Artificial Intelligence-based Power Oscillation Source Location Detection for Power System Stability

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Abstract:
Reliability and resiliency of the power grid have become preeminent issues, as even a small interruption within the power system can cause stress to the intra-grid or interconnected grid, thereby resulting in power oscillations and/or system instability. Conventional control and protection schemas, for many cases, have been insufficient to detect and resolve power system issues, such as low frequency oscillations (LFOs), due to the small signals involved; these weak signals require a high-resolution telemetry data detection capability (along with the ability to detect for harmonics, interharmonics, and/or subharmonics). As conventional methods do not suffice, a stochastic subspace identification (SSI) methodology was utilized to achieve the requisite identification accuracy of the oscillation modal for the oscillation detection algorithm.

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