Master/Bachelor Thesis:

Spare modelling of distribution power grid for monitoring and protection applications

Context:
The field of compressive sensing is an area of active interest in the past 15 years, since it offers a methodology for reconstruction of a signal without following Nyquist–Shannon sampling theorem according to which the signal's highest frequency should be less than half of the sampling rate for faithful reconstruction. Although compressive sensing seems an obvious choice for reconstruction of the measurements, there are a few inherent pre-conditions, which hinders the implementation of compressed sensing. Compressed sensing demands the measurement signal to be ''sparsely represented'' using over-complete dictionary which extracts the transform coefficients from the measurement signal. The sparse signal is reconstructed at the control center.

The monitoring system should use compressed sensing to faithfully reconstruct the measurement signals at the control center. The advantages of using compressed sensing are as follows
- The measuring instrument does not need a high sampling rate
- Smaller measurement data packets needs to be sent to the control center, hence reducing the data traffic to the control center
- Compressed sensing has an inherent encryption attached to the algorithm

Your tasks:
The major tasks involved in the thesis are as tabulated below.
- Sparse modelling of the power grid on MATLAB
- Modelling should take into account monitoring and protection application
- Verifying the model with a real-time module such as Raspberry Pi
- Implementation of compressive sensing on an existing monitoring platform

At the beginning, the student should look into the methodologies for the transform, where the different types of transform libraries are present in MATLAB . Comparative study should be carried out on MATLAB with the monitoring platform.

Profile:
We are looking for students with a knowledge of MATLAB and power system

Contact:

Gaurav kumar roy
Tel. +49-241-80-49473
GRoy@eonerc.rwth-aachen.de

ACS | Institute for Automation of Complex
Power Systems
ERC | E.ON Energy Research Center
RWTH Aachen University
Mathieustr. 6, 52074 Aachen, Germany

Abhinav Sadu
Tel. +49-241-80-49473
asadu@eonerc.rwth-aachen.de

ACS | Institute for Automation of Complex
Power Systems
ERC | E.ON Energy Research Center
RWTH Aachen University
Mathieustr. 6, 52074 Aachen, Germany