On Measuring Inconsistency in Graph Databases with Regular Path Constraints (Abstract Reprint)

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Abstract

Real-world data are often inconsistent. Although a substantial amount of research has been done on measuring inconsistency, this research concentrated on knowledge bases formalized in propositional logic. Recently, inconsistency measures have been introduced for relational databases. However, nowadays, real-world information is always more frequently represented by graph-based structures which offer a more intuitive conceptualization than relational ones. In this paper, we explore inconsistency measures for graph databases with regular path constraints, a class of integrity constraints based on a well-known navigational language for graph data. In this context, we define several inconsistency measures dealing with specific elements contributing to inconsistency in graph databases. We also define some rationality postulates that are desirable properties for an inconsistency measure for graph databases. We analyze the compliance of each measure with each postulate and find various degrees of satisfaction; in fact, one of the measures satisfies all the postulates. Finally, we investigate the data and combined complexity of the calculation of all the measures as well as the complexity of deciding whether a measure is lower than, equal to, or greater than a given threshold. It turns out that for a majority of the measures these problems are tractable, while for the other different levels of intractability are exhibited.

References

[Grant and Parisi, 2024] John Grant and Francesco Parisi. On measuring inconsistency in graph databases with regular path constraints. *Artificial Intelligence*, 335:104197, 2024.