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A flexible web visualization framework for nuclear fusion experiment data

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As the fusion experiment goes to steady state and more sophisticated diagnoses are developed, the experiment data becomes larger and collaboration between researchers tends to be more frequent. So a well-designed flexible and easy to use web visualization framework is becoming more important.

The new web visualization framework is designed and implemented based on ASP.NET MVC framework. It is part of the JCDB project, which is a database cloud for J-TEXT based on Cassandra,. In JCDB data are stored in form of matrix and can be read and written efficiently with cursor and writer. MongoDB is used to store data structure. Models are designed to works with the JCDB backend.

In the controller, we design a RESTful web API which allows users to access and operate data through HTTP after authorized. For GRUD data operation, we provide actions with get, post, put and delete method. For large data transmission, the stream action and binary serialization can be chosen to reduce the network overhead and improve the performance.

In the view layer, we adopt a modular interface which is flexible and highly user oriented. The tree module can present the whole experiment channel in the lazy loading way and allow users to design their experiment data structure. The visualization modules are responsible for data visualization for different channels. Different visualization modules are chosen automatically for different types of data. And users can save or share the setup anytime they like because the URL for the page keeps in sync with the page content and layout. Furthermore, all the modern browsers in intelligent terminals with different size are supported.

This data visualization framework has been deployed and integrated in LogBook, which is a web system for experiment data management and visualization. The delay is usually small and the user experience is much better than that in traditional data visualization tool used in fusion community. With this web visualization tool, the researchers can visualize and analysis the experiment data wherever the Internet covers, and can save and share their experiment data more easily and efficiently.

Eligible for student paper award?

Yes

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