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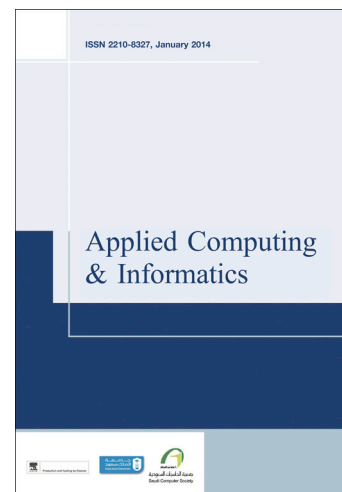
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Ensemble Methods of Classification for Power Systems Security Assessment[☆]

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Abstract

One of the most promising approaches for complex technical systems analysis employs ensemble methods of classification. Ensemble methods enable a reliable decision rules construction for feature space classification in the presence of many possible states of the system. In this paper, the novel techniques based on decision trees are used for evaluation of electric power systems regime's reliability. We proposed the hybrid approach based on random forests models and boosting models. Such techniques can be applied to predict the interaction of increasing renewable power, storage devices and switching of smart loads from intelligent domestic appliances, storage heaters and air-conditioning units and electric vehicles with grid for enhanced decision making. The ensemble classification methods were tested on the modified 118-bus IEEE power system showing that proposed technique can be employed to examine whether the power system is secured under steady-state operating conditions.

Keywords: power system, ensemble methods, boosting, classification, heuristics, random forests, security assessment.

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