A Validation Frame Work Design Concept for Mutation based Evaluation of Integrated Performance of Avionics Systems of Unmanned Air Vehicles

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Abstract

The Avionics of an Unmanned Air Vehicle comprises of a number of Flight-Critical and Mission-Critical systems and a pilot-vehicle interface with complex real-time performance capabilities. Verification of integrated dynamic performance of such systems in an Avionics Integration Rig is a challenging task in terms of achieving sufficient test adequacy and inclusion of optimization in test case design. As the complexity of the systems increases, generating effective test cases to improve test adequacy and an optimistic way of classification of test case combinations becomes a necessity. This paper proposes a Validation Framework Design for Integrated Evaluation of Avionics Systems in a Rig with the introduction of various classifications of mutant operator models required for Mutation Testing, to achieve both the above factors required for evaluation of an Integrated Avionics System with respect to its System Level Specifications and Functional Performance.

References

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- Ying Jiang, Ying-Na Li1, Xiao-Dong Fu. 2010 - Faculty of Information Engineering and Automation “The Support of Interface Specifications in Black-box Components Testing”; - Kunming University of Science - Fifth International Conference on Frontier of Computer Science and Technology.
- Shan-Shan Hou1,2, Lu Zhang1,2, Tao Xie3, Hong Mei1,2, Jia-Su Sun1. 2007 – “Applying Interface-Contract Mutation in Regression Testing of Component-Based Software” - IEEE.
- Tafline Murnane, Associate Professor Karl Reed. 2001 -On the Effectiveness of Mutation Analysis as a Black Box Testing Technique.
- Technical report, Georgia Institute of Technology, Atlanta, GA.
- Timothy Alan Budd. May 1980 - “Mutation Analysis of Program Test Data”;
- Ph. D dissertation, Yale University.
- Budd, T. A. , and A. S. Gopal. 1985 - “Program testing by specification mutation”;
- Computer Languages, 10 (1).
Index Terms

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Keywords

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Station
Simulators
Mutant Operators
Line Replaceable Units
Test Case Generation
Mutation Testing
Test Adequacy
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