Literature Review 3

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1 Introduction

For this literature review I read 2 articles from the Computer Graphics Forum (CFG) about data reduction. Reading and making comparisons between the two articles gave me a sense of how far technology has advanced in the past 10 years as both articles are dated almost 10 years apart.

2 Data Reduction Techniques for Simulation, Visualization and Data Analysis

The first article (more recent article) introduces the process of visualization of data and talks about how File I/O is the main paradigm of transfer rates and storage capacity. Slow I/O rates can be problematic for users (scientists, data consumers, etc) as they need a reasonable turnaround time after visualizing the data. If the time to read the data goes down the turnaround time goes up. The article then moves on to talking about data reduction techniques and comparisons between them. The paper shows how lossless compression compares to lossy compression and its sizes. It compares lossy compression and mesh reduction to show that the new method of mesh reduction is faster and requires less storage while barely being distinctive to the near lossless compression algorithm of data reduction. [1]

3 Data reduction practice in X-ray reflectometry

The second article (from 2017) talks about how X-rays need high processing and data storage. They introduce the article by pointing out that the amount of data storage needed is directly proportional to the amount of time and X-ray is used on a person and the size of the area of the x-ray that is being processed. Different methods are compared to the accuracy of X-rays (Gaussian functions, offset scans and rocking-curve methods. They go into depth about the data reduction relating to this processing by coming up with a series of steps that

is raw data -¿ scaling -¿ binning and normalization -¿ footprint correction -¿ background subtraction. I think that this is an old way of Data reduction that was mentioned in the first article (lossless compression) that takes up a lot of space and time, which increases the turn around time. To decrease the turnaround time I think the mesh reduction process could be used to reduce turnaround time for X-rays [2]

References

[1] S. Li, N. Marsaglia, C. Garth, J. Woodring, J. Clyne, and H. Childs. Data reduction techniques for simulation, visualization and data analysis. *Computer Graphics Forum*, 0(0).

[2] F. Salah, B. Harzallah, and A. van der Lee. Data reduction practice in X-ray reflectometry. *Journal of Applied Crystallography*, 40(5):813–819, Oct 2007.