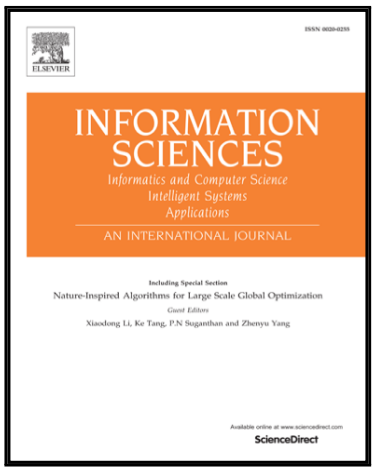

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Abstract

In this paper, we discuss the main scientific aspects of a Multi-Agent System (MAS), which was designed for monitoring Smart Grids (SGs) with assessment of optimal settings obtained through approximate Optimal Power Flow (OPF) solutions. The consideration behind the approach is that large historical operation data-sets are usually available in SGs and employed to extract useful information; besides, such datasets are also expected to grow over and over because of the pervasive deployment of SGs sensors. So we use Fuzzy transform in order to respond to two issues, that is first to reduce the storage need, by compressing the historical datasets, and second to provide agents with fast and reliable actions to get accurate OPF solutions, by a similarity search throughout the compressed historical dataset. A formal discussion on properties involved by the application of the method is afforded. Numerical results, obtained both on small and large-scale power systems, support the theoretical achievements, by showing the effectiveness of the proposed

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