Categorizing Uncertainties in the Process of Segmenting and Labeling Time Series Data

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Segmenting and Labeling of Time Series

The segmenting and labeling of multivariate time series data is applied in different domains, e.g., activity recognition or sensor states. This involves several steps of (pre-) processing, segmenting, and labeling of time intervals, and visually exploring the results as well as iteratively refining the parameters for all the processing steps. Within these processes different uncertainties are involved and relevant.

Uncertainty Categories

Uncertainty types involved in the process of segmenting and labeling multivariate time series data [1]. The figure shows the relation between uncertainties and process steps. The vicinity of the uncertainties to the corresponding steps imply where they are generated in and which they influence, e.g., value uncertainties are coming from the input time series or generated by data processing.

Categories in Detail

Value Uncertainty

Data Uncertainty

(Pre-) Processing Uncertainty

Result Uncertainty

Label Uncertainty

Time Interval Uncertainty

(Cause &) Effect Uncertainty

Summary

Allow identification of involved uncertainties in the process
Support specification of metrics to communicate uncertainties
Help designing uncertainty representations within the process and adapt visualizations reflecting the user's tasks adequately

References: