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Machine learning approach to cyber security in smart grid

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Nowadays, power grids are being integrated into the smart grid concept for efficiently managing and delivering electric power. A smart grid provides a two-way dialogue where electricity and the information can be exchanged between the utility and its customers by allowing them to sell and purchase electricity. Attacks on such systems may have catastrophic impact, especially on the customers which is a particular threat in the winter, when people can be left without heat. Hence, the mitigation solutions for these situations are necessary. It is impractical to test attacks and mitigation strategies on real-time networks. Therefore, we propose a predictive analysis to make the smart grid prepared to address power failure faults and attacks in the time of emergencies. We explain different power system scenarios and network designs by simulating IEEE 14 bus system models through Power System Analysis Toolbox (PSAT) in MATLAB for the assessment of power flow and to perform a complete and accurate power system analysis. A data sheet of power system analysis is created and fed into various machine learning algorithms in WEKA data mining tool. The goal is to make our machine learn different power system analysis scenarios in order to be able to detect normal, fault and attack instances in a power system by checking the accuracy of the instances being learnt by the machine and cluster formations of all the correctly classified instances. This can help save millions of dollars and long hours of investigation invested to study and detect unusual occurrences in a power system. We embark upon a journey towards a new era of reliability, availability and efficiency of the smart grid by bringing in the machine learning domain in the assessment process which is a faster and more reliable way of detecting adversities in a power system than the conventional way.

Biography

Kshitija Bhasme has completed her Bachelor of Technology in the Faculty of Electronics and Communication from Usha Mittal Institute of Technology, SNDT Women's University, India. She is currently working as a Research Intern in the field of Smart Grid Technologies at Center for Development of Advanced Computing (CDAC) which is an Autonomous Scientific Society of Department of Electronics and Information Technology (DeitY), Ministry of Communications and Information Technology, Government of India. Her past research experiences include a Research Internship with the Bhabha Atomic Research Center (BARC), Government of India where she has worked as a Research Project Trainee with some of the best scientific officers in India.

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