Keshara Weerasinghe

AI/ML Research Intern

PhD Candidate in Computer Engineering | University of Virginia
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Research Interests

Multimodal and Egocentric Activity Recognition, Human-centered AI Systems, Real-time Cognitive Assistance, Dependable AI for Safety-critical and Resource-Constrained Environments.

Education

University of Virginia Charlottesville, VA
PhD in Computer Engineering (GPA: 3.86/4.00) *August 2022 – Present*

- **Relevant Coursework:** Advanced Embedded Systems, Advanced Computer Architecture, Dependable Computing Systems, Machine Learning and Image Analysis, Reinforcement Learning.

University of Peradeniya Peradeniya, Sri Lanka
BSc in Computer Engineering (GPA: 3.70/4.00) *November 2016 – September 2021*

- **Relevant Coursework:** Embedded Systems, Data Structures & Algorithms, Operating Systems, Programming Methodology, Computer Architecture, Advanced Computer Communication Networks, Advance Database Systems.

Selected Publications

- **Weerasinghe, K.**, Ge, X., Heick, T., Wijayasingha, L.N., Cortez, A., Satpathy, A., Stankovic, J., and Alemzadeh, H. (2026). EgoEMS: A High-Fidelity Multimodal Egocentric Dataset for Cognitive Assistance in Emergency Medical Services. **AAAI 2026 AISI Track** Acceptance Rate 24.1%
- **Weerasinghe, K.**, Janapati, S., Ge, X., Kim, S., Iyer, S., Stankovic, J. A., & Alemzadeh, H. (2024). Real-Time Multimodal Cognitive Assistant for Emergency Medical Services. **IoTDI 2024** Acceptance Rate 36.7%
- **Weerasinghe, K.**, Roodabeh, S. H. R., Hutchinson, K., & Alemzadeh, H. (2024). Multimodal Transformers for Real-Time Surgical Activity Prediction. **ICRA 2024** Acceptance Rate 44.8%

Technical Skills

Machine Learning & Perception: Deep Learning, Transformers, Multimodal Learning, Activity Recognition, Computer Vision, Sensor Fusion, Real-Time / Edge AI Inference
Frameworks & Scientific Computing: PyTorch, CUDA, OpenCV, NumPy, SciPy, Pandas, Matplotlib
Programming & Systems: Python, C, C++, Java, Go, Linux, Embedded AI (NVIDIA Jetson, Vuzix AR Glasses)
Data Engineering & Experimentation: Multimodal Dataset Design, Annotation Pipelines, Data Synchronization, Visualization Tools, Performance Benchmarking
Cloud & Software Infrastructure: Microsoft Azure, AWS, Docker, CI/CD (GitHub Actions), REST APIs, NodeJS, Angular
Sensors, Protocols & Hardware: Azure Kinect SDK, Smartwatch IMU Integration, MQTT, HL7 Medical Protocol, PCB Design, CAD/CAM, Rapid Prototyping

Experience

Graduate Research Assistant August 2022 – Present
University of Virginia - Link Lab *Charlottesville, VA*

- Developing **CognitiveEMS**, a context-aware AR assistant for EMS responders. Built video-based action recognition models optimized for edge devices (NVIDIA Jetson) using multimodal sensor data.
- Lead the development of a unified hardware-software data collection system integrating Azure Kinect, GoPro, and Smartwatches to capture high-fidelity egocentric datasets.
- Developed real-time multimodal activity recognition model for **robot-assisted surgery**, leveraging Transformers to predict surgical activities and improve operational reliability.
- **Tech Stack:** Python, PyTorch, C++, CUDA, Azure Kinect SDK, Android, Java, Vuzix AR Glasses.

Trainee Software Engineer Mar 2021 – Sep 2021

99x Technology *Colombo, Sri Lanka*

- Contributed to development of enterprise-scale web applications, focusing on authentication, localization, and cloud-integrated services.
- Built REST APIs and supported CI/CD pipelines for automated testing and deployment.
- **Tech Stack:** Angular, .NET Core, C#, Azure, TypeScript.

Instructor / Teaching Assistant September 2021 – July 2022

University of Peradeniya *Peradeniya, Sri Lanka*

- Conducted lab sessions for Computer Architecture and Image Processing; mentored undergraduate capstone projects.
- Developed an industrial anomaly detection system for injection molding using computer vision on Raspberry Pi for real-time safety monitoring.
- **Tech Stack:** Python, OpenCV, C, Raspberry Pi, Pi Camera, IR Imaging

Technical Projects

Open-Source EMS Data Collection System | *Lead Developer* 2024

- Engineered a scalable multimodal recording system capturing synchronized video, speech, and smartwatch IMU data for multi-person activity capture.
- **My Contribution:** System architecture design, Android application development and GoPro API integration
- **Tech Stack:** C++, Python, Azure Kinect SDK, GoPro API, Android.

COVID-19 Real-Time ICU Monitoring System | *Full-Stack Developer* 2021

- Developed a remote vital monitoring system connecting to ICU monitors via HL7 protocols.
- **My Contribution:** Frontend development, Network architecture design and deployment
- **Tech Stack:** Go (Golang), NodeJS, PostgreSQL, HL7 Protocol, WebSocket, Cisco IOS.

Health-Watch (Wearable Remote Vital Monitoring) | *Embedded Systems & Hardware (Team Project)* 2019

- Built a wearable + web/mobile monitoring prototype for elderly/patients to stream basic vitals for remote viewing.
- **My Contribution:** PCB design/manufacturing, ESP8266 firmware (C/C++), MQTT integration, and CAD/CAM enclosure design + fabrication.
- **Tech Stack:** ESP8266, C/C++, MQTT, NodeJS, Vue, MongoDB, JavaScript, PCB Design, CAD/CAM.

Awards & Achievements

- **AAAI Student Scholarship (2026):** Travel grant for EgoEMS paper presentation.
- **1st Place, UVA AI/ML Resource Fair (2025):** Best Poster for CognitiveEMS research.
- **Best Project/Product - SLASSCOM Ingenuity Awards (2021):** National award for ICU Monitoring System.

Leadership & Service

- **Reviewer:** ICCPS 2025, IEEE S&P 2025, ICRA 2025.
- **Undergraduate Mentor (UVA):** Mentored 6+ interns on research methodologies and capstone projects.
- **Voluntary Mentor (CHS / UVA Link Lab):** Mentored senior capstone team on system design, manufacturing, and project presentations.
- **Community Service:** Designed and manufactured 10,000+ face shields distributed to Sri Lankan hospitals during Covid-19.

References

- **Prof. Homa Alemzadeh**
  Professor in Electrical and Computer Engineering
  Department of Electrical and Computer Engineering, School of Engineering and Applied Science, University of Virginia.
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- **Prof. John Stankovic**
  BP America Professor Emeritus, Director of the Link Lab, Emeritus
  Department of Computer Science, School of Engineering & Applied Science, University of Virginia.
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