Sankarasubramanian Ganesh (Shankar Ganesh)

CONTACT INFORMATION

- *email*: shankargss@icloud.com
- *website*: https://ravenheartss.github.io/

EDUCATION

- University of Calgary, Calgary, AB Canada
  Master of Science (M.Sc.) in Computer Science
  Convocated Winter 2024
  Thesis: FrAG: A Framework for Automated Game Analysis
  Advisor: Prof. John Aycock

- University of Calgary, Calgary, AB Canada
  Bachelor of Science (B.Sc.) in Computer Science
  Convocated Spring 2021 with Distinction

AWARDS

- Best Paper Award, Foundations of Digital Games Conference (2022)
- International Student Graduate Tuition Award (2021–2024)
- Dean's List, Faculty of Science (2018–2020)

PUBLICATIONS

- Shankar Ganesh, Matthew Michaud, Akil Fletcher, John Aycock, Katie Biittner and Carl Therrien. 2022. Replaying Early Video Game History: The Channel F. Sidestone Press. To be published.
- S. Ganesh, J. Aycock and K. Biittner, FrAG: A Framework for the Analysis of Games. 2023 IEEE Conference on Games (CoG), Boston, MA, USA, 2023, pp. 1-4.
- John Aycock, Shankar Ganesh, Katie Biittner, Paul Allen Newell, and Carl Therrien. 2022. The Sincerest Form of Flattery: Large-Scale Analysis of Code Re-Use in Atari 2600 Games. In Proceedings of the 17th International Conference on the Foundations of Digital Games (FDG 22). Association for Computing Machinery, New York, NY, USA, Article 26, 1-10.

CONFERENCES & WORKSHOPS

- Contributed talk at the IEEE Conference on Games 2023 (Virtual), Boston MA, Aug. 23, 2023.
- Workshop: Platform studies and code reading, *History of Games* (Virtual), Nov. 8, 2022.
- Contributed talk at the Blockchain Technology Symposium 2022 (Virtual), Jun. 9, 2022.

Projects & Research Experience

- ◇ Replaying Early Video Game History: The Channel F
  - · Used the AI-driven framework FrAG to reveal patterns in game implementation, such as memory usage.
  - · Reverse engineered Channel F games for in-depth analysis with FrAG.
- ◇ FrAG: A Framework for the Analysis of Games
  - · Designed and developed an automated framework for analysis of video games within the MAME emulator.
  - · Created a novel "point disassembler" that leverages execution data to distinguish code from data in ROM images improving disassembly accuracy, aiding in reverse engineering ROMs.
  - · Conducted extensive evaluation of FrAG using a test suite of Atari 2600 games, demonstrating its effectiveness in game analysis and reverse engineering.
- ◇ Security Analysis of Android Crypto Wallets
  - · Reverse engineered a collection of popular Android cryptocurrency wallets implementing Bitcoin Improvement Protocol 32.
  - · Performed static analysis and threat modeling to identify potential security vulnerabilities and privacy issues.
  - · Uncovered concerning practices, such as storing master keys on the device with insufficient security measures, highlighting risks for users.
- ◇ A Network Analysis and Interactive Visualizer of UofC CPSC Courses
  - · Developed a graph-based model to analyze and optimize course paths in the Computer Science curriculum at the University of Calgary, identifying bottleneck courses and potential redundancies in course prerequisites.
  - · Created an interactive course visualizer tool using JavaScript to aid students in navigating course prerequisites and exploring potential academic paths.
  - · Performed a comparative analysis of the 2009 and current curricula, highlighting shifts in course offerings and trends towards practical and engineering-focused computer science education.
- ◇ Reverse Engineering Tide
  - · Reverse engineered Tide, an Android application, uncovering a collection of private identifiers in violation of Google Play Store policies.
- ◇ Large Scale Analysis of Code Re-Use in Atari 2600 Games
  - · Developed tools to identify and analyze shared code sequences across 1.984 Atari 2600 game ROM images.
  - · Investigated patterns of code re-use at multiple levels, offering insights into the early software development practices.

Teaching

- ◇ Teaching Assistant, CPSC 525/625: Principles of Computer Security, University of Calgary (Fall 2023).
- ◇ Teaching Assistant, CPSC 411: Compiler Construction, University of Calgary (Winter 2023).
- ◇ Teaching Assistant, CPSC 525/625: Principles of Computer Security, University of Calgary (Fall 2022).
- ◇ Teaching Assistant, CPSC 411: Compiler Construction, University of Calgary (Winter 2022)

· Nominated for Teaching Excellence Award.

Languages

◇ Programming: C, C++, Go, Rust, Python, Java, Bash, ARMv8 Assembly

◇ Other: Flex, Bison, LaTeX, LLVM, make, Git

◇ Languages: Tamil (native proficiency), English (native proficiency), Hindi (professional proficiency)