**DIAGNOSTIC ALGORITHM BENCHMARKING**

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**Objectives**
- Benchmark diagnostic algorithms (DAs) using standardized platform
- Compare performance empirically
- Facilitate research in and maturation of diagnostic technologies

**Challenges**
- Various diagnostic approaches (expert systems, model-based, data-driven, stochastic)
- Diagnostic algorithms support different operational contexts – difficult to define evaluation criteria

**Approach**
- Acquire nominal and faulty experimental data with known ground truth
- Use standard formats for system description, data, and diagnosis results
- Create software framework to execute diagnostic algorithms and evaluate performance

**Implementation**
- Two system descriptions created from the ADAPT Electrical Power System testbed
- Archived ~4 minute nominal and faulty scenarios with known ground truth for ADAPT-Lite and ADAPT systems

**Results (only DXC’10 DP-I shown, see links for more information)**
- No DA dominates all metrics
- Real-world system noise, latencies, transients, and coding errors resulted in DA false positives and classification errors

**DXC’10 Diagnostic Problems**
- Aspect: DP-I, DP-II
  - System: ADAPT-Lite, ADAPT
  - Diagnostic case: single-string UAS mission
  - Fault isolation time: detection
  - Isolation: detection
  - Diagnosis output: detection
  - CPU load: detection
  - Memory load: detection

**Publication and Data Sets**
- ADAPT Electrical Power System information, software framework, sample data, test data, results, publications, and presentations are available on DASHlink:
  - DXC’09: https://c3.ndc.nasa.gov/dashlink/projects/36/
  - DXC’10: https://c3.ndc.nasa.gov/dashlink/projects/33/

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