Saahil Ognawala

Ph.D. student in Computer Science with a passion for security and secure software development

Pfeuferstraße 40
81373 Munich
Germany
+49 (176) 349 93325
saahil.in@gmail.com
saahil.github.io
DOB: 11.08.1989
Nationality: Indian

Profile Highlights

- **Experienced software engineer**: Demonstrable programming skills in Python, C++, C and Java through over 8 years of combined academic and industrial experience. Acquired software design and architectural skills through applied research.
- **Strong security focus**: Developed highly scalable software solutions (published in peer-reviewed venues and released as several state-of-the-art open-source software) for finding low-level vulnerabilities. Reviewed and assessed impact of critical flaws in medium- to- large-scale and widely-used system software.
- **Presentation and communication skills**: Over 15 presentations of personal and organizational work to international community of researchers and practitioners. Efficiently handled interactions with cross-domain teams of academic and industrial partners.
- **Effective pedagogic skills**: Taught over 5 bachelor's and master's level courses and supervised various student theses. Obtained stellar teaching reviews and student ratings during academic stint.
- **Team-play and leadership**: Can motivate and drive successful teams of engineers, young and experienced, alike.

Education

2015–2019 **Doctor of Philosophy in Natural Sciences**, *Technical University of Munich*, Germany.
Specialization: Software Engineering, Testing Intelligence
Thesis Topic: Scalable Greybox Fuzzing for Effective Vulnerability Management

2012–2014 **Master of Science**, *Technical University of Munich*, Germany.
Specialization: Artificial Intelligence, Software Engineering
Thesis Topic: Regularizing Recurrent Neural Networks

2007–2011 **Bachelor of Engineering**, *Manipal Institute of Technology*, India.
Thesis Topic: Active Data-in-Motion Security in Enterprise Networks

Experience

2015–Current **Researcher and Ph.D. student**, *TU Munich,* Germany, Python, C, C++.
- Adaptive hybrid combination of blackbox fuzzing and concolic execution to find low-level vulnerabilities in programs.
- Compositional reachability and exploitability analysis of vulnerabilities.
- Domain specific vulnerability assessment using experiential knowledge.

2018–2018 **Summer Intern**, *Imperial College London,* United Kingdom, Python, C, C++.
- Tight integration between AFL fuzzer and KLEE concolic execution engine.

2012–2014 **Scientific Assistant**, *TU Munich,* Germany, Python, C.
- Classification of surface texture for robot handling using deep-learning.
- NLP-based analysis of user stories to gain insight into wrong estimations, for agile development companies.

2011–2012 **System Software Engineer**, *Hewlett-Packard Corp.,* Bangalore, India, C++, Java.
- Development of the backbone architecture for SOAP based web services framework on HP's proprietary NonStop OS. Responsible for implementing WS-Security.

2011–2011 **Bachelor Thesis Intern**, *RSA - The security division of EMC,* Bangalore, India, C.
- QA for Data Loss Prevention (DLP) and integration of two RSA products, viz. DLP and Archer (e-Governance, Risk Control Suite).

2010–2010 **Summer Intern**, *Jawaharlal Nehru University,* New Delhi, India, C.
- Implementing and evaluating basic techniques of web recommender systems over MovieLens database.

2009–2009 **Summer Intern**, *Otto von Guericke Universitat,* Magdeburg, Germany, PHP.
- Modelling software failure modes and effects analysis (SFMEA) through a web tool; Analyzing risk factors in SPLC stages defined in different software development models.

Relevant Academic Projects

- **Regularization of Recurrent Neural Networks** Python
  - Comparing the performance (w.r.t. vanishing gradients) of norm-based regularizers in deep time-series networks with advanced techniques like fast-dropout, Hessian-free optimization and spectral radii.
- **Tactile Manipulation (TACMAN) Using BioTac Data** Python
  - Using pressure, force, torque and piezoelectric sensor data to classify surface information such as friction and curvature, from robot hands.
- **Segmentation of Erythema in Multispectral Skin Images** Python, C++
  - Deep learning on spectral data from 10-channel camera to learn properties of lesions in different skin diseases; Real-time segmenting of affected skin regions.
- **Network Traffic Monitor** C
  - Implementing active 'data-in-motion' security; TCP packet sniffing and sensitivity checks using Perl style regular expressions.

Teaching Experience

- **Advanced Concepts in Software Engineering** Master's level lecture course, *Winter semester 2017/18*
- **Modelling of Distributed Systems** Master's level lecture course, *Summer semesters 2016, '17, '18*
- **Fuzz Testing for Vulnerability Detection** Master's level seminar, *Winter semester 2016/17*
- **Introduction to Programming and Systems Engineering** Master's level lecture course, *Winter semester 2016/17*
- **Secure coding**, Master's level practical course, *Winter semester 2015/16*
- **Introduction to Software Engineering**, Bachelor's level lecture course, *Summer semester 2015*

Key skills

Programming Languages	Python, C, C++, Java, HTML, CSS
Databases	MySQL, SQLite, PostgreSQL
Frameworks	PyLearn,Theano,Scikit-learn,Django

Languages

English	Second Native Level
Hindi	Native Level
German	B1

Interests

Kickboxing, bouldering, literature, Rubik's cube enthusiast (best time of 160s on 3x3), hip-hop and jazz music. I play the keyboard and melodica.

References

To be provided on request.

Publications

Ognawala, S., A. Pretschner, T. Hutzelmann, E. Psallida, and R. N. Amato. Reviewing klee's sonar-search strategy in context of greybox fuzzing. *1st International KLEE Workshop*, 2018.

Ognawala, S., R. N. Amato, A. Pretschner, and P. Kulkarni. Automatically assessing vulnerabilities discovered by compositional analysis. In *Proceedings of the 1st International Workshop on Machine Learning and Software Engineering in Symbiosis*, 2018.

Ognawala, S., A. Petrovska, and K. Beckers. An exploratory survey of hybrid testing techniques involving symbolic execution and fuzzing. *arXiv preprint arXiv:1712.06843*, 2017.

Ognawala, S,, T. Hutzelmann, E. Psallida, and A. Pretschner. Improving function coverage with munch: A hybrid fuzzing and directed symbolic execution approach. In *Proceedings of the Symposium on Applied Computing*, 2017.

Ognawala, S., M. Ochoa, A. Pretschner, and T. Limmer. Macke: Compositional analysis of low-level vulnerabilities with symbolic execution. In *Automated Software Engineering (ASE), 2016 31st IEEE/ACM International Conference on*, 2016.

M. Karl, A. Lohrer, D. Shah, F. Diehl, M. Fiedler, **Ognawala, S.**, J. Bayer, and P. van der Smagt. Ml-based tactile sensor calibration: A universal approach. *arXiv preprint arXiv:1606.06588*, 2016.

A. Vetro, **Ognawala, S.**, D. M. Fernández, and S. Wagner. Fast feedback cycles in empirical software engineering research. In *Proceedings of the 37th International Conference on Software Engineering-Volume 2*, 2015.

A. Duliu, R. Brosig, **Ognawala, S.**, T. Lasser, M. Ziai, and N. Navab. Illumination compensation and normalization using low-rank decomposition of multispectral images in dermatology. In *International Conference on Information Processing in Medical Imaging*, 2015.

Ognawala, S. and J. Bayer. Regularizing recurrent networks-on injected noise and norm-based methods. *arXiv preprint arXiv:1410.5684*, 2014.

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J. J. Cuadrado-Gallego, P. Rodríguez-Soria, A. González, D. Castelo, and **Ognawala, S.** Early functional size estimation with ifpug unit modified. In *Computer and Information Science (ICIS), 2010 IEEE/ACIS 9th International Conference on*, 2010.