

Efficient identification of abnormalities in power distribution data

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The reliability and security of power distribution systems is a critical infrastructure issue that can affect the lives of many people when compromised. Research in the *International Journal of Power and Energy Conversion* looks at how the gSpan method for screening data sets can be used to ensure power security.

Keyan Liu of the China Electric Power Research Institute and Hui Zhou of the School of Electrical Engineering at Beijing Jiaotong University both in Haidian District, Beijing, China, have proposed a new method for detecting abnormal data in digital power distribution devices. Their approach utilizes the gSpan algorithm and a cloud computing platform. By combining fuzzy association rules to collect abnormal data and wavelet threshold denoising to clean and prepare the data. The researchers explain that they then use the gSpan algorithm to screen the processed data and to extract strong correlations for secondary screening to give them the final results.

The gSpan algorithm is a graph-based algorithm commonly used in pattern mining and structured data analysis. It can detect irregular, unexpected, and incomplete patterns in a data set. Fuzzy association rules allow uncertain and imprecise information to be processed, while wavelet threshold denoising improves data accuracy by boosting the signal-to-[noise ratio](#).

Proof of principle tests have shown the approach to have a minimum screening time of 6.2 seconds and an [error rate](#) of less than 0.2%, it also demonstrates a low rate of missing data. Overall, the team suggests that their approach offers a faster and more accurate means of detecting abnormal data in [power](#) distribution devices. The approach improves on the length of time that is often needed with traditional methods to screen for abnormal data, it reduces the number of errors, and cuts the rate of missed data. The next step will be to improve the data-processing capacity of the approach while ensuring data-screening efficiency is

maintained.

More information: Keyan Liu et al, An abnormal data screening method of digital power distribution device based on gSpan, *International Journal of Power and Energy Conversion* (2022). [DOI: 10.1504/IJPEC.2022.10052104](https://doi.org/10.1504/IJPEC.2022.10052104)

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