



Design of RFI Monitoring Data Analysis and Evaluation Software for the Ali Observatory

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The Ali Observatory is located at the Tibet plateau with the altitude above 5000 meters [1]. Several optical and radio telescopes have been constructed or planned at the site. In order to measure the local radio environment, a Radio Frequency Interference (RFI) monitoring system working in the bands of 100 MHz to 20 GHz has been installed at the site recently [2]. Based on this monitoring system, a software for the data analysis and evaluation has been designed. The software is proposed to achieve efficient processing and storage of the monitoring data, obtain the characteristics of RFI signals, and evaluate the radio environment of the site, which will support the scientific observations of local radio telescopes.

The technical requirements of the RFI monitoring data analysis and evaluation software are presented below. The software should have a management and user interface, which will provide role-based data browsing, retrieval, processing, and visualization. The functions the software are planned to include data access and storage module, data analysis and display module, interference signal identification module, historical data query module, data replay module, data statistical and analysis module, log management module, and platform framework.

For the design of the software, a layered method is adopted. According to the software development standards and specifications, the software architecture is constructed with display layer, interface layer, core business layer and resource layer, as well as security system, maintenance system and standardization. The software is developed by using VS Code and Vue. Meanwhile, Echarts is implemented for visualization. The user-friendly and intuitive interfaces with multi-graph displays are prioritized, which will ensure that the operation remains consistent with common commercial software. In addition, the associated database system is designed to manage the information of monitoring plans, signal samples, interference markers, user permissions and system logs.

The preliminary development of the software has been finished. With the recent practical data of RFI monitoring system at the Ali Observatory, the validity of the software has been assessed. The subsequent feedback on the trial use is being collected and analyzed to further enhance and refine the software's functionality and user experience.

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References

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