Diagnostic Profiler®

DIAGNOSTIC DESIGN SOFTWARE

FEATURES

- Accurate, Fast, Efficient run-time failure diagnosis based on current conditions and symptoms

- Powerful run-time recommended next best test algorithm

- Scalable to any size system

- Supports hierarchical modeling

- Flexible run-time integration as a diagnostic service

- Practical approach to model development includes many automated data capture tools

- Hardware independent

- Supports multiple levels of maintenance and test sequencing

- Implements diagnostics on mechanical, electrical and hybrid equipment

- Capable of learning field failure rates and unforeseen failure modes
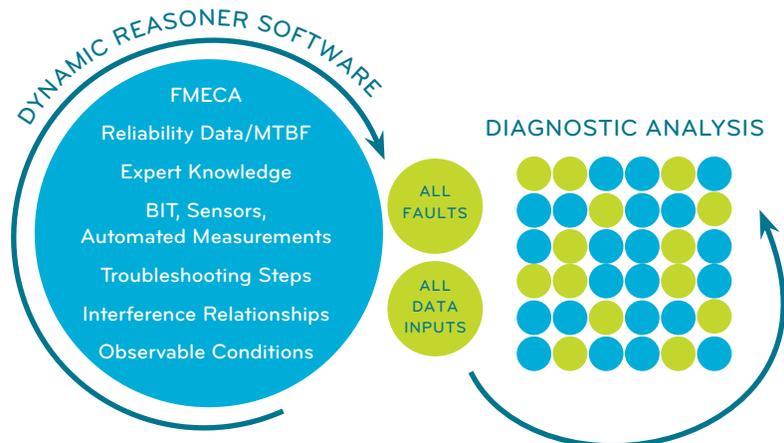
- Handles multiple fault scenarios

APPLICATIONS

- Embedded Diagnostic Systems

- Condition Based Maintenance (CBM) Systems

- Guided Troubleshooting

- Test Programs

- Interactive Electronic Technical Manuals (IETMs)

- Maintenance Aids

The Diagnostic Profiler® is an Integrated Development Environment (IDE) for developing diagnostic capabilities used in maintenance, embedded diagnostics, and troubleshooting applications. Its output is a diagnostic knowledge-base specific to the system or equipment being tested that configures the Diagnostician™ run-time software to perform fault detection and isolation. The run-time software applies advanced algorithms to provide many diagnostic services to its host application, including fault call-outs, suggested next best test to further isolate faults, and direct maintenance actions. At the end of a diagnostic session, the technician knows what the cause of the problem is and how to fix it. Replacement parts and repair procedures are identified. When more than one fault possibility exists, the run-time software prioritizes the fault call-outs by probability. Even in situations when test data is unavailable, the Diagnostician run-time software always provides a recommendation.

The Diagnostic Profiler addresses all the issues associated with development of a diagnostic or troubleshooting capability, including capture of existing data, change management, evaluation of diagnostic and troubleshooting parameters, preparation of the run-time files, testing, analyzing observed problems, and off-line regression testing of changes.

The use of the Diagnostic Profiler for development and the Diagnostician at run-time eliminates the need for the development and maintenance of diagnostic flowcharts and hard-coded test sequences. This, by itself, reduces the effort required to correct even small bugs and design changes. Over the life of the system, the result is a significant cost savings.

DYNAMIC REASONER SOFTWARE

FMECA
Reliability Data/MTBF
Expert Knowledge
BIT, Sensors, Automated Measurements
Troubleshooting Steps
Interference Relationships
Observable Conditions

ALL FAULTS

ALL DATA INPUTS

DIAGNOSTIC ANALYSIS

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BENEFITS

Superior diagnostic capability

- Uses both pass & fail data
- Applies minimum set covering algorithms to isolate failures
- Handles multiple fault scenarios
- Never leaves the technician hanging – always provides an analysis even when data is unavailable

Low implementation costs

- Model development focuses on run-time capability
- No hard coded logic trees
- Automated data captures
- V&V can be performed off platform

Low cost to maintain

- Eliminates complex logic code changes
- Diagnostic changes are simple updates to the knowledge base file
- Enables structured programming

The Diagnostic Profiler provides testability analysis reports that support military contract requirements for reporting fault detection and fault isolation. Since these reports are based on the actual diagnostic capability delivered, they can be quickly updated during development to show the impacts of design changes, added tests and other modifications and an accurate final report provided with little effort.

The Diagnostic Profiler User Interface (UI) provides a straightforward development path through a series of tabs that guide the user through the development process. The development path starts with the importation of existing data (Import Design tab) followed by the addition of test and operational information (Specify Diagnostics tab). At any point in the effort the diagnostic parameters of the current design can be checked (Testability Analysis/Reports tab) and the results used to identify further design changes or design completion. When a diagnostic or troubleshooting design is ready, the run-time output is generated and results pre-tested using the Generate & Test Run-time tab. When live tests are run, the Diagnostic Profiler's Verification & Validation Tool supports the analysis of anomalies, the testing of changes and the off-line regression testing of the changes against previously correct results.

CAPTURING EXPERT KNOWLEDGE

Diagnostic Profiler provides the means to capture diagnostically relevant information about a system in a sustainable format. This Diagnostic Knowledge Base is based on design information which can be imported automatically via the use of various tools that support XML, DiagML, CAD, FMECA. Test and measurement data inputs may include BIT/BITE, sensors, automated measurements, manually obtained measurements, observable conditions and status inputs. Failure rate data such as MTBF may also be included. Ultimately, the inference relationships between available data inputs and possible faults is captured. This includes subject matter expert knowledge so that every technician has access to the best of breed expert knowledge.