



Temporal Data Warehousing, OLAP, and Mining

An Application in Medicine

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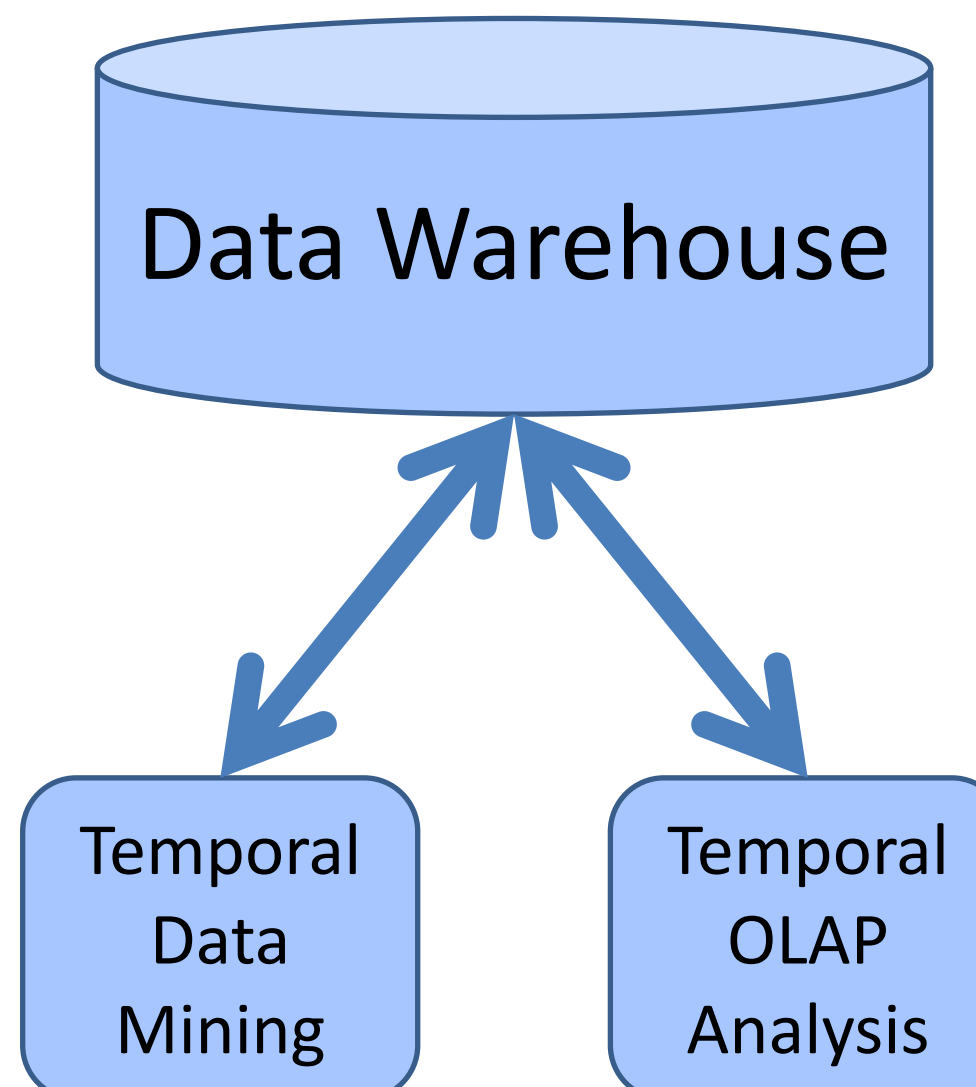


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Thesis Objectives

✓ Mining of **Approximate Temporal Functional Dependencies** with a temporal grouping based on sliding windows. *“Usually, the patient’s severity and the pathology determine the main therapy in a time window of 30 days.”*

✓ Mining of **Temporal Association Rules** applied to interval-based temporal clinical data. *“If a beta blocking agent is administered, usually nausea follows within 3 days.”*

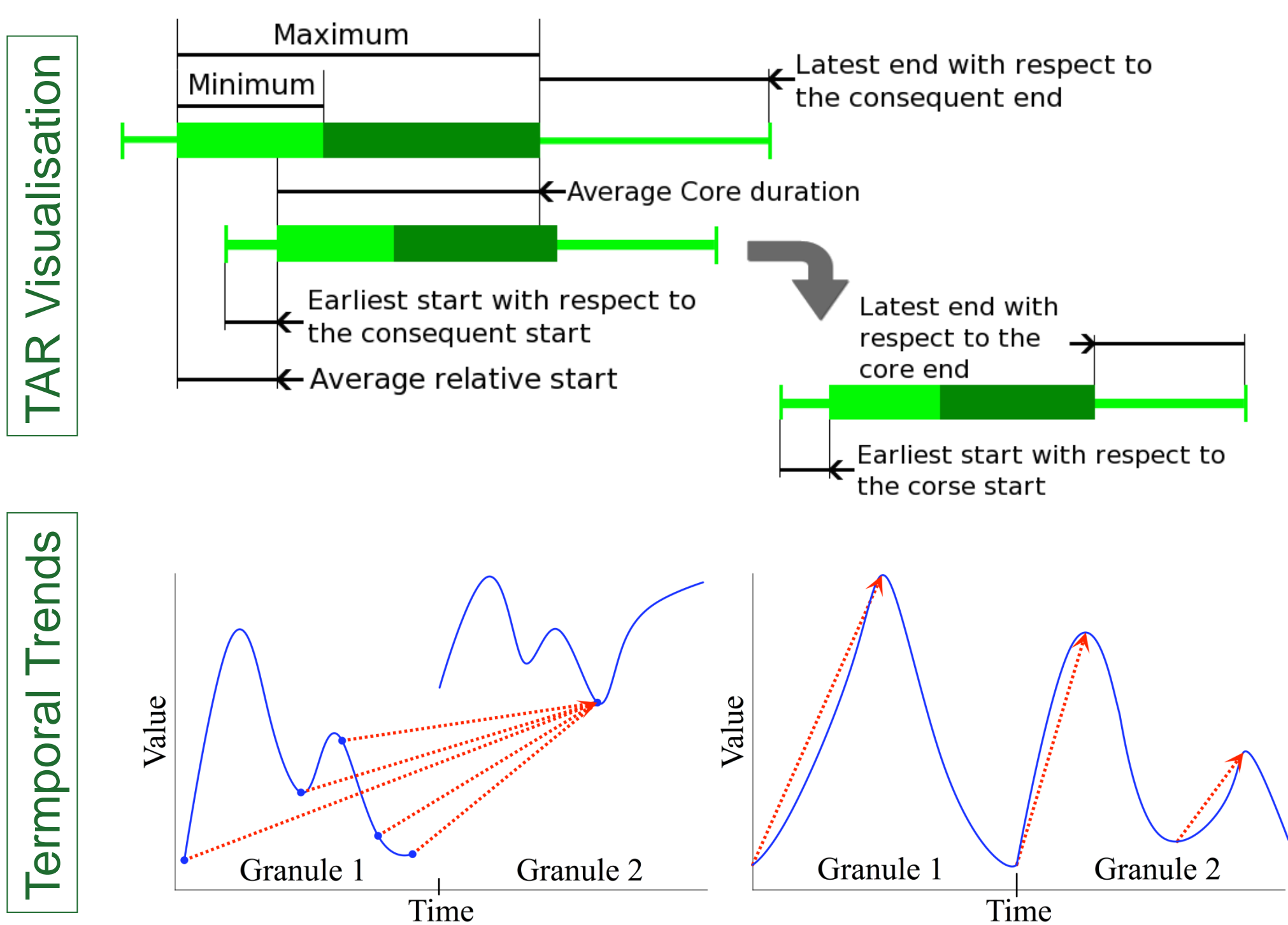


✓ Displaying and visually analysing **Temporal Association Rules** through a new visualization solution.

✓ Interval based reasoning for **Temporal Operations and Aggregation** by combining temporal dimensions from standard OLAP analysis on cubes.

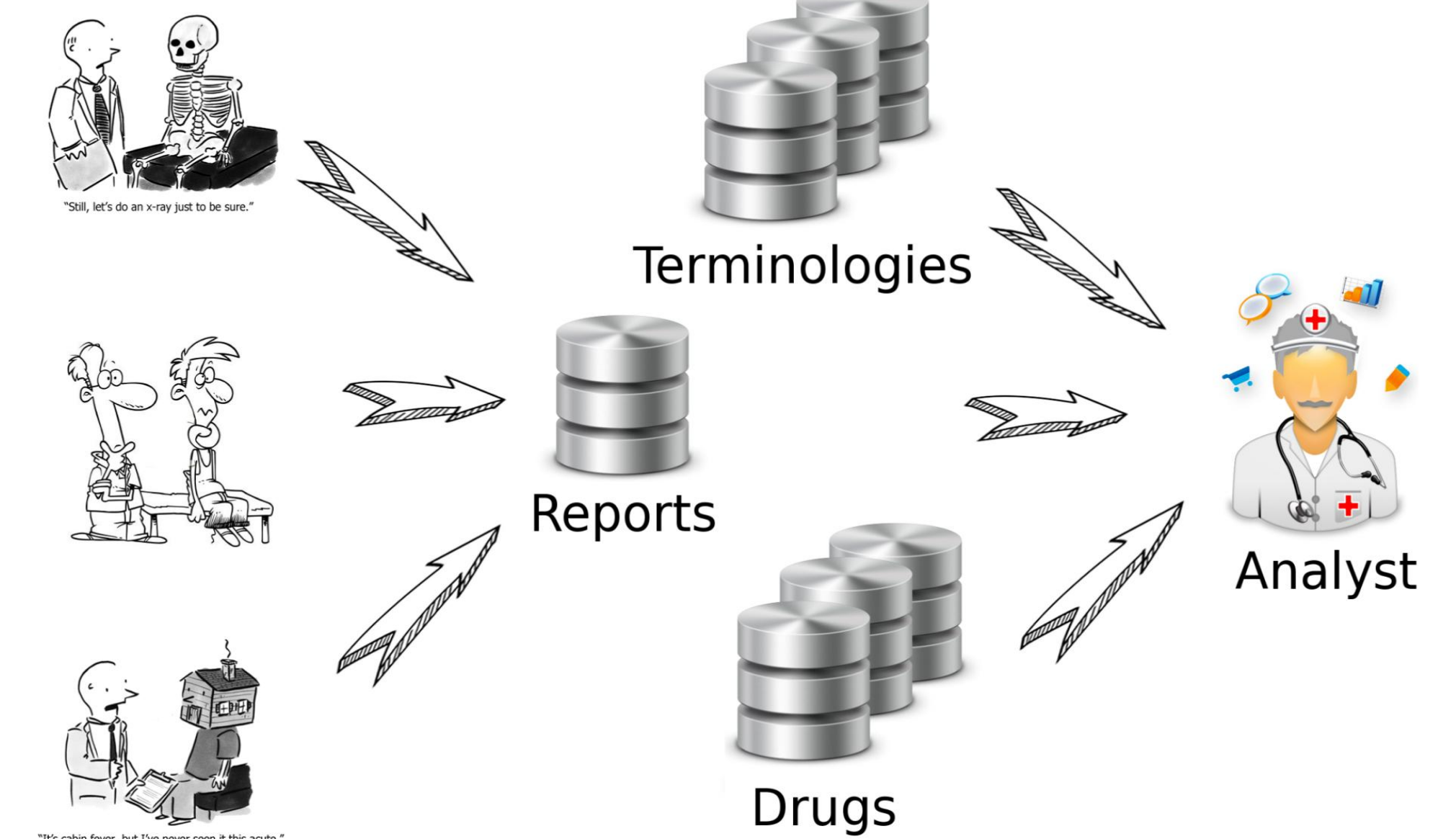
✓ Discovering of **Granular Temporal Trends** in data warehouses by exploiting the hierarchical structure of dimensions in order to find trends of possibly aggregated data. *“Display for each drug, the positive trends in days for each quarter of 2013.”*

Results

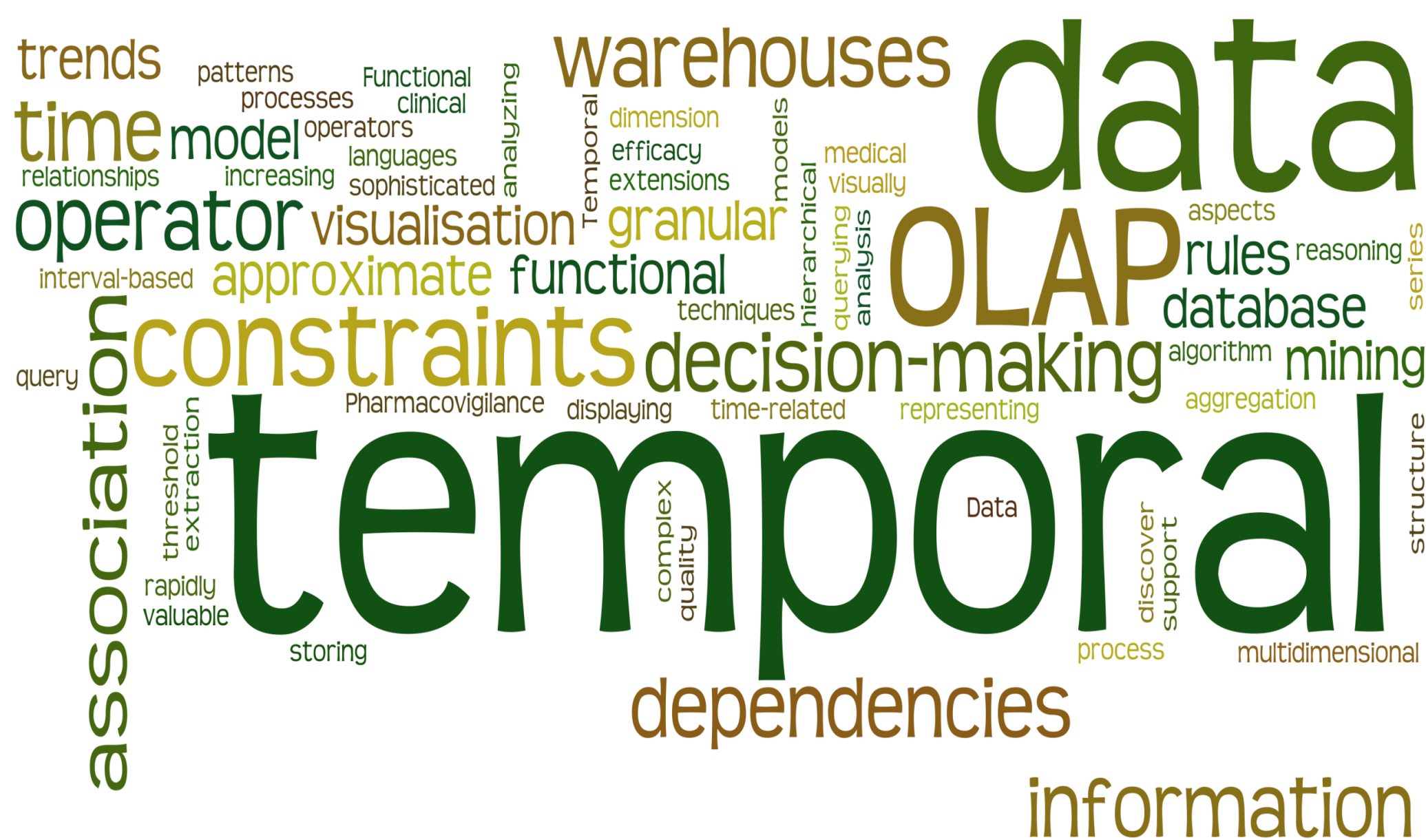


Medical Data

Adverse Reactions



Every poster needs a word cloud



References

- ❖ E. Malinowski and E. Zimányi. *Advanced Data Warehouse Design: From Conventional to Spatial and Temporal Applications*. Springer Publishing Company, Incorporated, 2008
- ❖ R. Lora, A. Sabaini, C. Combi, and U. Moretti. *Designing the Reconciled Schema for a Pharmacovigilance Data Warehouse through a Temporally-enhanced ER Model*. 2012 international workshop on Smart health and wellbeing, New York, NY, USA, 2012. ACM.
- ❖ C. Combi, A. Sabaini. *Extraction, Analysis, and Visualization of Temporal Association Rules from Interval-Based Clinical Data*. AIME 2013, Murcia, Spain. Springer 2013
- ❖ A. Sabaini, E. Zimányi, C. Combi. *An OLAP-based Approach to Modeling and Querying Granular Temporal Trends*. DaWak 2014, Munich, Germany.

Take Home Message

Time dimensions should be used not only for keeping track of changes, but also to enhance users’ capabilities for performing more in-depth analysis.