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Sommario/riassunto	This Special Issue was intended as a forum to advance research and apply machine-learning and data-mining methods to facilitate the development of modern electric power systems, grids and devices, and smart grids and protection devices, as well as to develop tools for more accurate and efficient power system analysis. Conventional signal processing is no longer adequate to extract all the relevant information from distorted signals through filtering, estimation, and detection to facilitate decision-making and control actions. Machine learning algorithms, optimization techniques and efficient numerical algorithms, distributed signal processing, machine learning, data-mining statistical signal detection, and estimation may help to solve contemporary challenges in modern power systems. The increased use of digital information and control technology can improve the grid's reliability, security, and efficiency; the dynamic optimization of grid operations; demand response; the incorporation of demand-side resources and integration of energy-efficient resources; distribution automation; and the integration of smart appliances and consumer devices. Signal processing offers the tools needed to convert measurement data to information, and to transform information into actionable intelligence. This Special Issue includes fifteen articles, authored by international research teams from several countries.