Checking the consistency between ucm and psm using a graph-based method

Truong N.T., Tran T.M.T., To V.K., Nguyen V.H.
College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam

Abstract: Checking the consistency in component models at design phase is essential in component-based software engineering (CBSE). In our previous work, we proposed an approach for verifying automatically the matching between protocol state machines (PSMs) and the Use Case Map (UCM), using the B method. Due to the expressive power of B notations, however, we cannot describe the parallel processing in the implementation machine, particularly we are not able to express all features (such as AND-forks/joins, OR-forks/joins) of UCMs in a B implementation machine. In this work, we propose an approach to solve the expression problem of UCM features using a graph-based algorithm. The UCM path which describes the interaction between components is extracted and then decomposed into sequential events paths if it has AND-forks/joins and/or OR-forks/joins. Each of sequential events paths will be checked with the order of events of PSMs by the proposed algorithm. ?? 2009 IEEE.
Index Keywords: B method; Component model; Component-based software engineering; Design phase; Expression problem; Expressive power; Graph-based; Graph-based methods; Parallel processing; State machine; Use case maps; Algorithms; Model checking; Models; Object oriented programming; Semiconductor quantum dots; Sequential switching; Software engineering; Database systems

Year: 2009
Source title: Proceedings - 2009 1st Asian Conference on Intelligent Information and Database Systems, ACIIDS 2009
Art. No.: 5175991
Page : 190-195
Link: Scorpus Link
Correspondence Address: Truong, N. T.; College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam; email: thuantn@vnu.edu.vn
Conference name: 2009 1st Asian Conference on Intelligent Information and Database Systems, ACIIDS 2009
Conference date: 1 April 2009 through 3 April 2009
Conference location: Dong Hoi
Conference code: 78395
ISBN: 9.78E+12
DOI: 10.1109/ACIIDS.2009.66
Language of Original Document: English
Abbreviated Source Title: Proceedings - 2009 1st Asian Conference on Intelligent Information and Database Systems, ACIIDS 2009
Document Type: Conference Paper

Source: Scopus

Authors with affiliations:

1. Truong, N.T., College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam
2. Tran, T.M.T., College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam
3. To, V.K., College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam
4. Nguyen, V.H., College of Technology, Vietnam National University, Hanoi, 144 Xuan Thuy, Cau Giay, Hanoi, Viet Nam

References:

1. JavaBeans 1.01 Specification, , http://java.sun.com/beans, Sun Microsystems
2. http://www.omg.orghttp://www.usecasemaps.org/http://www.w3c.org/XML/, World Wide Web Consortium XMLAlfaro, L., Henzinger, T.A., Interface automata (2001) 9th Annual Symposium on Foundations of Software Engineering, , pages 109-120. ACM press
3. Amyot, D., He, X., He, Y., Cho, D.Y., Generating scenarios from use case map specifications (2003) Third International Conference on Quality Software, p. 108
4. Booch, G., Rumbaugh, J., Jacopson, I., (1998) The Unified Modeling Language User Guide, , Addison-Wesley
5. Eddon, G., Eddon, H., (2000) Inside COM+ Base Services, , Microsoft Press
6. Han, J., A comprehensive interface definition framework for software components (1998) Asia Pacific Software Engineering Conference, , pages 110-117. IEEE Computer Society
7. Han, J., Temporal logic based specification of component interaction protocols (2000) Proceedings of the Second Workshop on Object Interoperability ECOOP'2000, , pages 12-16. Springer-Verlag
8. Hatcliff, J., Cadena: An integrated development, analysis, and verification environment for component-based systems (2003) Proceedings of 25th International Conference on Software Engineering, , pages 160-172
9. Mencl, V., Specifying component behavior with port state machines (2004) Electronic Notes in Theoretical Computer Science, 101C, pp. 129-153. , Special issue: Proceedings of the Workshop on the Compositional Verification of UML Models
10. Migliore, M., Martorana, V., Sciortino, F., An algorithm to find all paths between two nodes in a graph (1990) J. Comput. Phys., 87 (1), pp. 231-236
11. Truong, N., Tran, V., Nguyen, V., Consistency between UCM and PSMs in component models (2008) International Conference on Research, Innovation and Vision for the Future in Computing and Communication Technologies (RIVF), , pages 184-189