Sonal Mahajan, Ph.D.

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SUMMARY

- Enthusiastic and driven software professional with 10+ years of research and development experience
- Expertise in automating software tasks (e.g., bug fixing) and increasing developer productivity using program analysis (static and dynamic) and AI techniques
- Filed 7 patents (2 granted); Authored 15 technical papers at top venues; Received 3 best paper awards and a Distinguished Achievement Award; Peer-reviewed research papers for 10+ conferences/journals
- Strong communication skills and ability to work independently or as part of a team

EXPERIENCE HIGHLIGHTS

Fujitsu Research of America, Inc. — Sunnyvale, CA
Research Scientist — *Sep 2018 – Present*

- Building a novel **Automated Machine Learning (AutoML)** technique to synthesize Machine Learning (ML) pipelines from human-written solutions using program analysis and machine learning
- Led the design and development of a novel **Automated Program Repair** technique for synthesizing fixes for Java program crashes using program analysis and mining repairs from Stack Overflow
- Mentored 3 summer interns and collaborated with teams comprising of 10-15 researchers/engineers
- Filed 6 US patents (2 granted), published 2 technical research papers, successful business trials

Research Intern — *May 2015 – Aug 2015*

- Designed and implemented a Javascript library to enable seamless porting of native device PhoneGap features to desktop browsers for automatic test case generation

University of Southern California — Los Angeles, CA
Doctoral Researcher — *Aug 2012 – Aug 2018*

- Researched and developed a suite of four novel AI-based techniques for the automated repair of UI problems in web applications, such as cross-browser issues and internationalization problems
- Designed the techniques using guided search-based algorithms and image processing
- Repaired UIs of web pages with an accuracy of over 85% and a user satisfaction rate of over 75%
- Supervised 3 Ph.D. and 2 undergraduate students, and collaborated with 2 research groups
- Published 13 technical papers (11 first author), received 3 best paper awards, filed 1 US patent, co-wrote a successful $375,000 NSF grant

Great Software Laboratory — Pune, India
Software Engineer — *Aug 2009 – Jul 2010*

- Built modern web application as a full-stack developer using Java, Spring, jQuery, and MySQL
- Deliberated new product features with designers and stakeholders, earned customer appreciation

EDUCATION

University of Southern California, CA — *Aug 2012 - Aug 2018*
Ph.D. in Computer Science

- Thesis: Automated Repair of Presentation Failures in Web Applications Using Search-based Techniques

San Francisco State University, CA — *Aug 2010 - May 2012*
M.S. in Computer Science

University of Pune, India — *July 2004 - June 2008*
B.S. in Computer Science

RELEVANT SKILLS

- **Languages:** Java, Python, C, C++, Matlab, Octave, R, SQL, Ruby, Bash, Perl
- **Technologies:** Maven, AWS, Git, LaTeX, OpenCV, Docker
- **Web Development:** HTML, CSS, Javascript, jQuery, XML, PHP, J2EE, Tomcat, Spring MVC
- **Courses:** Program Analysis, Artificial Intelligence, Machine Learning, Computer Vision, Analysis of Algorithms, Software Engineering, Data Structures

LEADERSHIP AND PROFESSIONAL ACTIVITIES

- **Mentorship:** Supervised 5 students (3 Ph.D. and 2 undergraduate) and 3 summer research interns, resulting in 8 published technical papers
- **Teaching:** Conducted labs, graded homework assignments, and contributed to curriculum design in classes totaling over 200 students
- **Reviewing:** Extensive experience in peer-reviewing research work in the Software Engineering field. Conferences: ICSE'23, ISSTA'22, ICSE'22 (ACM-SRC), FSE'20, ICST'19, ICWE'19, ISSTA'20 (Tool Demo), MSR'19 (Data Showcase), and ISSTA'19 (Artifact Evaluation). Journals: EMSE'20, TSE'19, and STVR'17
- **Organization:** Student Volunteer Co-Chair for ISSTA'22, Web Co-Chair for ICSE'16

HONORS AND AWARDS

- President's Award for Innovation, Fujitsu Laboratories Ltd., 2019
- Finalist for the ACM SIGSOFT Outstanding Doctoral Dissertation Award, 2019
- Finalist for the PhD Achievement Award, University of Southern California, 2018
- Best/Distinguished Paper Awards at ICST 2018, ISSTA 2017, and ICST 2016
- Graduate Distinguished Achievement Award, San Francisco State University, 2012
- Travel award to attend ASE 2014, ICSE 2016, ISSTA 2017
- Anita Borg Scholarship for Grace Hopper Conference, 2016
- Scholarship of Distinction and Merit, University of Pune, 2004 – 2008
- National Merit Scholarship, India, 2004

SELECTED PUBLICATIONS

Google Scholar Citations: 351, h-index: 11

- **S. Mahajan**, N. Abolhassani, M. R. Prasad. "Recommending Stack Overflow Posts for Fixing Runtime Exceptions using Failure Scenario Matching." *Foundations of Software Engineering (ESEC/FSE)*, 2020
- **S. Mahajan**, N. Abolhassani, P. McMinn, W. Halfond. "Automated Repair of Mobile Friendly Problems in Web Pages." *International Conference on Software Engineering (ICSE)*, 2018
- **S. Mahajan**, A. Alameer, P. McMinn, W. Halfond. "Automated Repair of Internationalization Presentation Failures in Web Pages Using Style Similarity Clustering and Search-Based Techniques." *International Conference on Software Testing, Verification and Validation (ICST)*, 2018. *[Invited to Journal Special Edition]* *Distinguished Paper Award*
- **S. Mahajan**, A. Alameer, P. McMinn, W. Halfond. "Automated Repair of Layout Cross Browser Issues using Search-Based Techniques." *International Symposium on Software Testing and Analysis (ISSTA)*, 2017. *Distinguished Paper Award*
- A. Alameer, **S. Mahajan**, W. Halfond. "Detecting and Localizing Internationalization Presentation Failures in Web Applications." *International Conference on Software Testing, Verification and Validation (ICST)*, 2016. *Best Paper Award*