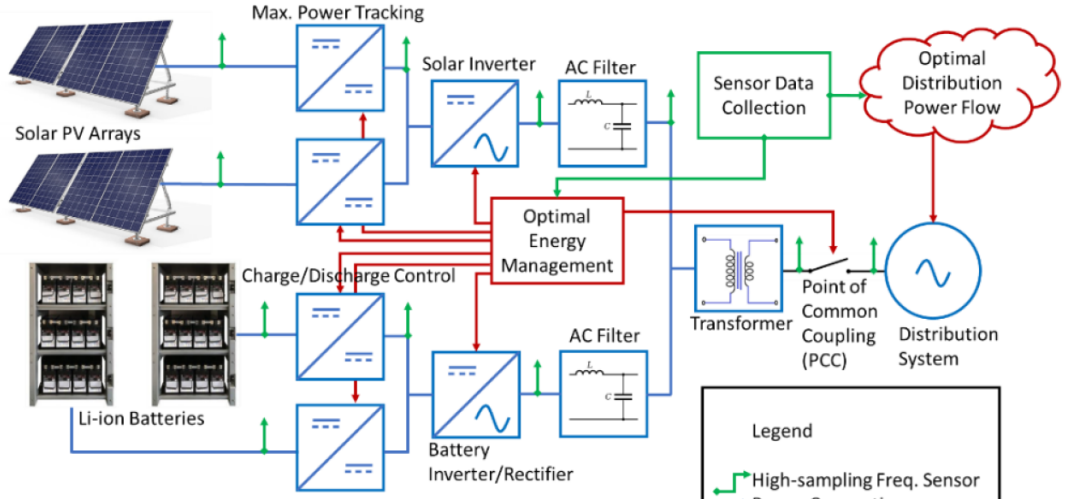
Project 1: Next-level Grid Resilience by Utilizing Sensors in Distributed Power Converters – **Ali Bazzi**

UCONN TECH PARK

Project Team:
PI- Dr. Ali Bazzi
Requested Funding: ~$88k, Two-year effort
Motivation and Objectives:

- Power converters in distributed energy resources have built-in sensors currently under-utilized and inaccessible to utilities
- Data from distributed sensors can be used to detect and respond to grid disturbances in real-time
- Understand how data from distributed sensors can be used to detect and respond to grid disturbances in real-time, such as voltage sags and frequency variations



Proposed microgrid utilizing converter sensors with optimal energy management

Approach:

- Effort is focused on modeling, simulating and building a small-scale AC microgrid with solar PV arrays and storage systems.
- Converter sensor data are collected and fed to the optimal energy management system.
- Data are then processed for critical information by using logic-based and AI techniques that further enhance observability and latest distributed oscillation detection with resilience against contaminated measurements.

PEARL
Power Electronics & Drives Advanced Research Laboratory

Main research tasks:

- Collection of power converter sensors from lab-scale microgrid and simulations including solar PV, Li-ion battery racks, electronic and passive loads, and grid connections
- Pre-processing of data to identify changes in operational conditions and constraints of existing sources, loads, and grid conditions
- Fault injection in the microgrid and utilization of the sensor data collection for fault diagnosis
- Logic-based and machine learning techniques with PCA-based feature selection and Bayesian filter techniques for fault diagnosis