DIAGNOSTIC ALGORITHM BENCHMARKING
Scott Poll (NASA Ames Research Center)

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

Diagnostic Framework (DXF)
- High-level representation of physical system description, sensor data, diagnosis output
- Run-time architecture for executing DAs with experimental scenarios
- Evaluation component that evaluates DAs using pre-defined metrics

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

DX'C'10 Diagnostic Problems
- Aspect DP-I DP-II
  - Diagnostic Framework (DXF)
    - ADAPT-Lite
  - System
    - TARDEC
  - Faults
    - intermittent
    - offset
    - memory
    - load
  - Metrics
    - accuracy
    - cost
    - runtime

Results (only DX'C'10 DP-I shown, see links for more information)

Publications and Data Sets
ADAPT Electrical Power System information, software framework, sample data, test data, results, publications and presentations are available on DASHlink:

- DX'C'09: https://c3.ndc.nasa.gov/dashlink/projects/36/
- DX'C'10: https://c3.ndc.nasa.gov/dashlink/projects/33/

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