Visualization of Structural Types in Document Databases

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1 Introduction

The main objective of this work is the design and implementation of an effective and intuitive visualization approach for exploration of the structural composition of document databases, specifically *MongoDB*. The method proposed in this study focuses on the identification of structural types in document databases, their visualization, and analysis of the frequency of their occurrence in the studied collection.

2 Method

A structural type of a document is defined as a unique set of key:data type pairs, where each pair consists of a key and the data type of the value associated with that key.
The tool processes database documents, groups them according to their structures, counts the frequency of each type, and presents the results using visual cards and frequency charts.

3 Results

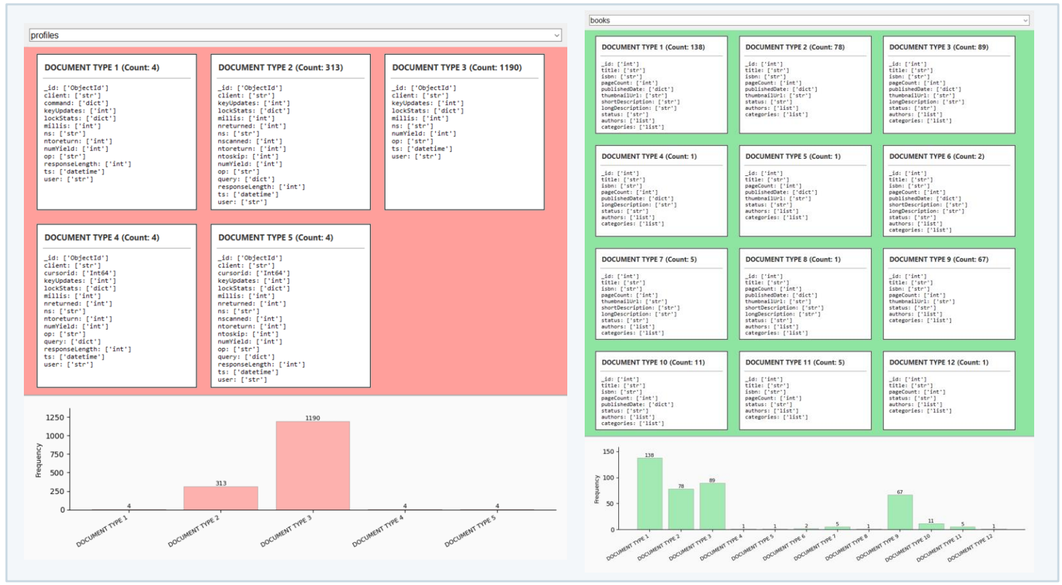


Figure 1. Visualization of structural types in benchmarking databases.

Efficient and intuitive exploration of heterogeneous document structures.

Table I. Comparison of *MongoDB Compass* and the proposed approach.

Criterion	MongoDB Compass	Proposed approach
Time (seconds)	$t \times n$	1
Number of actions	$3{\times}n{-}1$	$m{+}1$
Automatic identification of structural types	×	✓
Visualization	×	✓
Native tool	✓	×

4 Conclusions

The proposed approach enables users to create clear and intuitive visualizations of document structures regardless of the size and structural complexity of the database.
Compared with the commonly used *MongoDB Compass* application, the proposed approach provides a clearer, more flexible, and more efficient means of visualizing document structures.
Future work includes directly detecting data anomalies, identifying patterns, and providing recommendations for data optimization.

Available at: *pypi.org/project/DDSTAV*

Design and implementation of novel structure-type focused visualization method for document databases.

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