# Development of Software Testing Ontology and Application to Test Automation

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## Abstract

Software testing is one of the most intensively investigated topics in the software engineering in the past decades since 1970s. A great number of testing methods, techniques and tools have been proposed and theories advanced. With the rapid growth of service-oriented computing, greater challenges have been imposed on automated testing methods and techniques, which naturally led to a collaborative approach to the integration of test services in order to deliver test on-the-fly. The formal representation of the ontology of software testing thus plays a crucial role in this collaborative testing approach. However, the development of software testing ontology is difficult not only because of the large volume of knowledge, but also the complexity in its structure and the empirical nature of the knowledge. In this talk, I will present an open ontology framework of software testing (called STOWS) based on a multiple dimensional structure of software testing knowledge. I will also outline a prototype implementation of the framework, and report some case studies and experiments with the uses of the ontology in testing web services.

The talk is based on the following publications.

1. Zhu, H. and Zhang, Y. *Collaborative Testing of Web Services*, IEEE Transactions on Service Computing, (In press). Pre-publication version available at: http://cms.brookes.ac.uk/staff/HongZhu/Publications/TSC-2009-08-0190.R3_ZHU-postprint.pdf
2. Zhang, Y. and Zhu, H. *An Intelligent Broker Approach to Semantics-based Service Composition*, Proc. of the 35th IEEE Annual Computer Software and Applications Conference (COMPSAC 2011), 18-22 July 2011, Munich, Germany, (In press). Pre-publication version available at: http://cms.brookes.ac.uk/staff/HongZhu/Publications/COMPSAC2011ServiceBroker.pdf
3. Zhang, Y. and Zhu, H. *Ontology for Service Oriented Testing of Web Services*, Proc. of The Fourth IEEE International Symposium on Service-Oriented System Engineering (SOSE 2008), Dec. 18-19, 2008, Taiwan.
4. Zhu, H. *A Framework for Service-Oriented Testing of Web Services*, Proc. of COMPSAC'06, Sept. 2006, pp679-691.
5. Zhu, H. and Huo, Q., *Developing A Software Testing Ontology in UML for A Software Growth Environment of Web-Based Applications*, Chapter IX: Software Evolution with UML and XML, Hongji Yang (ed.). IDEA Group Inc. 2005, pp263-295.
6. Zhu, H. *Cooperative Agent Approach to Quality Assurance and Testing Web Software*, Proc. of QATWBA'04/COMPSAC'04, Sept. 2004, IEEE CS, Hong Kong,pp110-113.
7. Zhu, H., Huo, Q. and Greenwood, S., *A Multi-Agent Software Environment for Testing Web-based Applications*, Proc. of COMPSAC'03, 2003, pp210-215.