The Design of Experimental Performance Analysis and Visualization System

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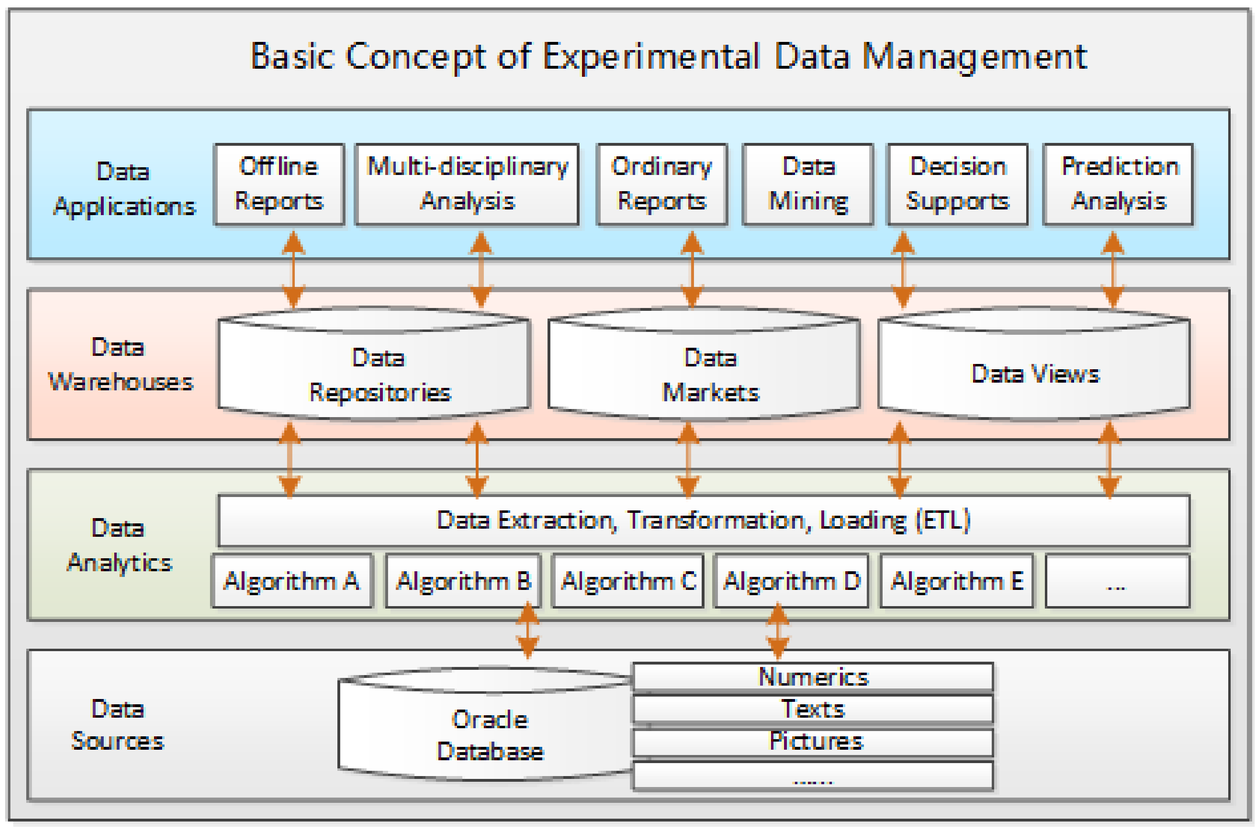
Problems & Motivations

- For some raw data in the database, due to their data formats, the extraction of useful information is a time-consuming task. It greatly affects the efficiency of data utilization.
- The previous products of data analysis and visualization programs mostly utilize the C/S framework, so that each data analysis and visualization program is only applied in a narrow user range. The degree of information sharing is quite low.
- Different scientists analyze the experiment data from different backgrounds and views, which results in different data integration patterns, different analysis algorithms, and different data visualization forms. This leads to meaningless repetitions of manpower development, and a large amount of meaningless maintaining jobs.

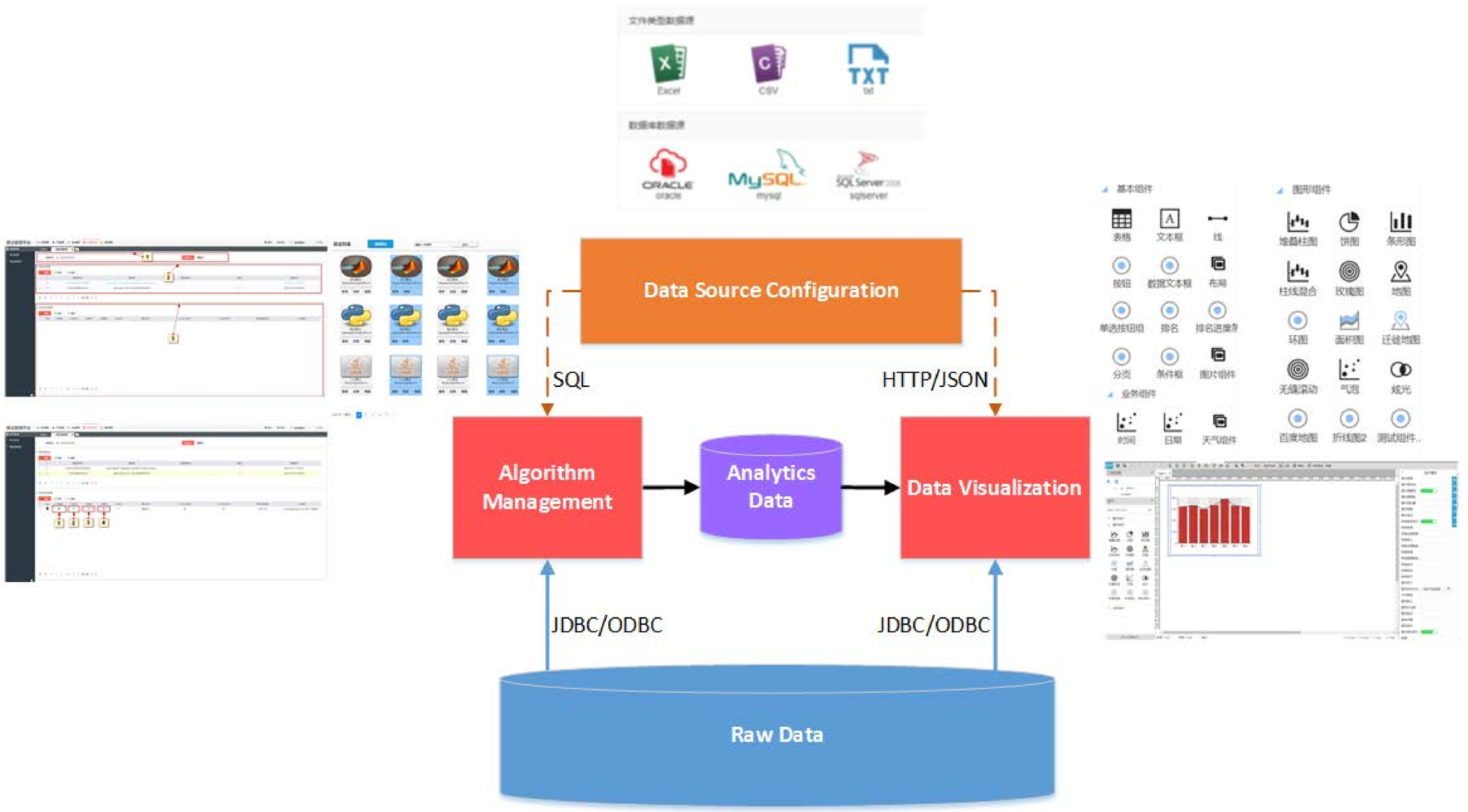
Our Work

- A unified data management scheme is designed;
- A web-based experimental performance analysis and visualization system is further realized.

Basic Concept of Data Management



System Architecture



Main Components

Data source configuration component

The component of data source configuration mainly defines the data correlated to the input of analytics algorithms and data visualization. It covers a wide range, including files and databases.

Algorithm management component

The motivation behind this component is that: different scientists analyze the experiment data from different backgrounds and views, using different computation tools; we expect to provide this algorithm management platform, such that different analysis computation environments can be integrated and run their functions under this unified framework. Hence we just concern the data deliveries and transfers, while the data process funtionalities are implemented by physical scientists who are more professional than us.

What's more, this platform also enables the validation of some immature algorithms. This will greatly help some theoretical analysis researches.

Data visualization component

The component of data visualization reuses a commercial product, which provides the basic graphical dashboards and the editing functionality.

All visualization systems are web-available.

Conclusion

We designed a unified data management scheme; on this basis, a web-based experimental performance analysis and visualization system is further realized. This system is under commissioning at the high power laser facility in Mianyang, supporting the analysis and visualization of experimental performance.

Our future work is to implement the graphycal user interfaces of algorithm data input definitions, and the integration of more databases and computation environments.