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Research on Anomaly Detection Technology for Raw Data Transmission Performance of JUNO Experiment

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The JUNO Experiment officially started data acquisition at the end of 2024, producing approximately 8TB of raw data daily, all of which must be transmitted to the offline computing platform in Beijing in real time. Nevertheless, in production, during data transmission, unstable transmission performance may occur, and existing monitoring methods cannot quickly identify the root causes. Therefore, there is an urgent need to develop a system capable of rapidly locating issues affecting raw data transmission performance. This report proposes a network performance anomaly detection method for high-energy physics raw data transmission. Through network session collection, collation, and analysis, an anomaly detection model based on ensemble attention and temporal memory identifies abnormal sessions. Combined with the iterative in-depth analysis method and IHEP's OpenDrSai, an intelligent agent for network anomaly classification is implemented. Experiments show that this method can achieve accurate identification and diagnosis of network performance issues in JUNO's raw data transmission.

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