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EXPERTISE

Experienced software engineering researcher and practitioner in the areas of software automation tools and collaborative applications. Development of Web, mobile and wearable apps to optimize industrial work by connecting people to other people and insights. Research contributions to: automated and collaborative software engineering, software architecture, model-driven systems development & testing, event-driven middleware, workflow management systems and groupware. Production of patents & research papers.

WORK EXPERIENCE

2013 – present. **GE Global Research,** San Ramon, CA
Lead Scientist, Human Systems Interaction Lab
Full stack R&D of industrial intelligent software systems. Applying UX, IoT, AI services & Software Engineering techniques to automate and optimize their workflow.
Keywords: Development of Web, mobile & wearable industrial apps, distributed simulation platforms and UX.

2009 – 2013**. SIEMENS Corporate Technology,** Princeton, NJ
Software Engineering Researcher, Software Architecture Development Lab.
Research and development of advanced software engineering tools & methods for the automation and optimization of industrial problems.
Keywords: Software Architecture Analysis and Improvement, Software Quality Assurance, Model-Driven Development & Testing, Workflow Automation.

Summer 2004. **IBM T. J. Watson Research Center (Collaborative User Experience Group),** Cambridge, MA
Research Intern: Developed, benchmarked and compared different architectural approaches for the construction of contextual collaboration servers used within IBM products.
Keywords: Development of contextual collaboration servers, performance simulation and benchmarking.

2000 – 2009. **University of California,** Irvine, CA
(2002-2009): **Graduate Research Assistant**
(2000-2002): **Teaching Assistant**

EDUCATION

2009. **Ph.D.** Information and Computer Sciences. UC, Irvine, CA, USA. GPA: 3.974/4.0
Concentration areas: **Empirical Software Engineering, Extensible Event-Based Middleware, CSCW**
Dissertation Title: An Empirical Study of Publish/Subscribe Middleware Versatility
2003. **M.Sc.** in Information and Computer Sciences. UC, Irvine, CA, USA. GPA: 3.906/4.0
Concentration area: **Software Engineering**
2000. **M.Sc.** in Computer Science. University of Campinas (UNICAMP), Brazil, GPA: 3.857/4.0
Thesis Title: Distributed Software Architectures for Large-scale Workflow using CORBA
1998. **B.Sc.** in **Computer Engineering.** University of Campinas (UNICAMP), Brazil**,** GPA: 0.748/1.0

SELECTED PROJECTS

2014 – present. GE Global Research.
Automation and optimization of industrial work. Research & development of mobile and wearable apps used to optimize and automate industrial workflows. Helping people connect to insights & capture data as they perform industrial work. Interfacing with industrial machines and robots using IoT protocols including Bluetooth, MQTT, and ROS. Integration with corporate information systems via JDBC and REST endpoints. Selected projects:

- **Digital Ghost App.** Developed Web app to log and visualize cyber-attacks on industrial assets. Built the infrastructure to store and analyze high-throughput time series data produced by the Digital Ghost agents, allowing users to rapidly detect and respond do cyber threats detected on critical industrial infrastructure.

- **Distributed Platform for Rapid Simulation Prototyping**. Design & implementation of message-driven framework supporting micro-services to facilitate the development of next generation train handling and control center for GE Transportation. Implemented Web and mobile apps using the new framework.
- **Machining Cost Optimization**. Developed Web app that optimizes CNC machining operations, allowing aviation workshop workers to save costs, and share their expertise throughout the organization.
- **Inspection & Overhaul Automation**: Develop Mobile apps used by GE Power engineering teams as a single point of access to all their information needs including: project management, time keeping, schematics & documents, reporting, and collaboration. Implemented server-side API gateway and offline operation.
- **Model-based robotic inspection**. Implemented middleware connecting UI and controls, allowing semi-autonomous robotic inspections of industrial assets.
- **Wearables@GE**. Apply speech recognition and wearable computing in support of different hands-free industrial scenarios involving field workers: wireless measurements, photo documentation, real-time video.

2009 – 2013. SIEMENS Corporate Research.
Software Tools for test automation and software quality analysis: Project manager & developer for Tedeso/UML, a model-based testing IDE. For 4 years, lead a small team of interns in the development of extensions and core capabilities including requirements-driven regression and prioritization of tests and workflow-driven UI. Tedeso can achieve high degrees of test coverage, by automatically generating tests based on UML system specification, at a fraction of time of conventional manual testing approaches.
Technologies: Java, Eclipse RCP, GEF, UML, model-based testing, Jenkins, Cruise Control.

2007 – 2009. UC, Irvine (UCI). **Analysis of Flexibility Trade-offs in Publish/Subscribe Infrastructures**: Developed a versatile pub/sub middleware evaluating it against different research and industrial publish/subscribe infrastructures, measuring and comparing their performance, maintainability, reusability, usability and flexibility. Produced different versatile software design principles and best practices.
Technologies: Java and RMI, CORBA-NS, JMS, JavaSpaces, Siena, YANCEES, OO metrics and analysis.

1998 – 2000. University of Campinas, São Paulo, Brazil (UNICAMP): **Agent-based Workflow on Distributed Environment**: Developed and evaluated the scalability of a distributed architecture for large-scale workflow as part of my Master's Thesis. This work shows the scalability benefits of a peer-to-peer agent-based workflow management system and discusses extra security and management costs induced by the approach.
Technologies: Java, JavaCC, CORBA, Workflow Management Systems, Mobile Agents, benchmarking.

TEACHING EXPERIENCE

Fall 2001 – Spring 2002. Introduction to Computer Science II. UC, Irvine (UCI)
Topics: Data Structures, Software Complexity, Java and Scheme programming.
Fall. 2000. Introduction to Software Engineering. UC, Irvine (UCI)
Topics: Software Engineering fundamental principles, techniques and processes.

HONORS AND AWARDS

2007. Bren School Summer Dissertation Fellowship, UC, Irvine, CA.
2001. **Best thesis award** (second place): VIII CLEI-UNESCO Latin American M.Sc. Thesis Context.
1998 – 2000. Scholarships to support M.Sc. Studies from FAPESP and CNPq, Brazil Research Agencies.

SKILLS

Programming Languages: Java, JavaScript, SQL, C#, Python, Go, LISP, Pascal, Prolog, C, C++, others.
Technologies: UI frameworks: Polymer, Vue.js, React, AngularJS; Mobile computing: Android, Cordova; Distributed Systems: REST Web Services, Docker, Event-based middleware, Distributed Network Objects (RMI, CORBA); Software Engineering: Software Product Line Engineering, UML Modeling, Software Architecture and ADLs, Aspect-Oriented Programming, Database and Internet Programming. Others: XML, Eclipse RCP and OSGi.
Processes: Agile Methods and Object-Oriented design principles and metrics, Rational Unified Process.
Operating Systems: Unix/Linux and Windows administration.

PATENTS & PUBLICATIONS

Author of more than 35 peer-reviewed publications; 6 US patents and 12 technical reports.
More details at the website: https://rsilvafi.github.io/publications.html