

# Parnian Shabani Kamran

Electrical and Computer Engineering Department, University of California, Davis

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## RESEARCH INTERESTS

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**Trustworthiness of AI-based Programming Tools:** Improving the trustworthiness of Large Language Models (LLMs) for code-related tasks using **safety policies**, **formal methods** and **verification**

**Supply Chain Security:** Discovering security vulnerabilities and detection of open source supply chain threats using **analysis tools**

**Proof Automation:** Automating proof generation by applying **reasoning**, **prompting**, and retrieval augmentation(RAG) techniques on LLMs

## SKILLS

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**Programming:** Rust, Python, Dafny, C++11, JavaScript  
**Libraries:** LangChain, Pandas, NumPy, PyTorch, Scikit-Learn, OpenCV, Hypothesis  
**Software & Tools:** **Theorem Prover:** Z3  
**Parallel Programming:** OpenCilk  
**Performance Analyzer:** Intel VTune, AMD uProf, Perf  
**Machine Learning:** WEKA

## RESEARCH PUBLICATIONS

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**Parnian Kamran**, Premkumar Devanbu, and Caleb Stanford. 2024. **Vision Paper: Proof-Carrying Code Completions**. In 39th IEEE/ACM International Conference on Automated Software Engineering Workshops (ASEW '24), October 27-November 1, 2024, Sacramento, CA, USA.  
<https://doi.org/10.1145/3691621.3694932>

A. A. Zeraatkar, **P. S. Kamran**, I. Kaur, N. Ramu, T. Sheaves and H. Al-Asaad, **On the Performance of Malware Detection Classifiers Using Hardware Performance Counters**, 2024 International Conference on Smart Applications, Communications and Networking (SmartNets), Harrisonburg, VA, USA, 2024, pp. 1-6, doi: 10.1109/SmartNets61466.2024.10577644.

A. A. Zeraatkar, **P. S. Kamran** and H. Al-Asaad, **Advancements in Secure Computing: Exploring Automated Repair Debugging and Verification Techniques for Hardware Design**, 2024 IEEE 14th Annual Computing and Communication Workshop and Conference (CCWC), Las Vegas, NV, USA, 2024, pp. 0357-0364, doi: 10.1109/CCWC60891.2024.10427806.

## WORK EXPERIENCE

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Software Engineer, Snapptrip (A local platform for accommodation and travel bookings) *Nov 2017 - Dec 2020*

- Developed responsive user interfaces for fulfillment workflows, including cancellations, order tracking and administrative dashboards, using modern JavaScript frameworks such as React and AngularJS with real-time data synchronization features utilizing WebSockets and REST API integrations.
- Integration of visual data representation tools within the administrative dashboards to assist administrators in tracking bookings and cancellations and exporting reports in PDF and CSV formats to improve revenue analysis by the finance department, increasing booking fulfillment rates by 87% during peak periods.
- Implemented data management features, such as filtering and sorting by booking status, customer, date, and location, to facilitate the handling of large amounts of data by the data analysis team

Intern, Huawei LTE Network Optimization Team *July 2016 - Oct 2017*

- Automated monitoring and tracking of network failures using Python, macros, and shell scripting, reducing performance KPI monitoring time by 14 hours/week

- Visualized network failure trends and performance KPIs to monitor network issues, leading to the responsibility for TDD LTE daily network reporting

## EDUCATION

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### Ph.D. Computer Engineering

*September 2021 - Till date*

*Department of Electrical and Computer Engineering, University of California, Davis*

**Expertise:** Natural Language Processing, Source code Analysis, Programming Languages, Formal Methods, Vulnerability Analysis, Machine learning

**Current Research:** *Improving Large Language Models (LLMs) trustworthiness in code-related tasks using formal verification and latest prompting and reasoning techniques including Chain of Thought (COT), using AI agents and external knowledge with Retrieval-Augmented Generation (RAG)*

### M.Sc. Computer Engineering

*September 2014 - 2016*

*Department of Computer Engineering, Amirkabir University of Technology*

**Thesis:** *Design and development of a process-variation resilient aging sensor for detecting hardware aging in the presence of process verification*

### B.Sc. Computer Engineering

*September 2008 - 2013*

*Department of Electrical and Computer Engineering, Isfahan University of Technology*

**Thesis:** *Development of an Android application for currency recognitions for visually-impaired people*

## ACADEMIC SERVICES

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<b>Session chair</b>	Automated Software Engineering (ASE) - 2024
<b>Reviewer</b>	IEEE Access - 2024
<b>Committee Member</b>	FPGA Hackathon - 2015

## VOLUNTEER EXPERIENCE

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- Student volunteer for Automated Software Engineering (ASE) *Oct 2024*
- Onboarded and trained 5 new hired members within a three-month period, Huawei *Oct 2016*