ACM UIST 2010, 2010, pp. 57–66.

Proposed Method

Propose a rerunning method in changing dataflows.

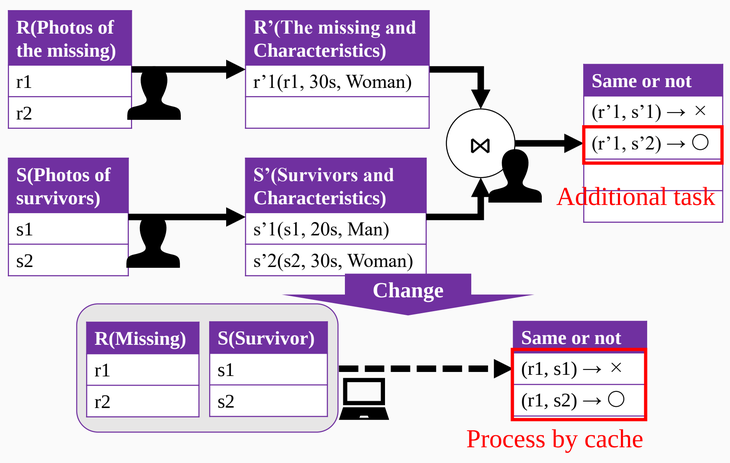
Combining Caches



Additional Task

Issue additional tasks to use dangling results.

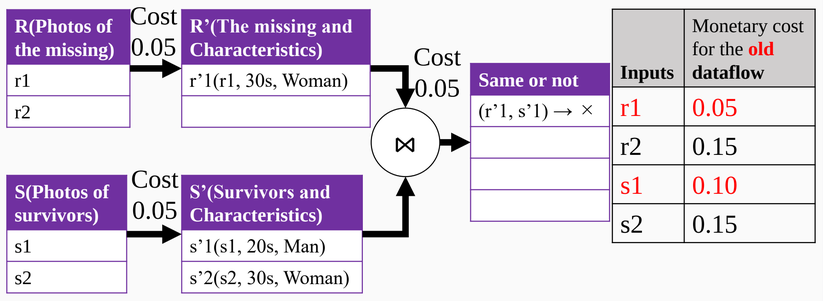
However, there is a tradeoff between cost reduction by cache and the cost increase by additional tasks.



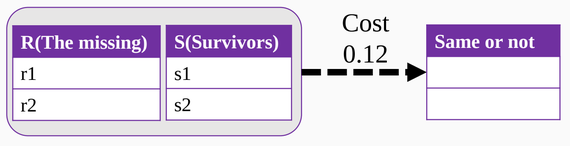
Cost Estimation

Compare the costs of the two plans

◆Monetary cost for the old dataflow



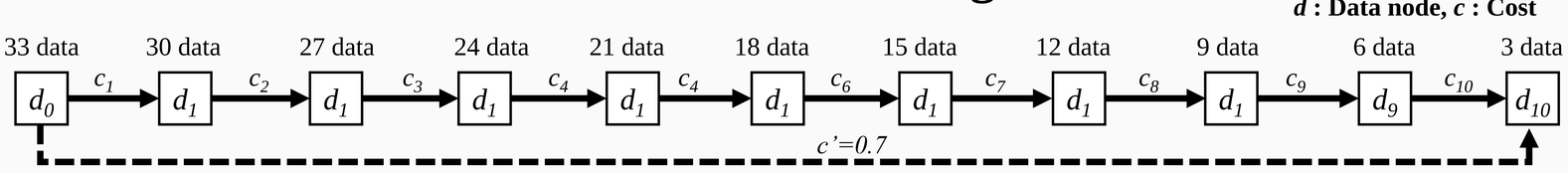
◆Monetary cost for the new dataflow



Simulation

It is possible to identify the best point to minimize the total cost and there is no obvious solution.

Simulation settings



Num of tasks

10

Data location at changing

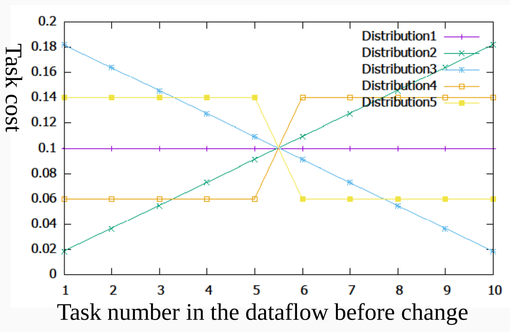
3 dangling results for each data node

Processing order

Process from data closest to the last node

Task cost distribution

Total cost of the task in the dataflow before change : 1.0
The task cost in the dataflow after change : 0.7



Cost distribution

1：Constant

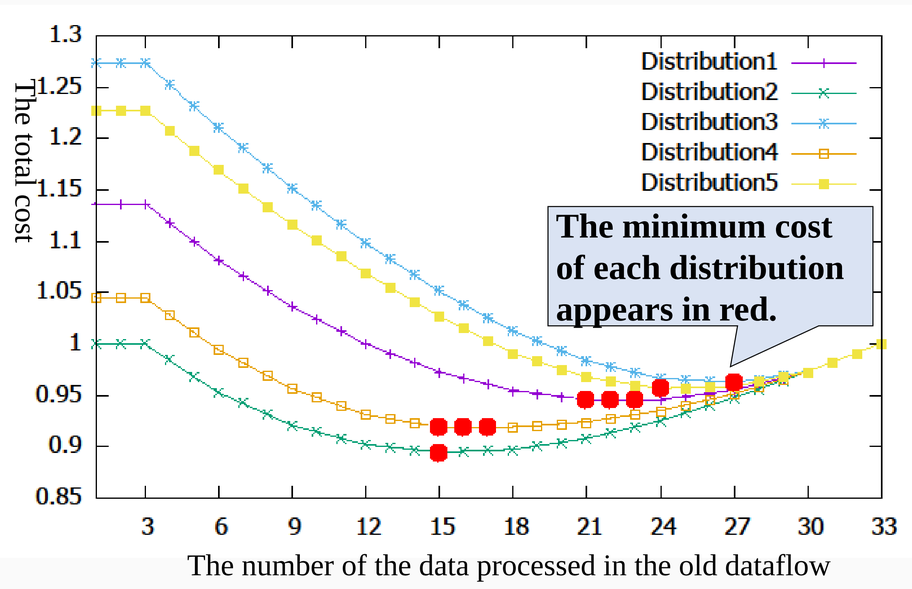
2：Linear increase

3：Linear decrease

4：Low & High

5：High & Low

Simulation Results



The Second IEEE Workshop on Human-in-the-loop Methods and Human Machine Collaboration in BigData (IEEE HMData2018), Dec. 10th, Seattle, US