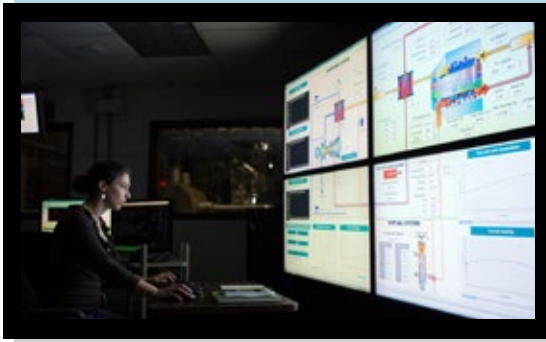
# Online System Identification Algorithm

The main challenge of this project is to detect and resolve critical control problems in an existing power system due to the impact of cycling operation. The increased penetration of non-dispatchable and intermittent renewable energy sources has forced traditional baseload power systems to operate at off-design conditions. This frequent ramping and cycling of fossil-fired power plants results in degraded performance, increased emissions, and acceleration of the deterioration of critical components.



We proposed developing a monitoring tool based on an empirical model running in parallel to the physical power plant process to predict dynamic operation and to detect performance drifting due to potential deterioration. A recursive algorithm was used to update the parameters of the empirical model in real time whenever the system operates at a different load condition. A control logic was used to detect abnormal operations or deterioration damage whenever the prediction from the model mismatched the process measurement.

The monitoring tool was successfully implemented on a laboratory scale gas turbine power system, and the next step will be focused on implementing and validating the online system identification methodology on a commercial scale power plant.

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