

*Applied Artificial Intelligence in Energy:
Challenges and Solutions*

Miltos Alamaniotis

**Assistant Professor of Electrical and Computer Engineering
University of Texas at San Antonio**

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Abstract

Recent advancements in intelligent systems aim to address challenges in diverse but related critical areas of energy engineering such as power system safety and nuclear energy security. The data generated in these applications increases exponentially due to the penetration of modern information technologies as well as their sensitive nature and need for accurate and fast data processing and analysis. For instance, power systems and distribution grids are monitored 24/7 by a variety of sensors aiming at predicting or diagnosing operational malfunctions. In such environments, the limitation of human operators to follow and interpret the huge volume of data offer opportunities for machine learning to support effective and fast decision making. Artificial intelligence tools such as learning kernel machines and fuzzy logic have been successfully applied in both areas. For example, in smart power systems Pareto-driven ensembles of kernel machines are shown to accurately forecast the future load demand, while fuzzy logic tools may be used to analyze gamma-ray signals and identify threats. Results from advanced power systems and nuclear energy security applications will be presented and implications for future research will be discussed.

Biography



Miltiadis "Miltos" Alamaniotis is an assistant professor in the Dept. of Electrical and Computer Engineering at University of Texas at San Antonio. Prior to joining UTSA, he worked as research assistant professor at Purdue University. He received the Diploma in Electrical and Computer Engineering from the University of Thessaly, Greece in 2005, and MS and Ph.D. in Nuclear Engineering emphasizing on Applied Artificial Intelligence from Purdue University in 2010 and 2012 respectively. His interdisciplinary research focuses on the development of intelligent systems and machine learning approaches applied to intelligent energy systems and smart grids, smart cities, and to nuclear security and detection hidden radioactive materials. He has published over a hundred (100) research papers in scientific journals, books, and international conference proceedings. He has been invited to serve as a guest editor in the International journal on Artificial Intelligence Tools, and as Program Chair in the IEEE International Tools with Artificial Intelligence 2018. He had worked as an external researcher with the National Argonne Laboratory from 2010 to 2012, and as visiting researcher in the Energy and Power Systems group at Oak Ridge National Laboratory in May 2016. He is the recipient of the Distinguished Alumni Award of ECE Department of University of Thessaly in July 2017, and is an active member of the American Nuclear Society and the Institute of Electrical and Electronic Engineering (IEEE).