

Optimizing Stochastic Gradient Descent Over Normalized Data

ABSTRACT

1. INTRODUCTION

Example

2. PRELIMINARIES AND BACKGROUND

Generalized Linear Models (GLMs)

Stochastic Gradient Descent (SGD)

Problem Definition

3. SIMPLE APPROACHES

3.1 SGD After a Join: Materialize

3.2 SGD Over a Join: Index-Stream

4. OPTIMIZING SGD OVER JOINS

4.1 Order-Preserving Index-Stream under Low Memory

4.2 Order-Relaxed Approaches

4.2.1 Hash-Partitioned Index-Stream

Analysis of Relaxed Orderings

4.2.2 Simulation Study

4.2.3 Shuffling Only Once

4.3 Extensions

4.3.1 Multi-table Joins

4.3.2 Shared-nothing Parallelism

4.4 Mini-Batch Gradient Descent

5. EXPERIMENTS

Real Datasets

Experimental Setup

5.1 High-level Performance and Quality

5.2 Performance Drill-Down

5.3 Evaluation of Extensions

6. RELATED WORK

7. CONCLUSION AND FUTURE WORK