## M4: A Visualization-Oriented Time Series Data Aggregation

Uwe Jugel, Zbigniew Jerzak,

Gregor Hackenbroich

SAP AG

Chemnitzer Str. 48, 01187 Dresden, Germany

Volker Markl
Technische Universitat Berlin
Strae des 17. Juni 135
10623 Berlin, Germany
volker.markl@tu-berlin.de

## I. Introduction

Visualization of large scale time series data is a crucial need of modern exploratory bigdata analysis [1]. But the huge size of the data is a barrier to visualization [2], [3], [4]. To address this challenge of bigdata different data reduction and sampling strategies are used to overcome the barrier [5], [6]. But for preserving the semantics of trend line of time series data these sampling strategies show huge limitations [7].

In this review paper we present a review of the paper [7] which address this issue of preserving the semantic of time series data and present some related works in the line. The paper appeared in the Proceedings of the VLDB Endowment, 2014.

II. QUERY REWRITING

**TODO** 

III. TIME SERIES VISUALIZATION

**TODO** 

IV. DATA REDUCTION OPERATORS

TODO

V. TIME SERIES DATA REDUCTION

VI. EVALAUTION

VII. RELATED WORKS

**TODO** 

VIII. OUR PROPOSAL

TODO

IX. CONCLUSION

The conclusion goes here, this is more of the conclusion

## REFERENCES

- [1] T.-c. Fu, "A review on time series data mining," *Engineering Applications of Artificial Intelligence*, vol. 24, no. 1, pp. 164–181, 2011.
- [2] A. Labrinidis and H. V. Jagadish, "Challenges and opportunities with big data," *Proceedings of the VLDB Endowment*, vol. 5, no. 12, pp. 2032–2033, 2012.
- [3] J. Fan, F. Han, and H. Liu, "Challenges of big data analysis," *National science review*, vol. 1, no. 2, pp. 293–314, 2014.
- [4] C. P. Chen and C.-Y. Zhang, "Data-intensive applications, challenges, techniques and technologies: A survey on big data," *Information Sciences*, vol. 275, pp. 314–347, 2014.
- [5] G. Cormode and N. Duffield, "Sampling for big data," 2014.
- [6] X. Wu, X. Zhu, G.-Q. Wu, and W. Ding, "Data mining with big data," *IEEE transactions on knowledge and data engineering*, vol. 26, no. 1, pp. 97–107, 2014.
- [7] U. Jugel, Z. Jerzak, G. Hackenbroich, and V. Markl, "M4: a visualization-oriented time series data aggregation," *Proceedings of the VLDB Endowment*, vol. 7, no. 10, pp. 797–808, 2014.