

Stephen Cranefield
Insu Song (Eds.)

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5 Conclusion and Future Work

Applying agent and multi-agent techniques on power networks for system modelling and simulation has been an active research area in recent years. In this paper, we proposed a multi-agent system to model the power distribution network by considering distributed generations. Five types of agents, i.e., substation agent, bus agent, feeder agent, load agent and generation agent, are introduced and implemented by using JADE. We also introduced a demand management mechanism to help agents dynamically balance the power supply and consumption in the distribution network through agents communication. The simulation result on a case study demonstrated the good performance of the proposed MAS.

Our future work will focus on the investigation of the existing agent and multi-agent techniques in power networks in terms of automatic fault diagnosis, network protection, and network restoration.

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References

1. Baran, M., El-Markabi, I.: A Multiagent-based Dispatching Scheme for Distributed Generators for Voltage Support on Distribution Feeders. *IEEE Transactions on Power Systems* 22(1), 52–59 (2007)
2. Bellifemine, F., Caire, G., Greenwood, D.: *Developing Multi-Agent Systems with JADE*, vol. 5. Wiley (2007)
3. Kodama, J., Hamagami, T., Shinji, H., Tanabe, T., Funabashi, T., Hirata, H.: Multi-agent-based Autonomous Power Distribution Network Restoration Using Contract Net Protocol. *Electrical Engineering in Japan* 166(4), 56–63 (2009)
4. Lin, C., Chen, C., Ku, T., Tsai, C., Ho, C.: A Multiagent-Based Distribution Automation System for Service Restoration of Fault Contingencies. *European Transactions on Electrical Power* 21(1), 239–253 (2011)
5. McArthur, S., Davidson, E., Catterson, V., Dimeas, A., Hatziargyriou, N., Ponci, F., Funabashi, T.: Multi-Agent Systems for Power Engineering Applications—Part I: Concepts, Approaches, and Technical Challenges. *IEEE Transactions on Power Systems* 22(4), 1743–1752 (2007)
6. Nagata, T., Fujita, H., Sasaki, H.: Decentralized Approach to Normal Operations for Power System Network. In: 13th Int. Conf. on Intelligent Systems Application to Power Systems, pp. 407–412 (2005)
7. Nagata, T., Tao, Y., Sasaki, H., Fujita, H.: A Multiagent Approach to Distribution System Restoration. *Electrical Engineering in Japan* 152(3), 21–28 (2005)
8. Nordman, M., Lehtonen, M.: An Agent Concept for Managing Electrical Distribution Networks. *IEEE Transactions on Power Delivery* 20(2 Part 1), 696–703 (2005)
9. Nordman, M., Lehtonen, M.: Distributed Agent-Based State Estimation for Electrical Distribution Networks. *IEEE Transactions on Power Systems* 20(2), 652–658 (2005)
10. Pipattanasomporn, M., Feroze, H., Rahman, S.: Multi-Agent Systems in A Distributed Smart Grid: Design and implementation. In: *Power Systems Conference and Exposition*, pp. 1–8 (2009)
11. Solanki, J., Khushalani, S., Schulz, N.: A Multi-Agent Solution to Distribution Systems Restoration. *IEEE Transactions on Power Systems* 22(3), 1026–1034 (2007)

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