

FaultNet: A Deep-Learning Framework for Data-Gap Analysis

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Each year, National Data Centers (NDCs) experience thousands of data gaps, often requiring human intervention to restore timely data. Understanding the source of these gaps is critical for maintaining mission capabilities. To address this, we present a three-tiered framework for real-time automated data-gap analysis: First, we present an Internet of Things (IoT)-based equipment suite, providing low-overhead status-of-health (SOH) monitoring capabilities at every instrument. We next describe an open-source infrastructure monitoring tool capable of collecting and trending the SOH-streams in real-time. Finally, we present FaultNet, a deep neural network algorithm that analyzes the raw SOH streams and produces a probabilistic model for source-fault analysis. Deep Neural Network-based analysis is currently responsible for revolutionary advances in equipment maintainability, and the FaultNet framework has the potential to both reduce outage response-time for NDCs, and improve data availability at the IDC.

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