Search Engine

ULPGC

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Big Data

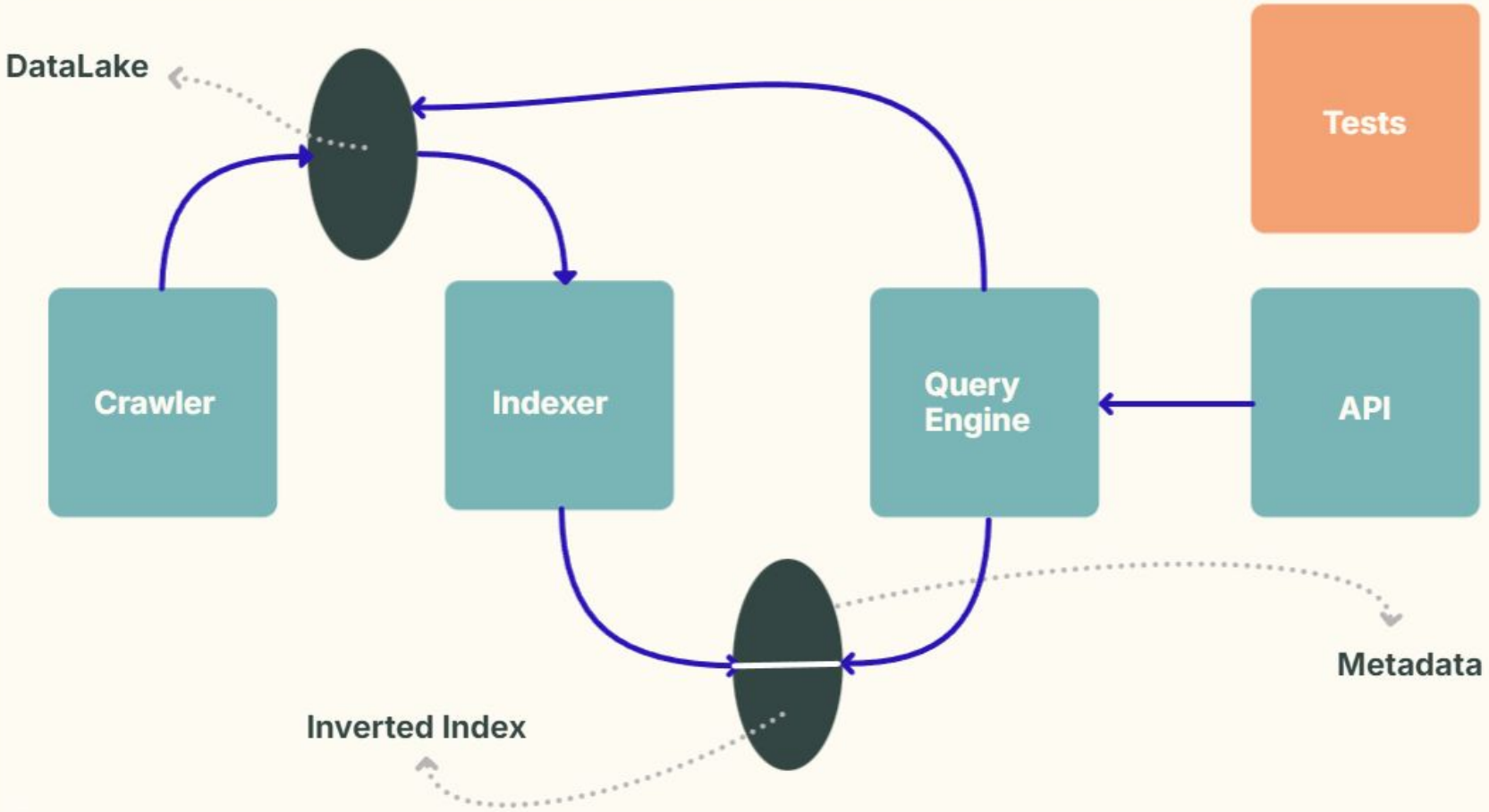
October 2024

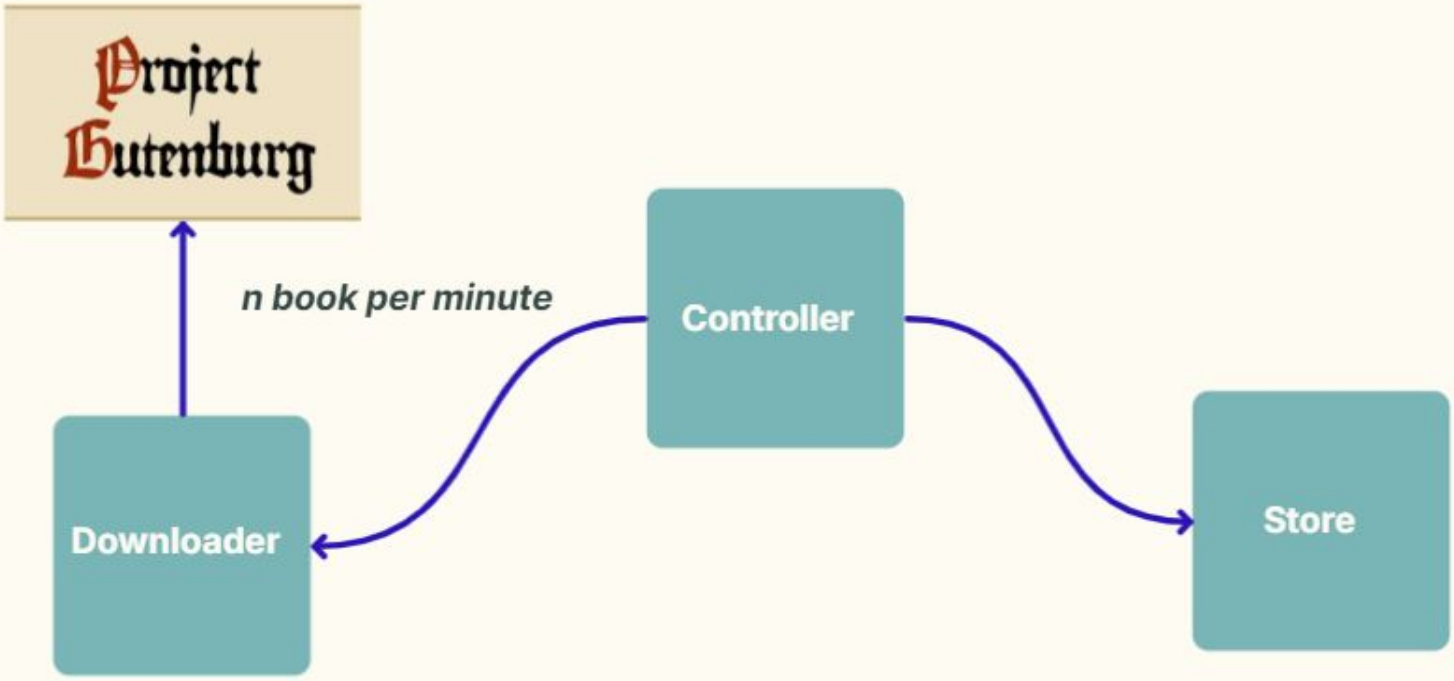
Data Science and Engineering

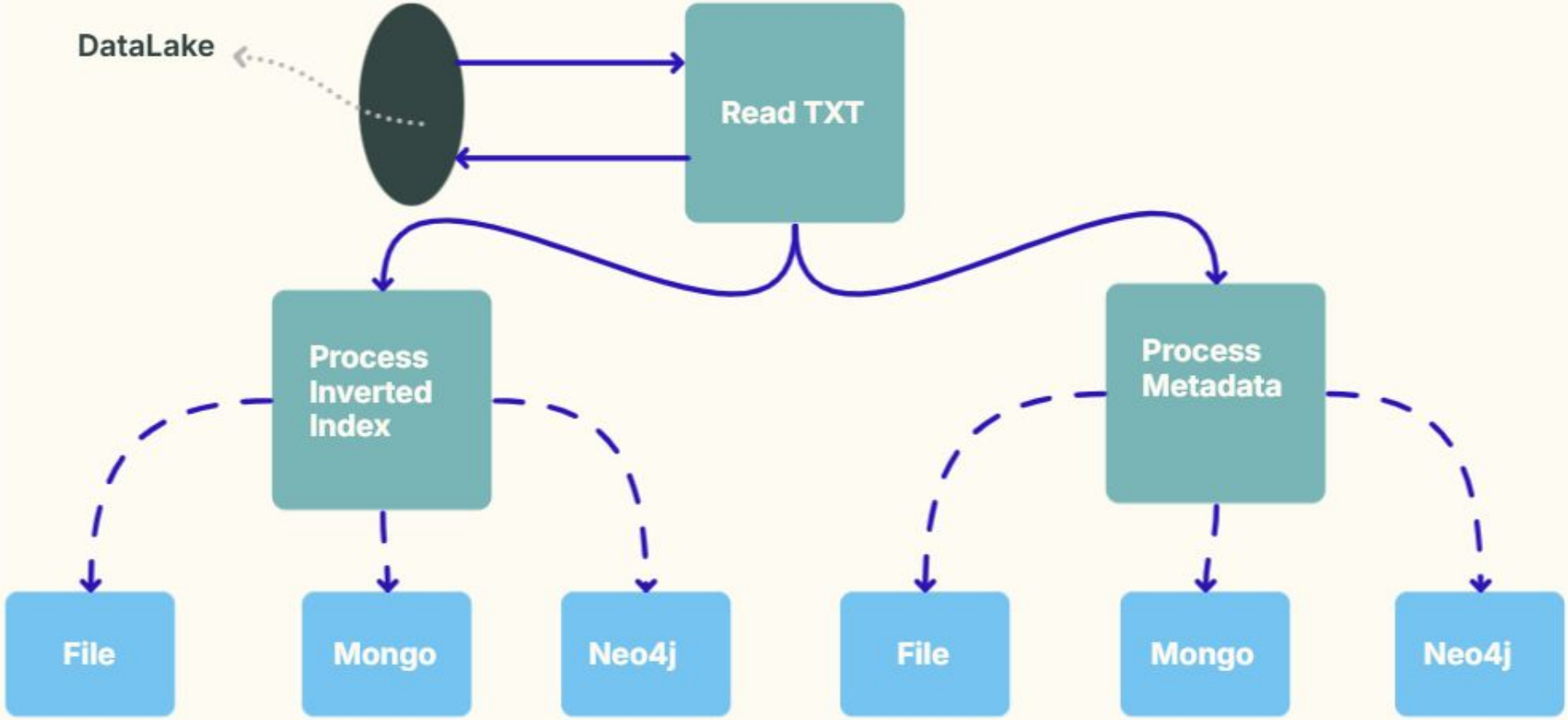
Index

A powerful book search engine designed to optimize performance and handle large datasets efficiently using cutting-edge data structures.

- **Performance Optimization**
  - We implemented improvements in query handling, enabling faster search in large data volumes
- **Appropriate Data Structures**
  - By comparing File System, MongoDB, and Neo4j, we selected the most efficient structure for each type of query (inverted index vs. metadata)
- **Modular Design with SOLID Principles**
  - By comparing File System, MongoDB, and Neo4j, we selected the most efficient structure for each type of query (inverted index vs. metadata)
- **Extensive Testing**
  - We conducted performance tests to identify bottlenecks and optimize processing and query times
- **Enhanced User Experience**
  - We developed a user-friendly and intuitive interface, improving the interaction with queries and results


DataLake
Tests
Crawler
Indexer
Query Engine
API
Metadata
Inverted Index


Project Gutenburg
n book per minute
Controller
Downloader
Store

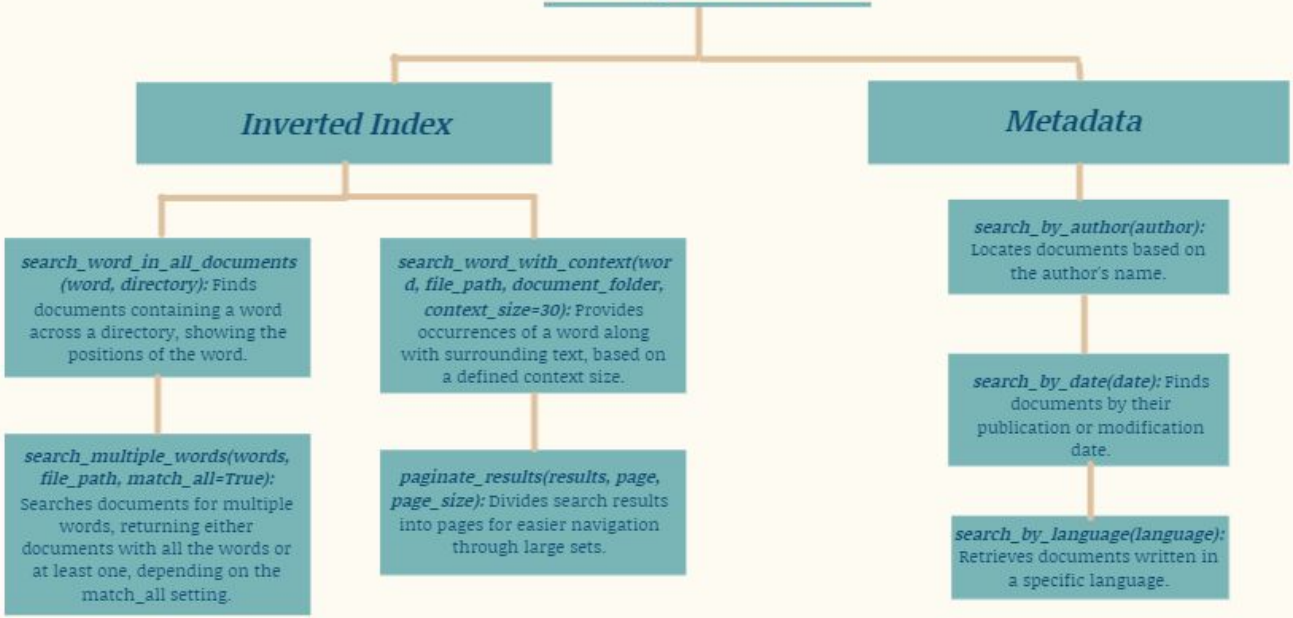

DataLake
Read TXT
Process Inverted Index
Process Metadata
File
Mongo
Neo4j
File
Mongo
Neo4j

File System

Mongo DB

Neo4j

Query Module



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                    2513
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                2298,
                2513
            ],
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        ]
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}
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                        2513
                    ],
                    8
                ]
            ]
        }
    ]
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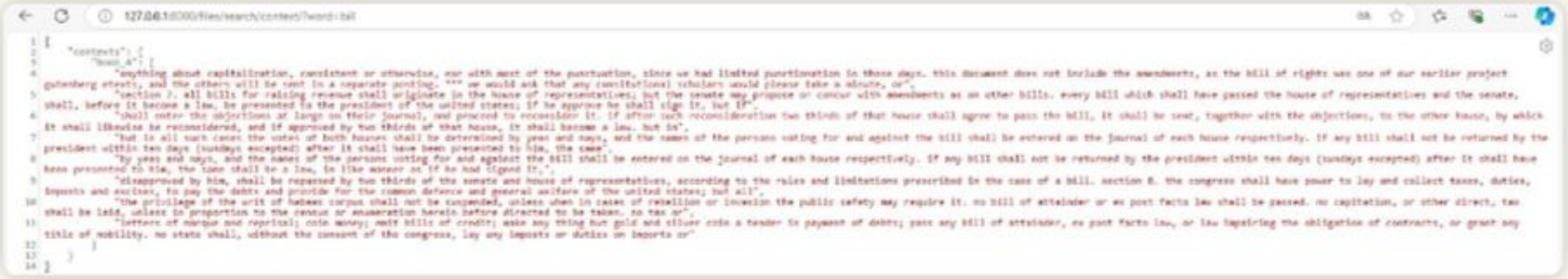
127.0.0.1:8000/files/search/context/?word=bill
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"book_4": [
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"section 7. all bills for raising revenue shall originate in the house of representatives; but the senate may propose or concur with amendments as on other bills. every bill which shall have passed the house of representatives and the senate, shall, before it become a law, be presented to the president of the united states; if he approve he shall sign it, but if",
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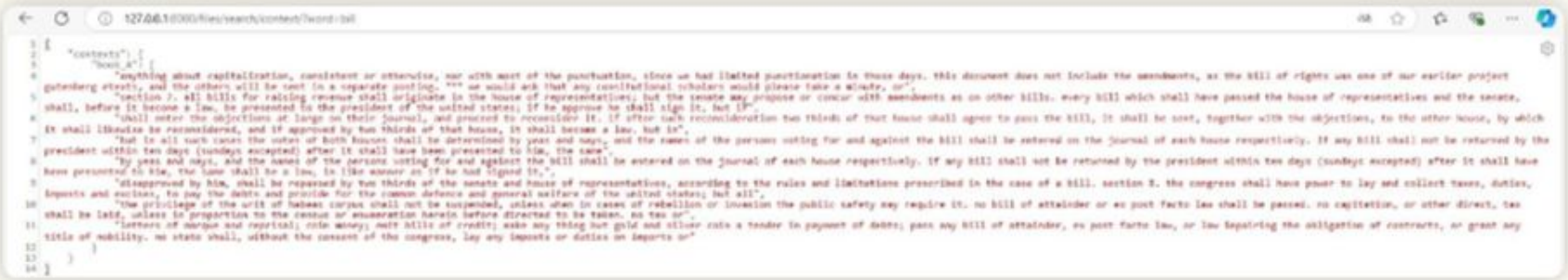
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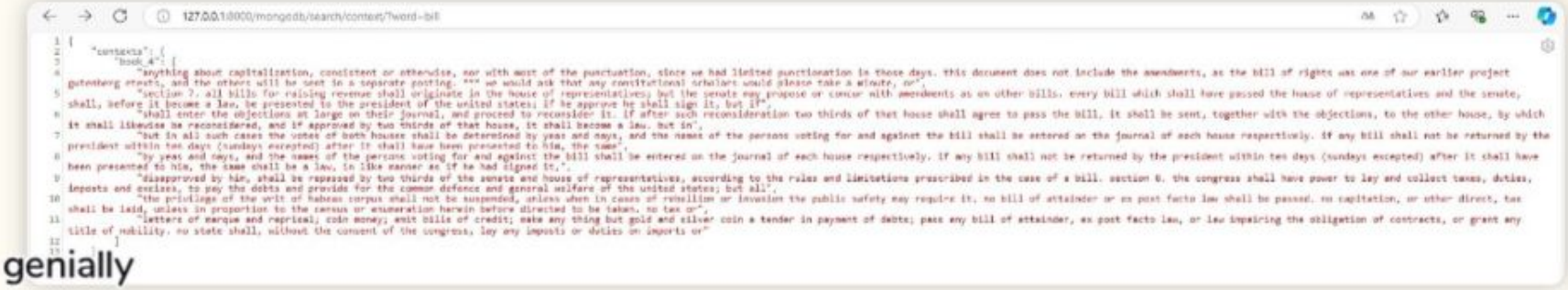
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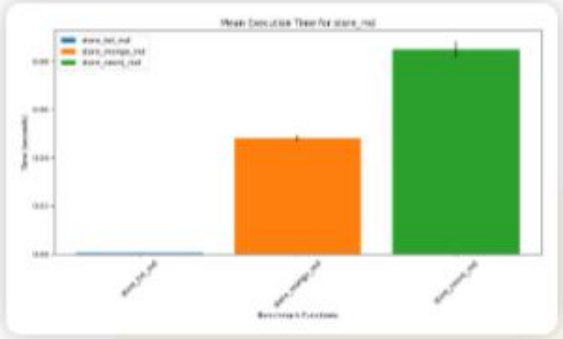
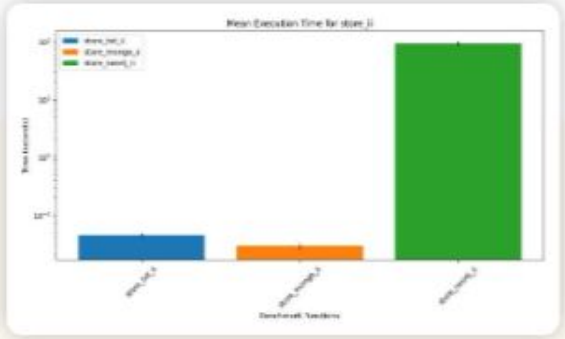
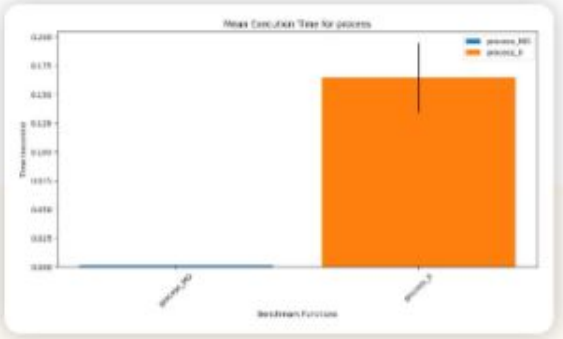
Time Results



Graph 1

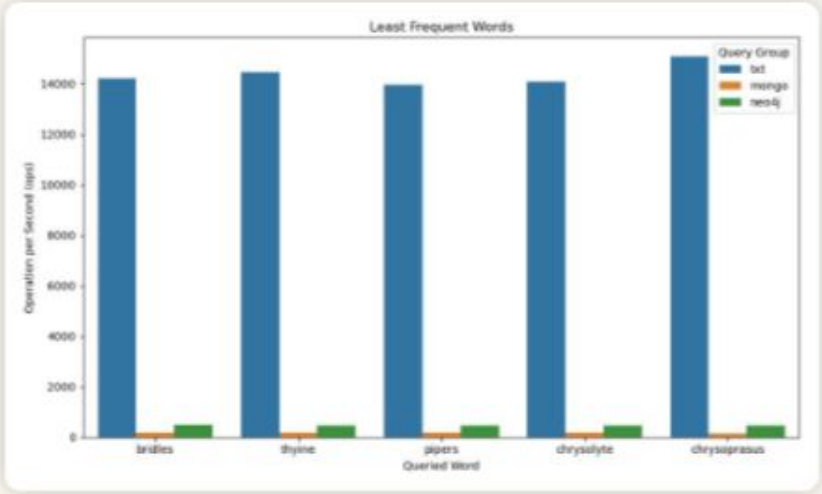


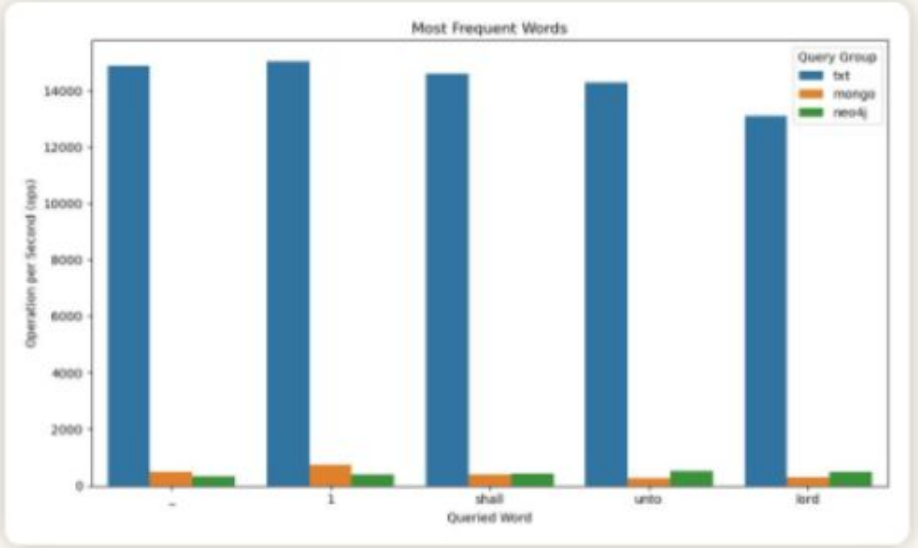
Graph 2



Graph 3

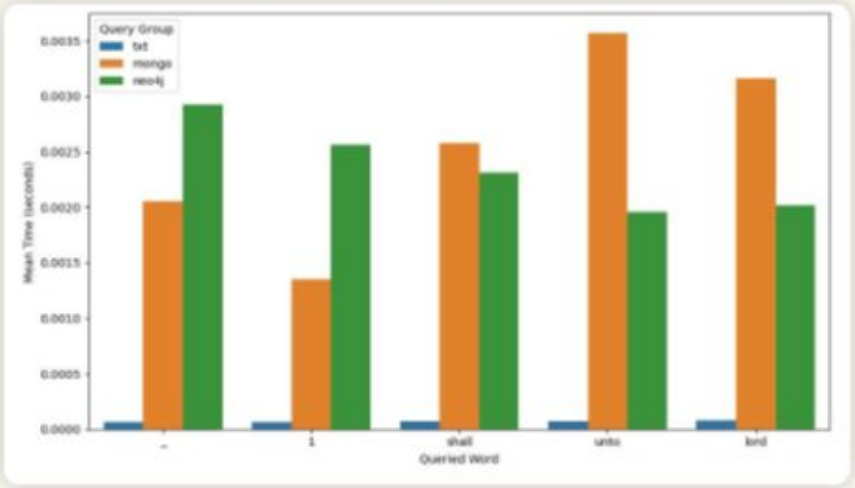
Least Frequent Words

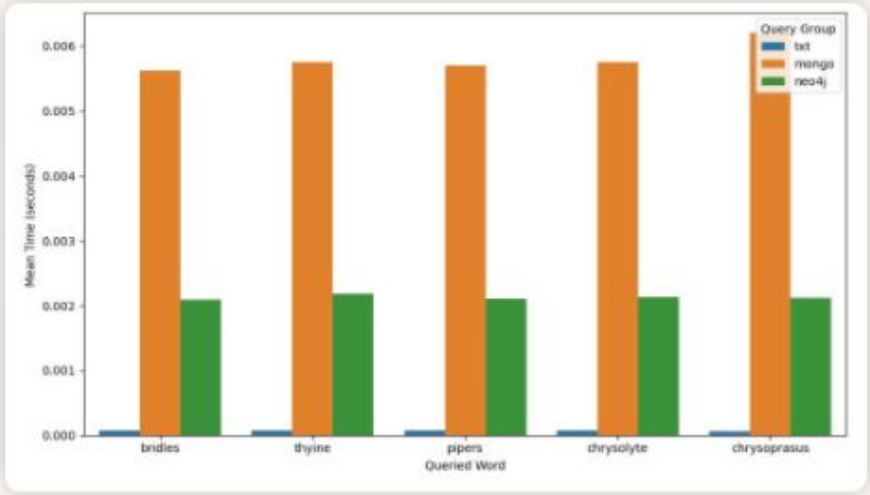




Most Frequent Words

Most Frequent Words





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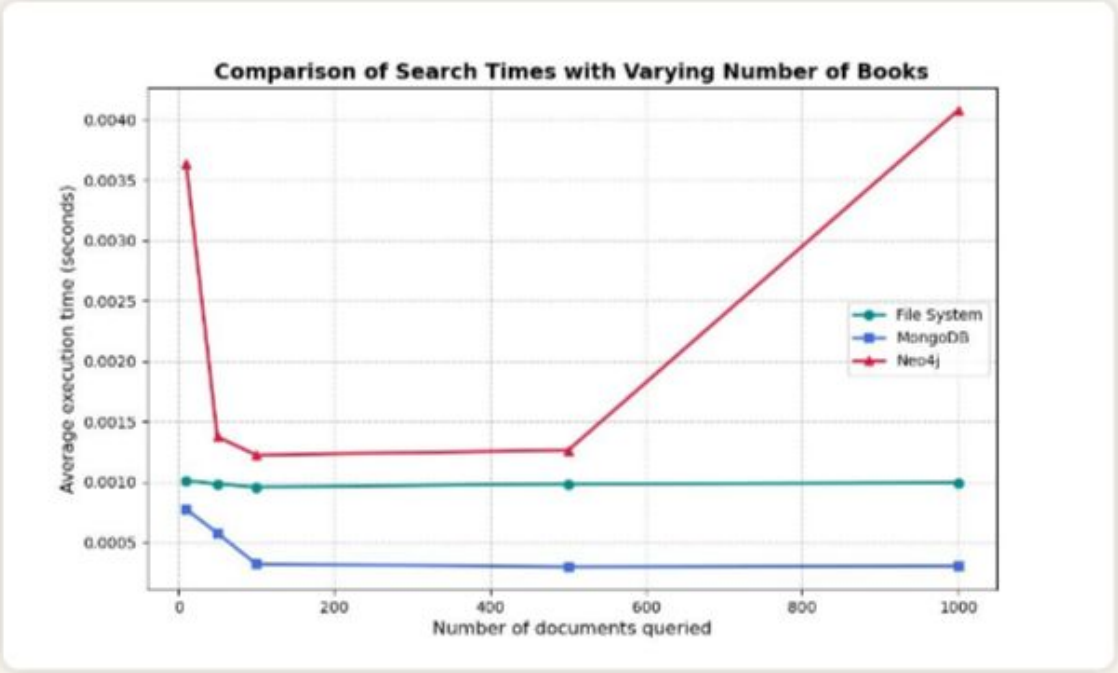

Search Scalability

Performance Differences

Metadata Processing Eficiency

Scalability with Increased Data

- **Java**
  Implementing the system in Java to improve performance and better follow SOLID principles.
- **Docker**
  Using Docker to streamline deployment, ensure consistency, and enable easier scaling.
- **Creating the UI**
  Creating a UI will make the application more user-friendly.
- **Context Query**
  Enhancing the context query feature to make it more user-friendly and intuitive, similar to Google's search results.

Thank You