



Power Systems Engineering Research Center

Outage Detection from PMU Data

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Description: There has been a steady stream of research lately on using streaming data from PMUs to detect line outages or other anomalies in grid operation in real time. Approaches based on topological modeling, integer programming, and compressed sensing have been proposed, among others. This talk describes machine learning approaches to this problem. A classifier is trained offline to recognize "signatures" of different types of outages, under various operational conditions, so that it can recognize an outage in real time when it occurs. We consider both multiclass logistic regression classifiers and neural network classifiers with one or more hidden layers. We also consider the issue of placing PMUs at locations in the grid that optimize the accuracy of the classifier.

Biography: Stephen J. Wright holds the George B. Dantzig Professorship, the Sheldon Lubar Chair, and the Amar and Balinder Sohi Professorship of Computer Sciences at the University of Wisconsin-Madison. His research is in computational optimization and its applications to many areas of science and engineering. Prior to joining UW-Madison in 2001, Wright held positions at North Carolina State University (1986-90), Argonne National Laboratory (1990-2001), and a Professor at the University of Chicago (2000-2001). He has served as Chair of the Mathematical Optimization Society and as a Trustee of SIAM. He is a Fellow of SIAM. In 2014, he won the W.R.G. Baker award from IEEE. Wright is the author / coauthor of widely used text / reference books in optimization including "Primal Dual Interior-Point Methods" and "Numerical Optimization". He has published widely on optimization theory, algorithms, software, and applications. Wright is current editor-in-chief of the SIAM Journal on Optimization and previously served as editor-in-chief or associate editor of Mathematical Programming (Series A), Mathematical Programming (Series B), SIAM Review, SIAM Journal on Scientific Computing, and several other journals and book series.