Keshara Weerasinghe

PhD Candidate in Computer Engineering | Human Sensing, Wearables & Multimodal Data Collection Systems
cjh9fw@virginia.edu | Portfolio | LinkedIn | GitHub

Education

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

University of Peradeniya — Peradeniya, Sri Lanka
BSc in Computer Engineering (GPA: 3.70/4.00) — *Nov. 2016 – Sep. 2021*

Selected Publications

- **Weerasinghe, K.**, Roodabeh, S. H. R., Hawkins, A., Zhang, Z., Schrader, Z., & Alemzadeh, H. (2026). MiDAS: A Multimodal Data Acquisition System and Dataset for Robot-Assisted Minimally Invasive Surgery. **The International Journal of Medical Robotics and Computer Assisted Surgery 2026**
- **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%

Experience

Research Scientist Intern — May 2026 – Nov 2026
Meta – Reality Labs — *Seattle, WA*

- Designed and built a multi-camera **3D eye-localization / eye tracking** research prototype, integrating synchronized imaging, learned segmentation, and geometric reconstruction on embedded hardware.
- Adapted existing perception models for edge deployment using ONNX and TensorRT; reduced processing latency through GPU-based preprocessing and postprocessing, numerical vectorization, and performance profiling.
- Developed camera-calibration and synchronized-recording workflows with a web interface for data acquisition and offline processing; added diagnostics and automatic recovery for camera failures.
- Designed custom illumination and control PCBs and developed microcontroller firmware to synchronize imaging with external motion-capture equipment.
- Built automated validation tools and conducted controlled robotic experiments to characterize localization accuracy, repeatability, and synchronization, separating tracking error from calibration and reference-system error.
- **Tech Stack:** Python, PyTorch, OpenCV, ONNX, TensorRT, NVIDIA Jetson, ESP32 / ESP-IDF, GMSL.

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

- Designed and built an open-source, synchronized **multimodal data collection system** (egocentric video/audio, smartwatch IMUs, custom ToF sensing, medical-device ground truth) for human-subject studies.
- Led collection and release of **EgoEMS** (AAAI 2026): a 20-hour egocentric EMS dataset (233 scenarios, 62 participants incl. 46 EMS professionals) with benchmarks for real-time keystep recognition and action quality estimation.
- Co-developed **MiDAS**, a platform-agnostic multimodal acquisition system for robot-assisted surgery (hand/foot tracking, surgical video), validated on Raven-II and da Vinci Xi with gesture-recognition benchmarks.
- Core research focus: developing **multimodal human activity recognition models** for egocentric and wearable data – real-time keystep recognition and cognitive assistance for EMS responders (**CognitiveEMS**), and multimodal Transformers for real-time surgical activity prediction and safety monitoring (ICRA 2024).
- **Tech Stack:** Python, PyTorch, C++, CUDA, Azure Kinect SDK, Android, Java, Vuzix AR Glasses

Technical Skills

Languages: C, C++,C#, Java, JavaScript,Typescript, Python, GoLang
Frameworks: ReactJS, NodeJS, Vue, Nuxt, OAuth, HTML/CSS
Machine Learning Libraries & Frameworks: PyTorch, OpenCV, NumPy, SciPy, ONNX, TensorRT
Computer Vision & Perception: Multimodal Learning & Sensor Fusion, Human Activity Recognition, Egocentric Vision, Eye Tracking, Multi-view Geometry, 3D Reconstruction, Camera Calibration, Accuracy & Repeatability Analysis
Continuous Integration: Microsoft Azure, Azure DevOps, Netlify, Github Actions, AWS, Heroku.
Database Systems: MYSQL, MongoDB, PostgresSQL.
Embedded Systems: ESP32 / ESP-IDF, ESP8266 Wi-Fi SOC, Microcontroller Firmware, Hardware Synchronization, PCB Design & Manufacturing, CAD/CAM, 3D Printing, CNC & CO2 Laser Manufacturing.

Technical Projects (Selected)

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

- Designed and deployed a remote vital monitoring system in 3 days for Sri Lankan hospitals during the pandemic.
- Interfaced with ICU monitors via HL7 protocols to stream patient data to a central dashboard, reducing staff exposure.
- **Tech Stack:** Go (Golang), NodeJS, PostgreSQL, HL7 Protocol, WebSocket, Cisco IOS.

Near-IR Vein Visualization Device | *Embedded Systems Lead* 2021

- Created a low-cost embedded device to visualize veins using Near-infrared illumination and image processing.
- Developed algorithms specifically optimized for darker skin tones to address bias in existing commercial devices.
- **Tech Stack:** Python, OpenCV, C++, CAD/CAM, NIR Spectroscopy.

Health-Watch (Wearable IoT) | *Hardware & Firmware Lead* 2019

- Co-developed a custom PCB wearable for elderly vital monitoring with a team of 4; responsible for PCB design, firmware development (C++), and enclosure manufacturing.

Awards & Achievements (Selected)

- **AAAI Student Scholarship (2026):** Travel grant for EgoEMS paper presentation.
- **1st Place, UVA AI/ML Resource Fair (2025):** Best Poster for CognitiveEMS research.
- **Best Product - SLASSCOM Ingenuity Awards (2021):** National award for the Covid-19 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.
- **Community Service:** Designed and manufactured 10,000+ face shields for 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.
  ha4d@virginia.edu
- **[Meta Manager Name]**
  [Title], Meta – Reality Labs, Seattle, WA.
  [Manager email]
- **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.
  stankovic@cs.virginia.edu