§3. Overview of the Improvements of Data Analysis Environment

Emoto, M., Yoshinuma, M., Ida, K., Moon, C. (Max Planck Institute for Plasmaphysik)

The authors have been developing user-friendly environment to analyze the LHD experimental data¹⁾. On this purpose, myView2, a python-based data visualization tool has been developed²). MyView2 is written in Python to support various platform, and currently it can run on Windows, MacOS, and Linux. Therefore, the visitors of NIFS can begin to analyze the experimental data using their own PC soon after their visit. Also, myView2 adopts modular structures, for example, it uses data loader modules that loads specific experimental data to visualize. Last year, 44 new data modules are added to the myView2, and totally, 162 data modules are available now. However, for the visitors, it is difficult to find the data they want. In order to find the data easily, the web page was provided to search for the summary information of the registered data. In this web page, they can learn what kind of data are registered, and download the data by the browsers (Fig 2). Furthermore, in order to use myView2 from their laboratory, the author improved the cache behaviors and network error handling, and reduced the frustrations when they use the slow network connections from abroad.

The physical data of the LHD experiment is provided by the Analyzed Data Server. There is dependency among these data. For example, if the equilibrium data is updated, all the physical data based on the effective radius, such as the electron temperature distribution, must be recalculated. To keep the consistency, AutoAna has been developed. When a physical data is registered into the analyzed data server, AutoAna begins calculation programs to register the dependent data automatically. It is often the case that all the data acquired in one season is updated because of the calibration factor is changed. In such a case, tens of thousands data must be recalculated. To enhance the calculation speed, 12 calculation servers are prepared for calculation. The calculations are executed at once, and the number of calculation processes executed at the same time becomes more than 100. At that time, the network becomes bottleneck of the calculation. For example, the average size of the magnetic field geometry data is about 73 MB/shot, and this data is required to calculate NBI beam attenuation. Therefore, when the number of the processes is more than 100, the total amount of data passing between the Analyzed Data Server and the calculation servers becomes serval GB at one time. In order to resolve this bottleneck, the network infrastructure was improved. The speed of the network connecting the Analyzed Data Server and the calculation servers had been 1Gbps, but it was replaced with 10Gbps network.

By several reasons, AutoAna fails to register the dependent data into the Analyzed Data Server, for example,

by lacks of the necessary data or by bugs of the calculation programs. In order to see the AutoAna status, the web interface has been developed. Using the interface, they can see the registration status and the log files in detail by the web browsers.



Fig. 1. MyView2, a flexible data viewer. It is written by python language, and it can run on Windows, MacOS, and Linux.

		10 - 00 / E			5 O.B.	×
Search for Reg	istered Data X +					
🕈 🔅 egdb	Ind.nds.ac.jp/dataexplog/registere	ed_data.html	C 9.00	2004401280		=
		Sea	arch for I	Registered Data		
			9			- 1
	EXP Cycle #: 18 - Shot	number :	124627 ~	131066 Max lines : 1000 Hide if no data : D find		- 11
	Degroates	Total	Owner	Comment		- 11
	UNDGAUSS_TSMESH_RAY	4003	Errota Malahko	<u>^</u>		- 11
	LID_OF	6378	Sakakbara Satoru			- 11
	MECH_ECE	742	ECE Group	Modulation ECH analysis by ECE radiometer		- 11
	RF_Spec_broad	6440	Akiyama Tsuyoshi	RE Spectrometer Broad band frequency		- 11
	🗹 autora	45				- 11
	ber90	1	Ohno Makote			- 11
	D bob	6266	Peterson Byron	Total radiated power measured by wide angle metal foll resetive bolomer		- 84
	C co2_NL	4261	Tanaka Kerdi			- 11
	Co2_nebar_monitor	5121	Funaba Hisamichi	meniter of average density by CO2 laser interferometer		
	Colsonality	1				
	da_fao	1525	CCS Group	Integration of NB Profile on the lines of shigt for cold.		
	C ca_carbana	2811	Emoto Masahiko			
	Cit_carbon7	2969	Emoto Masahiko			
	🗆 ostté	5484	Emoto Masahiko			
	C coct7	5404		time evolution of polynomial fitting coefficients for Ti profile from comap		
	oct6	2				
	CI comeo3	2760				
	Comeol_denity	1519	COS Group			
	The second	C164				

Fig. 2. A web interface to search or retrieve the registered data into the Analyzed Data Server.

M. Emoto, to al. : Fus. Eng. Des., in press.
C. Moon et al.: Fus. Eng. Des. 104, 56 (2016).