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Roberto S. Silva Filho

EXPERTISE

Experienced researcher and practitioner in the areas of Software Engineering, HCI & CSCW. Development of intelligent industrial Web, mobile and wearable apps. 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 Vernova Advanced Research (Former GE Research),** San Ramon, CA
Senior Scientist, Software, AI & Robotics Lab
Full stack R&D of industrial applications applying UX, IoT, AI services & Software Engineering techniques to automate and optimize industrial workflows across GE [MS'15], [HCII'15], [IJCC'20].
Keywords: Web, mobile & wearable industrial apps, distributed simulation platforms and UX.

2009 – 2013**. SIEMENS Corporate Technology,** Princeton, NJ
Software Engineer/Researcher, Software Architecture Development Lab.
Full stack R&D of advanced software engineering tools & methods for the automation and optimization of industrial systems and user workflows across SIEMENS businesses.
Keywords: Software Architecture Analysis and Improvement, Software Quality Assurance [AOSD'11], Model-Driven Development & Testing [ICST'12], Workflow Automation [IJCIS'15], [HFES'12].

Summer 2004. **IBM T. J. Watson Research Center,** Cambridge, MA
Research Intern, Collaborative User Experience Lab.
Developed, benchmarked and compared different architectural approaches for the construction of contextual collaboration servers used within IBM products.
Keywords: Contextual collaboration servers, performance simulation and benchmarking [JUCS'08].

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, Event-Based Middleware, CSCW**
Dissertation Title: An Empirical Study of Publish/Subscribe Middleware Versatility [UCI'09]
2003. **M.Sc. Information and Computer Sciences.** UC, Irvine, CA, USA. GPA: 3.906/4.0
Concentration area: **Software Engineering**
2000. **M.Sc. Computer Science**. University of Campinas (UNICAMP), Brazil, GPA: 3.857/4.0
Thesis Title: Distributed Software Architectures for Large-scale Workflow using CORBA [CLEI'01]
1998. **B.Sc. Computer Engineering.** University of Campinas (UNICAMP), Brazil**,** GPA: 0.748/1.0

SELECTED PROJECTS

2013– present. GE Global Research.

- **Borescope Inspection Search Engine**. Developed Web document repository and search engine providing instant access to thousands of legacy inspection reports, assets analytics of inspection images. Optimization of GE Gas Power inspection workflow, reducing costs from days to minutes.
- **Digital Ghost.** Developed the Web app used to visualize cyber-attacks on industrial assets. Built the infrastructure to log and analyze high-frequency time series data produced by the Digital Ghost agents, allowing users to rapidly detect and respond do cyber threats to critical industrial infrastructure [GE'20].
- **Distributed Platform for Rapid Simulation Prototyping**. Developed a event-driven services coordination framework to facilitate the development of next generation train handling and controls. Used the framework to develop human-in-the-loop remote train handling simulator [WSC'17].

- **Fieldwork Automation**: Developed mobile apps used by GE Power field engineers 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 disconnected operation [MS'15] [HCII'15].
- **Model-based robotic inspection**. Implemented middleware connecting UI and drone controls, allowing supervised semi-autonomous robotic inspections of industrial assets [EDGE'18].
- **Wearables@GE**. Applied speech-driven wearable computing in support of hands-free workflow applications including: wireless measurements, photo documentation, real-time video communication.

2009 – 2013. SIEMENS Corporate Research.
IDE for model-based test automation: Project manager & developer for TEDESO/UML, a model-based testing IDE. Lead, for 4 years, a small team of interns in the development of extensions and core capabilities including requirements-driven regression and prioritization of tests [STA'10]. 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 [ASE'13].
Technologies: Java, Eclipse RCP, GEF, UML, model-based testing, Jenkins, Cruise Control.

2007 – 2009. UC, Irvine (UCI). PhD dissertation: **Analysis of Flexibility Trade-offs in Publish/Subscribe Infrastructures**: Developed YANCEES, a versatile pub/sub middleware evaluating it against different research and industrial message-oriented middleware, measuring and comparing their performance, maintainability, reusability, usability and flexibility. Published different versatile software design principles and best practices [ISR'09].
Technologies: Java, CORBA-NS, JMS, JavaSpaces, Siena, YANCEES, OO metrics and analysis.

1998 – 2000. University of Campinas, São Paulo, Brazil (UNICAMP): M.S. Thesis: **Agent-based Workflow on Distributed Environment**: Developed and evaluated a scalable peer-to-peer workflow automation framework with more traditional centralized approaches. Discussed the scalability, performance, security and management trade-offs of each approach [ISADS'99].
Technologies: Java, DSL, 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: Web UI frameworks: Vue.js, Angular, React.js, Polymer; Mobile platforms: Android, Cordova; Distributed Systems: REST Web Services, Docker, Event-based middleware, Distributed Network Objects (RMI, CORBA); Software Engineering Technologies: Software Product Lines, Model-Driven Engineering, Software Architecture and ADLs, Aspect-Oriented Programming, OSGi components.
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