

A Machine Learning Perspective on Predictive Coding with PAQ

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1 Introduction to PAQ

2 PAQ8

- Architecture
- Model Mixer
- Mixture of Experts
- Updating & Filtering

3 Applications for PAQ8

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Introduction to PAQ

What is PAQ8

- What is it?
- How does it work?
- What makes it so famous?

Introduction to PAQ

Matt Mahoney

- Born 1955
- Recieved Ph.D in computer science at Florida Tech in 2003
- Released PAQ1 on January 6, 2002



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What is PAQ?

- A lossless, open-source compression algorithm
- Brings high performance at the cost of increased memory usage and time consumption
- Related to PPM, is envisioned as PPMs improvement

Principles of PAQ

- Modeling combined with adaptive arithmetic encoding
- Open to additions and improvements
- Improves performance of PPM by including several predictors (i.e. models of data)
- Combines the result of the predictors

Exemplary Predictors

The order- n context predictor

- Examines the last n bits and counts the 1's and 0's
- Estimates probability whether next bit is 1 or 0 like PPM

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- Context consists of a specific amount of non-contiguous bytes before the current bit

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PAQ & Predictors

- Predictors in PAQ are used simultaneously
- Result with the most usability is chosen

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