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**Research Interests and Selected Papers**

**Software Product Line Engineering**

- M. Abu-Matar and H. Gomaa, "Feature Based Variability for Service Oriented Architectures", Proc. International Workshop on Variability in Software Architecture, Boulder, Colorado, June 2011.
- M. Abu-Matar and H. Gomaa, "Variability Modeling for Service Oriented Product Line Architectures", Proc. International Software Product Line Conference, Munich, Germany, August 2011.
- A. Abu-Matar, H. Gomaa, M. Kim, and A. Elkhodary, Feature Modeling for Service Variability Management in Service-Oriented Architectures, Proc. 22<sup>nd</sup> International Conf. on Software Engineering and Knowledge Engineering , Redwood City, CA, July 2010.
- H. Gomaa and M. Saleh, "Feature Driven Dynamic Customization of Software Product Lines", Proc. 9<sup>th</sup> International Conference on Software Reuse, Springer Verlag LNCS 4039, Pages 58-72, Torino, Italy, June 2006.
- H. Gomaa and M.E. Shin, "Multiple-View Modeling and Meta-Modeling of Software Product Lines", Journal of IET Software, Volume 2, Issue 2, Pages 94-122, Published by Institution of Engineering and Technology, April 2008.
- H. Gomaa and M.E. Shin, "A Multiple-View Meta-Modeling Approach for Variability Management in Software Product Lines", Proc. International Conference on Software Reuse, Springer Verlag LNCS 3017, Pages 274-285, Madrid, Spain, July 2004.
- H. Gomaa and M. Gianturco, "Domain Modeling for World Wide Web Based Software Product Lines with UML", Proc. 7<sup>th</sup> International Conference on Software Reuse, Springer Verlag LNCS 2319, Pages 78-92, Austin, Texas, April 2002.
- H. Gomaa and E. Olimpiew, "Multiple View Requirement Models for Software Product Line Engineering", in Applied Software Product Line Engineering, edited by K.C. Chang, V. Sugumaran, and S. Park, CRC Press, 2010.
- H. Gomaa and E. Olimpiew, "Managing Variability in Reusable Requirement Models for Software Product Lines", Proc. 10<sup>th</sup> International Conference on Software Reuse, Beijing, China, May 2008.
- E. Olimpiew and H. Gomaa, "Reusable Model-Based Testing", Proc. 11<sup>th</sup> International Conference on Software Reuse, Falls Church, VA, September 2009.
- E. Olimpiew and H. Gomaa, "Model-based Testing of Software Product Lines", Proc. 5th Software Product Line Testing Workshop (SPLiT 2008), Limerick, Ireland, September 2008.

- E. Olimpiew and H. Gomaa, “Customizable Requirements-based Test Models for Software Product Lines”, International Workshop on Software Product Line Testing, Baltimore, MD, August 2006.
- D. Webber and H. Gomaa, "Modeling Variability in Software Product Lines with the Variation Point Model", Journal of Science of Computer Programming, Volume 53, Issue 3, Pages 305-331, Elsevier, December 2004.

## **Software Modeling and Architectural Design**

- H. Gomaa, “From Model-Based Systems Engineering to Model-Based Software Engineering”, Proc. 3rd International Conference on Model-Based Systems Engineering, Fairfax, VA, August 2010.
- H. Gomaa, “A Software Modeling Odyssey: Designing Evolutionary Architecture-centric Real-Time Systems and Product Lines”, Keynote paper, Proc. 9th ACM/IEEE International Conference on Model-Driven Engineering, Languages, and Systems, Springer Verlag LNCS 4199, Pages 1-15, Genova, Italy, October 2006.
- H. Gomaa, “Object Oriented Analysis and Modeling for Families of Systems with the UML”, Proc. 6<sup>th</sup> International Conference on Software Reuse, Springer Verlag LNCS 1844, Pages 88-99, Vienna, Austria, June 2000.
- H. Gomaa, D. Menasce, E. Shin, “Reusable Component Interconnection Patterns for Distributed Software Architectures,” Proceedings ACM Symposium on Software Reusability, ACM Press, Pages 69-77, Toronto, Canada, May 2001.
- H. Gomaa and E. Olimpiew, “The Role of Use Cases in Requirements and Analysis Modeling”, Proc. ACM Workshop on Use Cases in Model-Driven Software Engineering, Montego Bay, Jamaica, October 2005.
- M.E. Shin and H. Gomaa, “Software Requirements and Architecture Modeling for Evolving Non-Secure Applications into Secure Applications”, Journal of Science of Computer Programming, Volume 66, Issue 1, Pages 60-70, Elsevier, April 2007.

## **Concurrent and Real-Time Software Design**

- J. S. Fant, H. Gomaa, and R. G. Pettit, “Architectural Design Patterns for Flight Software,” 2nd IEEE Workshop on Model-based Engineering for Real-Time Embedded Systems, Newport Beach, California, March 2011.
- H. Gomaa, “Concurrent Programming”, in Encyclopedia of Computer Science and Engineering, Benjamin Wah (Ed.), John Wiley & Sons, Inc., Hoboken, NJ, Pages 648-655, January 2009.
- H. Gomaa, “Modern Software Design Methods for Concurrent and Real-Time Systems”, in Software Engineering: Vol 1: The Development Process, Third Edition, edited by M.

Dorfman and R. Thayer, Wiley-IEEE Computer Society Press, 2005. ISBN: 0-471-68417-1, October 2005.

- H. Gomma, “Concurrent Systems Design”, Encyclopedia of Software Engineering, Second Edition, Ed. J. Marciniak, John Wiley & son, January 2002.
- R. Pettit, H. Gomma and J. S. Fant, “Modeling and Prototyping of Concurrent Software Architectural Designs with Colored Petri Nets”, International Workshop on Petri Nets and Software Engineering (PNSE), Paris, France, June, 2009.
- R. Pettit, and H. Gomma, “Analyzing Behavior of Concurrent Software Designs for Embedded Systems”, Proc. 10th IEEE International Symposium on Object and component-oriented Real-time distributed Computing, Santorini Island, Greece, May 2007.
- R. Pettit and H. Gomma, “Modeling Behavioral Design Patterns of Concurrent Objects”, Proc. ACM/IEEE International Conference on Software Engineering, Shanghai, China, May 2006.
- R. Pettit and H. Gomma, “Modeling Behavioral Patterns of Concurrent Software Architectures Using Petri Nets”, Proc. Fourth Working IEEE/IFIP Conference on Software Architecture, Oslo, Norway, June, 2004.

## **Software Performance Engineering**

- H. Gomma and D. Menasce, “Performance Engineering of Component-Based Distributed Software Systems”. Published in “Performance Engineering”, Editors Reiner Dumke, Claus Rautenstrauch, Andreas Schmietendorf, Andre Scholz, Springer Verlag LNCS # 2047, Pages 40-55, 2001.
- H. Gomma and D. Menasce, “Design and Performance Modeling of Component Interconnection Patterns for Distributed Software Architectures”, Proceedings Workshop on Software Performance, ACM Press, Pages 117-126, Ottawa, Canada, September 2000.
- D. Menasce and H. Gomma, “A Method for Design and Performance Modeling of Client/Server Systems,” IEEE Transactions on Software Engineering, Vol. 26, No.11, Pages 1066-1085, November 2000.
- D. Menasce, H. Ruan and H. Gomma, “QoS Management in Service-Oriented Architectures”, Journal of Performance Evaluation, Volume 64, Issues 7+8, Pages 646-663, Elsevier, August 2007.
- J. Street and H. Gomma, “An Approach to Performance Modeling of Software Product Lines”, ACM Workshop on Modeling and Analysis of Real-Time and Embedded Systems, Genova, Italy, October 2006.

## **Knowledge-based and Agent-based Software Engineering**

- B. Blake and H. Gomma, “Agent-Oriented Compositional Approaches to Services-Based Cross-Organizational Workflow”, Journal of Decision Support Systems, Volume 40, Issue 1, Pages 31-50, July 2005.

- B. Blake and H. Gomaa, "Object-Oriented Modeling Approaches to Agent-Based Workflow Services", *Advances in Software Engineering for Large-Scale Multi-Agent Systems*, Ed. C. Lucena et al, Springer Verlag LNCS, Springer, 2004.
- H. Gomaa, "Inter-Agent Communication in Cooperative Information Agent-Based Systems", *Proc. International Workshop on Cooperative Information Agents*, Uppsalla, Sweden, July 1999, Published by Springer Verlag LNAI 1652, Pages 137-148.
- K. Mills and H. Gomaa, "Knowledge-Based Automation of a Design Method for Concurrent and Real-Time Systems", *IEEE Transactions on Software Engineering*, Volume: 28 Issue: 3, Pages 228 -255, March 2002.
- K. Mills and H. Gomaa, "A Knowledge-Based Method for Inferring Semantic Concepts from Graphical Models of Real-Time Systems", *ACM Transactions on Software Engineering and Methodology*, Vol. 9, No. 3, pages 306-337, July 2000.

## **Automated Software Engineering**

- H. Gomaa and G.A. Farrukh, "Methods and Tools for the Automated Configuration of Distributed Applications from Reusable Software Architectures and Components", *IEE Proceedings – Software*, Vol. 146, No. 6, December 1999.
- H. Gomaa, L. Kerschberg, and G. Farrukh, "Domain Modeling of Software Process Models", *Proceedings IEEE International Conference on the Engineering of Complex Computer Systems*, IEEE Computer Society Press, Pages 50-60, Tokyo, September 2000.
- H. Gomaa, L. Kerschberg, V. Sugumaran, C. Bosch, I Tavakoli, "A Knowledge-Based Software Engineering Environment for Reusable Software Requirements and Architectures", *Journal of Automated Software Engineering*, Vol. 3, 285-307, 1996.
- H. Gomaa and M.E. Shin, "Automated Software Product Line Engineering and Product Derivation", *Proc. Hawaii International Conference on System Sciences*, Hawaii, January 2007.
- H. Gomaa and E. O'Hara, "Dynamic Navigation in Multiple View Software Specifications and Designs", *Journal of Systems and Software*, Vol. 41, 93-103, 1998.

## **Dynamic Software Adaptation**

- H. Gomaa and K. Hashimoto, "Dynamic Software Adaptation for Service-Oriented Product Lines", *Proc. Fifth International Workshop on Dynamic Software Product Lines*, Munich, Germany, August 2011.
- H. Gomaa and M. Hussein, "Model-Based Software Design and Adaptation", *Proc. ACM/IEEE ICSE Workshop on Software Engineering for Adaptive and Self-Managing Systems*, Minneapolis, MN, May 2007.
- H. Gomaa and M. Hussein, "Software Reconfiguration Patterns for Dynamic Evolution of Software Architectures", *Proc. Fourth Working IEEE/IFIP Conference on Software Architecture*, Oslo, Norway, June, 2004.

- H. Gomaa and M. Hussein, "Dynamic Software Reconfiguration In Software Product Families", Proc. 5th International Workshop on Product Family Engineering, Siena, Italy, November, 2003, Springer Verlag LNCS 3014, Pages 435-444.

## **Separation of Concerns**

- H. Gomaa and M.E. Shin, "Separating Application and Security Concerns in Use Case Models", Proceedings Early Aspects Workshop, Charlottesville, VA, March 2009.
- H. Gomaa and M.E. Shin, "Modeling Complex Systems by Separating Application and Security Concerns", Proceedings IEEE International Conference on the Engineering of Complex Computer Systems, Florence, Italy, April 2004.
- M. Saleh and H. Gomaa, "Separation of Concerns in Software Product Line Engineering", Proc. ACM/IEEE Workshop on Modeling and Analysis of Concerns in Software, International Conference on Software Engineering, St. Louis, MO, May 2005.
- M.E. Shin and H. Gomaa, "Separating Application and Security Concerns in Modeling Software Product Lines", in Applied Software Product Line Engineering, edited by K.C. Chang, V. Sugumaran, and S. Park, CRC Press, 2010.

## **SASSY (Self-Architecting Service-Oriented Systems) Research**

- D. Menasce, H. Gomaa, S. Malek, J. Sousa, SASSY: A Framework for Self-Architecting Service-Oriented Systems", Accepted for publication in IEEE Software.
- D. Menascé, J. Sousa, S. Malek and H. Gomaa, QoS Architectural Patterns for Self-Architecting Software Systems, Proceedings 7th IEEE/ACM International Conference on Autonomic Computing and Communications , Washington DC, June 2010.
- Hassan Gomaa, Koji Hashimoto, Minseong Kim, Sam Malek, Daniel A. Menascé, "Software Adaptation Patterns for Service-Oriented Architectures", Proceedings of ACM Symposium on Applied Computing (SAC), March 2010, Sierre, Switzerland.
- D. A. Menascé, J. M. Ewing, H. Gomaa, S. Malek, and J. P. Sousa, "A Framework for Utility-Based Service Oriented Design in SASSY", Proc. First Joint WOSP/SIPEW International Conf. on Performance Engineering, January 2010.
- N. Esfahani, S. Malek, J. P. Sousa, H. Gomaa, and D. A. Menascé, "A Modeling Language for Activity-Oriented Composition of Service-Oriented Software Systems", Proc. ACM/IEEE 12th International Conference on Model Driven Engineering Languages and Systems (MODELS 09), Denver, Colorado, October 2009.
- S. Malek, N. Esfahani, D. A. Menascé, J. P. Sousa, H. Gomaa, "Self-Architecting Software SYstems (SASSY) from QoS-Annotated Activity Models", Proceedings Workshop on Principles of Engineering Service Oriented Systems (PESOS), Vancouver, Canada, May 2009.