

# Pranav Waghanna

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## Education

**University of Rochester**, Master of Science in Computer Science Aug 2024 – Dec 2025

- CGPA: 3.59/4.0

• **Coursework:** Computer Security Foundations, Collaborative Programming, Intro to Cryptography

**Pune Institute of Computer Technology**, Bachelor in Information Technology Aug 2020 – Jun 2024

- CGPA: 8.19/10

• **Coursework:** Operating Systems, Computer Networks, Processor Architecture, Data Structures and Algorithms

## Projects

**eBPF System and File Access Monitor** (View Project) Nov 2025 – Dec 2025

- Designed and implemented a kernel-level security monitor with eBPF (BCC) to trace critical syscalls, capturing 14K+ events in 32 seconds (447 events/sec) with zero event loss.
- Developed heuristic-based detection mechanisms using advanced data structures and algorithms for identifying suspicious file access, directory traversal, and sensitive port activity; flagged malicious activities (2.8% of total events) in real time.
- Evaluated runtime overhead using syscall tracing techniques, identifying a 2x latency increase in 'ls' execution (0.015s to 0.031s) while maintaining a minimal CPU and memory footprint.

**Houdini: VFS-layer Rootkit for FreeBSD** (View Project) Sept 2025 – Dec 2025

- Engineered kernel-mode rootkit within the VFS layer, strategically intercepting 'getdirents64()' and process list operations to conceal 6 targeted files, demonstrating advanced low-level system manipulation techniques.
- Evaded security tools by bypassing traditional syscall based monitoring using VFS function pointers, demonstrating deep kernel compromise and overcoming challenges with defined constants.
- Demonstrated expertise in kernel-mode programming on the FreeBSD operating system through VFS layer manipulation, investing 60 hours in rootkit design and implementation.

**Roomsense: AR-Based Classroom Engagement System** (View Website) (Demo) Sept 2025 – Dec 2025

- Proposed a full-stack AR system integrating Snap Spectacles, a web platform, a MongoDB Database and Flask backend services, supporting real-time visualization at 20 FPS with less than 1s UI update latency.
- Spearheaded the development of on-device engagement estimation, integrated facial landmark analysis across 10+ signals per frame with a team of 4, and preserved user privacy.
- Orchestrated user testing with eight participants to evaluate the software system, leading to a perfect 100% task completion rate and an average satisfaction score of 8.75/10, uncovering previously unknown needs.

**LHUPR: Modular Software Engineering Project** Sept 2025 – Dec 2025

- Architected and led a team of four in developing a multi module distributed version control system (DVCS) using Rust language, creating formal design documentation and weekly reports over 8+ weeks.
- Generated complete module specifications, SPMP, and weekly progress reports for 6+ software components over a 4 week development cycle, facilitating zero late-stage architectural refactors.
- Established rigorous interface definitions across the software modules, decreasing integration errors by 20% and improving code reusability system-wide, reducing debugging time by 7 hours weekly.

## Skills

**Languages:** C/C++, Java, SQL, JavaScript, Python, Rust, HTML, CSS, Shell, Bash.

**Technologies:** MERN stack (MongoDB, Express, ReactJS, Node.js), Sockets, Cybersecurity, Cryptography, Computer Networks, Penetration Testing, Web Fuzzing, Footprinting, AWS(EC2, S3), Git, Github Copilot, CAD

## Publications

**Effects of Adopting Industry 4.0 on a Manufacturing plant** Mar 2024

*P. Waghanna*, A. Reddy, S. Deshpande, S. Chavan, V. R. Jaiswal and V. Naranje

DOI: 10.1109/ICRITO61523.2024.10522189