

AYSU BETIN-CAN

Curriculum Vitae

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RESEARCH INTERESTS

Software engineering, reliable software development, modular verification and specification, web services, concurrency, model checking

EDUCATION

2000-2005 University of California, Santa Barbara,

PhD Computer Science.

Dissertation Title: Design for Verification for Concurrent and Distributed Systems

Advisor: Assoc. Prof. Tevfik Bultan

1996-1999: Middle East Technical University, Ankara, Turkey,

B.S. in Computer Engineering

HONORS AND AWARDS

November 2005: ACM SIGSOFT Distinguished paper award

November 2005: Automated Software Engineering Conference (ASE) 2005 best paper award

October 2004: ACM SIGSOFT CAPS Grant for the 12th ACM SIGSOFT International Symposium on Foundations of Software Engineering, (ESEC/FSE 2004), Newport Beach, CA, USA, October 31 - November 6, 2004

September 2004: Graduate Division Travel Grant, University of California, Santa Barbara 2004

Winter 2004: One of the exceptional Teaching Assistants

June 1999: High-Honor Student, Class of 1999 at Middle East Technical University, Ankara, Turkey.

PROFESSIONAL ACTIVITIES

ACM/SIGSOFT Student Member

IEEE Student Member

Volunteer in 8th International Conference on Implementation and Application of Automata (CIAA 2003)

WORK EXPERIENCE

Summer Research Assistant, Department of Computer Science, University of California, 2002- Santa Barbara

Summer2005: Developed verifiable design patterns for concurrent and distributed systems and interface-based automated modular verification techniques based on these patterns.
Supervisor : Assoc. Prof. Tevfik Bultan

2000-2002 Teaching Assistant, Department of Computer Science, University of California, and Santa Barbara

Winter 2004: Courses: Software Engineering, Automata and Formal Languages, Foundations of Computer Science (discrete mathematics), Programming Methods (Java)

June 1999- Software Development Engineer, Central Bank of the Republic of Turkey, June 2000: Ankara, Turkey

Designed and implemented various distributed applications.

PUBLICATIONS

(available at <http://www.cs.ucsb.edu/~aysu/>)

- Aysu Betin-Can, Tevfik Bultan, Mikael Lindvall, Benjamin Lux, and Stefan Topp. "Application of Design for Verification with Concurrency Controllers to Air Traffic Control Software". **ACM SIGSOFT Distinguished Paper Award, ASE 2005 Best Paper Award**. In Proceedings of the 20th IEEE International Conference on Automated Software Engineering (ASE 2005), pages 14-23, Long Beach, California, USA, November 7-11, 2005. Acceptance rate 9%
- Tevfik Bultan and Aysu Betin-Can. " Scalable Software Model Checking Using Design for Verification. ". In Proceedings of the IFIP Working Conference on Verified Software: Theories, Tools, Experiments, Zurich, Switzerland, October 10-14, 2005.
- Aysu Betin-Can and Tevfik Bultan. "Verifiable Web Services with Hierarchical Interfaces". In the Proceedings of the 2005 IEEE International Conference on Web Services (ICWS 2005), pages 85-94, Orlando, Florida USA, July 2005. Acceptance rate 19% (Invited to the International Journal of Web Services Research)
- Aysu Betin-Can, Tevfik Bultan and Xiang Fu."Design for Verification for Asynchronously

- Communicating Web Services". In Proceedings of the 14th International World Wide Web Conference (WWW 2005), pages 750-759, Chiba, Japan, May 2005. Acceptance rate 14%
- Aysu Betin-Can. "Design for Verification for Concurrent and Distributed Systems", SIGSOFT 2004 Student Research Forum in conjunction with the SIGSOFT 12th International Conference on Foundations of Software Engineering, Newport Beach, California USA, November 2004.
 - Aysu Betin-Can and Tevfik Bultan. "Verifiable Concurrent Programming Using Concurrency Controllers." In the Proceedings of the 19th IEEE International Conference on Automated Software Engineering (ASE 2004), pages 248-257,, 2004, Linz, Austria, September 20-25 2004. Acceptance rate 14%
 - Aysu Betin-Can and Tevfik Bultan. "Interface-Based Specification and Verification of Concurrency Controllers." In Proceedings of the Workshop on Software Model Checking (SoftMC 2003) in conjunction with the 15th International Conference on Computer Aided Verification, Electronic Notes in Theoretical Computer Science (ENTCS), vol. 89, no. 3. Boulder, Colorado, July 14, 2003.
 - Aysu Betin-Can and Tevfik Bultan. "Interface-Based Specification and Verification of Concurrency Controllers". Technical Report No: 2003-13 in Department of Computer Science University of California Santa Barbara
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SELECTED TALKS

- July 2005:** "Verifiable Web Services with Hierarchical Interfaces". Presented in the 2005 IEEE International Conference on Web Services (ICWS 2005)
- May 2005:** "Design for Verification for Asynchronously Communicating Web Services". Presented in the 14th International World Wide Web Conference (WWW 2005)
- September 2004:** "Verifiable Concurrent Programming Using Concurrency Controllers" Presented in the 19th IEEE International Conference on Automated Software Engineering (ASE 2004)
- July 2003:** "Interface-Based Specification and Verification of Concurrency Controllers." Presented in the Workshop on Software Model Checking (SoftMC 2003)
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SELECTED PROJECTS

- **Verifiable Web Service Programming Environment:**
Developed a design pattern and an automated modular verification technique based on this pattern for reliable asynchronously communicating web services programming in Java. The pattern facilitates explicit behavioral contract implementation as finite state machines and hierarchical finite state machines. Based on this pattern, the modular verification technique enables users to statically analyze both peer interaction properties and conformance of peer implementations to their contracts. Improvements have achieved by adapting the

synchronizability analysis in behavioral analysis and abstracting the asynchronous communication in conformance analysis.

Within this project I implemented several composite web services by using the Java API for XML messaging (JAXM) in asynchronous communication mode. I experimented web service application development with the Java web service developer pack (JWSDP).

- **Verifiable Concurrent Programming Environment:**

Developed a framework for verifiable concurrent programming in Java through a design pattern and a modular verification technique based on this pattern. The pattern aids reliable implementation of customized synchronization policies without using any of the error-prone synchronization primitives in Java. Based on the decoupling of concurrency controller behavior and interface in the pattern, tools for behavior and interface verification are implemented by utilizing the existent model checking tools with different strengths. A significant improvement in the efficiency is achieved during interface verification because of the usage of concurrency controller interfaces as stubs. For a further improvement, the interface verification is performed thread modular and a tool for thread isolation is provided.

Within this project I implemented a concurrent and distributed text editor with a client-server architecture. The Concurrent Editor allows multiple users to edit a document concurrently as long as they are editing different paragraphs and maintains a consistent view of the shared document among the clients and the server. The document is saved only when a consensus is reached among all clients.

Link: <http://www.cs.ucsb.edu/~aysu/CCPattern/index.html>

- **MV: A Tool for Reliable Monitor Development**

Developed a tool for interface-based specification and verification of monitors. The tool automatically generates Java monitors that preserve the verified properties. The tool also facilitates a refinement check that allows the users to design complex monitors by composing interfaces of different monitors.

Link: <http://www.cs.ucsb.edu/~aysu/MV/index.html>

REFERENCES

Assoc. Prof. Tevfik Bultan
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