

Nirmit Desai

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RESEARCH INTERESTS

Modeling and analysis of business service engagements, large-scale distributed systems, multiagent systems, model-driven methodologies

PROFESSIONAL SUMMARY

- More than one year of industry research experience in business informatics with IBM Research
- One year of industry software development experience in financial systems with Applied Software
- Scholarly contributions with more than 20 research papers published in leading journals and conferences (H-index: 7), a US patent filed, and a "*best student paper*" award
- Actively involved with industry partners in the reconciliation of the specifications WS-CDL and ebXML business processes with scholarly contributions towards engineering of TWIST foreign exchange interactions (paper [9] below)
- Active professional participation as a reviewer and referee of several of the leading international journals and conferences

PROFESSIONAL EXPERIENCE

IBM India Research Lab, Bangalore, India
Research Staff Member, June 2008 - Present

- Service delivery innovation for the financial services sector

North Carolina State University, Raleigh, NC
Postdoctoral Fellow, Jan 2008 – May 2008

- Preparing grant proposals in collaboration with colleagues at other institutions. Contributed to two proposals to NSF CISE-SRS program and one proposal to NIH.
- Preparing course materials for graduate and undergraduate level "Service-Oriented Computing" class. Focus on teaching enterprise SOA technologies such as ESB and CICS.
- Continuing research on protocols in the direction of developing tools and techniques to aid practitioners with Amoeba methodology.
- Continuing research on contracts in the direction of enhancing the algorithms to consider Pareto optimality and other more flexible notions of "beneficial" contract.

Research Assistant (under Munindar P. Singh), Aug 2003 – Nov 2007

- Investigating application of a formal interaction-oriented approach for modeling, analysis, and engineering of business services engagements across organizations.
- Contracts: Formally representing legal contracts in terms of commitments and checking whether the contract is safe or beneficial for an organization to participate, given how the organizations value the various terms of the contract.
- Protocols: Enabling a repository of modular interaction protocols and a technique for various ways of composing them to yield desired protocols for applications. Capturing the semantics of the business interactions via commitments.
- Foreign Exchange Processes: Applied the specification and composition techniques to build a repository of standardized TWIST foreign exchange interactions. With our technique, 28 TWIST processes can be represented as just 13 core protocols and their compositions. The 13 core protocols can be composed in novel ways to yield business scenarios not described in the TWIST standard.

Research Assistant (under Frank Mueller), Oct 2001 – Jun 2003

- Applying hierarchical locking techniques to achieve logarithmic scalability for distributed locking algorithms.
- Evaluated the algorithms on a cluster of 128 physical and 512 logical nodes requesting locks over a distributed database.

Research Assistant (under Dean Lee), Dec 2001 – Aug 2003

- Algorithms for visualization of particle configurations in lattices.

IBM T. J. Watson Research Center, NY

Research Intern (Intelligent Business Systems), Jul 2006 – Dec 2006

- Applied the Web 2.0 community concept to SOA. Designed and developed a middleware platform for creation and management of service communities that support sharing, consumption, and analytics of services.
- Developed a framework for sharing services mashups among a community. The common mashup patterns can be reused. Participated in the design of a domain-specific language for services mashups based on Ruby.

Research Intern (Model-Driven Business Transformation), May 2005 – Aug 2005

- Application of model-driven development to model, build, and deploy a generic portal that allows application of model-driven development to model, build, and deploy generic business solutions. Automated the model transformations from CIM to PIM to PSM to deployment via integration of several Eclipse Plugins and other tools.
- Using the portal, business process models (in WBI modeler) are automatically transformed into a deployed J2EE application having a data model and a default UI.

Research Intern (Advanced Enterprise Middleware), May 2003 – Aug 2003

- Supporting WS-Transaction for BPEL processes. Developed a WS-Policy based specification of transactional requirements (named T-BPEL). Developed a prototype for generating and deploying T-BPEL services.

Applied Software, Ahmedabad, INDIA

Software Engineer, Jan 2001 – Jul 2001

- Participated in the design and development of a Jakarta Struts-based financial CRM application. The components included management of portfolios, campaigns, and relationships.
- Commercialized as WealthSpectrum™ and deployed at financial institutions such as HSBC, ABN-AMRO, and Franklin Templeton.

EDUCATION

North Carolina State University, Raleigh, NC, USA

Ph.D., Computer Science, November 2007

Interorganizational Business Interactions: Contracts, Processes, Evolution

Advisor: Munindar P. Singh

M.S., Computer Science, June 2003

Scalable Distributed Concurrency Protocol with Priority Support

Advisor: Frank Mueller

GPA: 3.96/4.00

Gujarat University, Ahmedabad, INDIA

Bachelor of Engineering, Information Technology, May 2001

GPA: 3.95 (First Class with Distinction)

HONORS / AWARDS

- One of the two NCSU College of Engineering nominations (from at least 79 PhD graduates) for Nancy G. Pollock best dissertation award (the nomination carries a USD 100 prize)
- Best Student Paper Award, IEEE International Conference on Services Computing (SCC), for paper [13], 2006
- One of the two nominations by the Department of Computer Science (from over 100 Ph.D. students) and selected as a finalist for IBM Ph.D. Fellowship award (for academic years 2005-2006 and 2006-2007)
- Travel and other supporting grants for attending and presenting papers at AAAI'07, AAMAS'07, SCC'06, OOPSLA'04 and '02, ICDCS'03, from various sources including ACM, IEEE Computer Society, and NCSU

PATENTS

- *Systems and Methods for Services Exchange*, with (alphabetically) A. Behera, K. Bhattacharya, M. A. Cohen, P. Mazzoleni, J. Sairamesh, S. Tai. Rated File. US, Thailand, and Taiwan.

PUBLICATIONS Peer-Reviewed Journals
AR: Acceptance Rate

1. **N. Desai**, A. K. Chopra, M. P. Singh. "Amoeba: A Methodology for Requirements Modeling and Evolution of Cross-Organizational Business Processes". *ACM Transactions on Software Engineering and Methodology (TOSEM)*, In press.
2. **N. Desai**, A. U. Mallya, A. K. Chopra, Munindar P. Singh. "Interaction Protocols as Design Abstractions for Business Processes". *IEEE Transactions on Software Engineering (TSE)* 31(12):1015-1027, 2005 (special issue, AR: 12.5%)
3. M. P. Singh, A. K. Chopra, **N. Desai**, A. U. Mallya. "Protocols for Processes: Programming in the Large for Open Systems". *ACM SIGPLAN Notices* 39(12):73-83, 2004 (AR: 30%)
4. S. Tai, T. Mikalsen, E. Wohlstadter, **N. Desai**, I. Rouvellou. "Transaction Policies for Service-Oriented Computing". *Data & Knowledge Engineering (DKE)* 51(1):59-79, 2004
5. **N. Desai**, F. Mueller. "Scalable Hierarchical Locking for Distributed Systems". *Journal of Parallel and Distributed Computing (JPDC)* 64(6):708-724, 2004

Peer-Reviewed Conferences and Workshops (Full-length, AR<30%)

6. **N. Desai**, M. P. Singh. "On the Enactability of Business Protocols". *International Conference on Artificial Intelligence (AAAI), AI & the Web track*, 2008 (AR: 24%)
7. **N. Desai**, N. C. Narendra, M. P. Singh. "Checking Correctness of Business Contracts via Commitments". *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2008 (AR: 22%)
8. E. Michael Maximilien, Hernan Wilkinson, **N. Desai**, S. Tai. "A Domain-Specific Language for Web APIs and Services Mashups". *International Conference on Service-Oriented Computing (ICSOC)*, 2007 (AR: 21%)
9. **N. Desai**, A. K. Chopra, M. Arrott, B. Specht, M. P. Singh. "Engineering Foreign Exchange Processes via Commitment Protocols". *IEEE International Conference on Services Computing (SCC), Applications and Industry track*, 2007 (AR: 25%)
10. **N. Desai**, A. K. Chopra, M. P. Singh. "Representing and Reasoning about Commitments in Business Processes". *International Conference on Artificial Intelligence (AAAI), AI & the Web track*, 2007 (AR: 27%)
11. **N. Desai**, M. P. Singh. "A Modular Action Description Language for Protocols". *International Conference on Artificial Intelligence (AAAI)*, 2007 (AR: 27%)
12. S. Tai, **N. Desai**, P. Mazzoleni. "Service Communities: Applications and Middleware". *International Workshop on Software Engineering and Middleware (SEM)*, 2006
13. **N. Desai**, A. K. Chopra, M. P. Singh. "Business Process Adaptations via Protocols". *IEEE International Conference on Services Computing (SCC)*, 2006, pp. 103-110 (AR: 25%), **Best Student Paper Award**

14. **N. Desai**, A. U. Mallya, A. K. Chopra, M. P. Singh. "OWL-P: A Methodology for Business Process Development". *Agent-Oriented Information Systems III, Lecture Notes in Computer Science (LNCS)* 3529: 79-94, 2006
15. M. P. Singh, A. K. Chopra, **N. Desai**, A. U. Mallya. "Protocols for Processes: Programming in the Large for Open Systems". *Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Onward! pp. 120-123, 2004 (AR: 30%)
16. **N. Desai**, M. P. Singh. "Protocol-Based Business Process Modeling and Enactment". *IEEE International Conference on Web Services (ICWS)*, 2004, pp. 35-42 (AR: 28%)
17. **N. Desai**, F. Mueller. "Scalable Distributed Concurrency Services for Hierarchical Locking". *International Conference on Distributed Computing Systems (ICDCS)*, 2003, pp. 530-537 (AR: 17%)
18. **N. Desai**, F. Mueller. "A Log(n) Multi-Mode Locking Protocol for Distributed Systems". *International Parallel and Distributed Processing Symposium (IPDPS)*, 2003, pp. 4-11 (AR: 29%)

Peer-Reviewed Conferences and Workshops (short, AR>30%)

19. **N. Desai**, P. Mazzoleni, S. Tai. "Service Clubs: A Structuring Mechanism for Services-Oriented Business Ecosystems". *IEEE International Conference on Digital Ecosystems and Technologies (DEST)*, 2007 (AR: 43%)
20. **N. Desai**, Z. Cheng, A. K. Chopra, M. P. Singh. "Toward Verification of Commitment Protocols and their Compositions". *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2007, pp. 144-146 (AR: 47%)
21. **N. Desai**, A. K. Chopra, M. P. Singh. "An Overview of Business Process Adaptations via Protocols". *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2006, pp. 1326-1328 (AR: 47%)
22. A. U. Mallya, **N. Desai**, A. K. Chopra, M. P. Singh. "OWL-P: OWL for Protocols and Processes". *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2005, pp. 139-140
23. A. K. Chopra, **N. Desai**, A. U. Mallya, L. Wagle, M. P. Singh. "A Semantic Protocol-Based Approach for Developing Business Processes". *International Conference on Service-Oriented Computing (ICSOC)*, 2004 (short paper, AR: 31%)
24. A. K. Chopra, A. U. Mallya, **N. Desai**, M. P. Singh. "Modeling Flexible Business Processes". *International Workshop on Declarative Agent Languages and Technologies (DALT)*, 2004
25. **N. Desai**, F. Mueller. "A Protocol for Scalable Distributed Concurrency Services". *ACM Student Research Competition at Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, 2002, pp. 108-109
26. **N. Desai**, F. Mueller. "A Brief Overview of Scalable Distributed Concurrency Services for Hierarchical Locking". *ACM Java Grande ISCOPE (JGI)*, 2002, pp. 226

Manuscripts Under Review/Revision

27. M. P. Singh, A. K. Chopra, **N. Desai**. "Commitment-Based SOA". Under revision, *IEEE Computer*.
28. M. Baldoni, C. Baroglio, A. K. Chopra, **N. Desai**, V. Patti, M. P. Singh. "Choice, Interoperability, and Conformance in Service Choreographies". Under review, *International Conference on Service-Oriented Computing (ICSOC)*, 2008

PROFESSIONAL SERVICES

- Organizing Committee: PRIMA '09, Mashups '08
- Program Committee: ICWS '08, Mashups '08, WSCA '08, Mashups '07, AI-SOC '06
- Conference Reviewer: WWW '08, ICWS '07 '06, AAAI '07, ICPP '07, SCC '06, ICSOC '06 '04, ICDCS '05, ESAW '04
- Journal Reviewer: *Computer*, *Software*, *Internet Computing*, *JWSR*, *IT & M*, *IJAOS*, *AAMAS*, *SOCA*
- Departmental Ambassador to the Office of International Students
- Student Volunteer, AAAI '07, Vancouver, BC, Canada
- Student Volunteer, AAMAS '07, Honolulu, HI, USA
- Student Volunteer, OOPSLA '04, Vancouver, BC, Canada
- Student Volunteer, OOPSLA '02, Seattle, WA, USA
- Student Ambassador, Career Fair, NCSU, 2002
- Principal Coordinator, IT Fair IT2000@Expo++, Nirma Institute of Technology, Ahmedabad, India
- Linux Users Group, Member and Speaker, Ahmedabad, India, 1999-2001

TALKS / PAPER PRESENTATIONS

1. *On the Enactability of Business Protocols*, at AAAI 2008
2. *Checking Correctness of Business Contracts via Commitments*, at AAMAS 2008
3. *Representing and reasoning about commitments in business processes*, at AAAI 2007
4. *A modular action description language for protocol composition*, at AAAI 2007
5. *Service clubs: A structuring mechanism for service-oriented business ecosystems*, at IBM Watson internship seminar, 2006
6. *Business process adaptations via protocols*, at SCC 2006
7. *Model-Driven solution development portal*, at IBM Watson internship seminar, 2005
8. *Toward transaction support for BPEL*, at IBM Watson internship seminar, 2003
9. *Scalable distributed concurrency services for hierarchical locking*, at ICDCS 2003