

# Azizul Zahid

✉ azahid@vols.utk.edu

🌐 AzizulZahid

🌐 LinkedIn

🎓 Azizul Zahid

🌐 <https://azizulzahid.github.io/>

☎ +1 865 232 7003

## Research Interest

LLM, Edge-AI, Reinforcement Learning, Health Robotics, Wearable Sensors

## Professional Experience

- June'23 – Current  **Graduate Research Assistant**, EPIC Lab, University of Tennessee Knoxville.  
**Advisor:** Dr. Sai Swaminathan
- Aug'23 – Current  **Graduate Teaching Assistant**, EECS, University of Tennessee Knoxville.  
**Courses:** Embedded Systems (ECE 455/555) Computer Organizations (COSC 230), Circuits I (ECE 201), Computer System Organization (ECE 356)

## Education

- June'23 – Current  **Ph.D. in Computer Engineering**  
University of Tennessee Knoxville.  
**Advisor:** Dr. Sai Swaminathan.
- June'23 – May'25  **Masters of Science in Computer Engineering**  
University of Tennessee Knoxville.  
**Advisor:** Dr. Sai Swaminathan.
- Feb'17 – May'22  **Bachelors of Science in Electrical & Electronic Engineering**  
Bangladesh University of Engineering & Technology.  
**Advisor:** Dr. Abdul Hasib Chowdhury

## Publications

- Zahid, Azizul**, J. Fan, F. Wang, A. Dy, S. Swaminathan, and F. Liu, "Toward aligning human and robot actions via multi-modal demonstration learning," in *ICRA 2025 Workshop: Human-Centered Robot Learning in the Era of Big Data and Large Models*.  URL: <https://openreview.net/forum?id=ZyRVRYAC97>.
- Fahad, Imran and Scott, Danny and **Zahid, Azizul** and Bringle, Matthew and Patil, Srinayana and Bevins, Ella and Palileo, Carmen and Swaminathan, Sai, "Radiogami: Batteryless, long-range wireless paper sensors using tunnel diodes," *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, vol. 9, no. 2, Jun. 2025.  DOI: 10.1145/3729487.
- Zahid, Azizul** et al., "PulseRide: A Robotic Wheelchair for Personalized Exertion Control with Human-in-the-Loop Reinforcement Learning," in *2025 IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)*, Los Alamitos, CA, USA: IEEE Computer Society, Jun. 2025, pp. 57–68.  URL: <https://doi.ieeecomputersociety.org/>.
- Mir Sayeed Mohammad and **Azizul Zahid** and Md Asif Iqbal, *Banglanum – a public dataset for bengali digit recognition from speech*, 2024. arXiv: 2403.13465 [eess.AS].  URL: <https://arxiv.org/abs/2403.13465>.
- D. Scott, M. Bringle, I. Fahad, G. Morales, A. Zahid, and S. Swaminathan, *Neurocamtags: Long-range, battery-free, wireless sensing with neuromorphic cameras*, New York, NY, USA, Sep. 2024.  DOI: 10.1145/3678529.

## Research Project Highlights

- Ongoing**     **SkillCoaching: An LLM-based on-device Real-Time Task Assistant**
-  **Human-in-the-Loop Interactive ML for Edge-AI**
- Past**     **PulseRide: A Robotic Wheelchair for Personalized Exertion Control with Human-in-the-Loop Reinforcement Learning**
- **Heart rate and ECG data for Adaptive Assistive system.** We introduced PulseRide, a novel wheelchair system that provides personalized assistance based on each user's physiological responses, helping them maintain their physical exertion goals. Our system integrates real-time physiological data-such as heart rate and ECG-with wheelchair speed to deliver adaptive assistance.
  - **Human in the loop Reinforcement Learning.** We proposed human-in-the-loop reinforcement learning approach with Deep Q-Network algorithm (DQN), the system adjusts push assistance to keep users within a moderate activity range without under- or over-exertion.
  - **User study.** We conducted preliminary tests with 10 users across carpet and slate terrains. PulseRide maintained users' heart rates in the moderate activity zone 71.7% longer than manual wheelchairs and reduced muscle contractions by an average of 41.86%, delaying fatigue and improving comfort.
-  **“Toward aligning human and robot actions via multi-modal demonstration learning**
- **Multi-Modal Demonstration Learning.** We introduced this framework that independently predicts human intentions and robot actions from RGB and voxelized RGB-D inputs within the same manipulation task.
  - **Cross-Modal Alignment.** By learning semantic correspondences across modalities, the system enables alignment between human and robot behaviors, paving the way for shared understanding in collaborative tasks.
  - **Performance and Challenges.** On the RH2oT dataset, our model achieved 71.7% accuracy for both human intention and robot action recognition. We identified key challenges-class imbalance and limited temporal context-motivating future improvements through synthetic augmentation and temporal voxel encoding for more robust multimodal learning in assistive and household domains.

## Skills

- Programming Language     Python, MATLAB, C/C++, Assembly.
- Tools & Framework     PyTorch, Tensorflow, Huggingface, Keras, LangChain, LangGraph.
- Operating System     Linux, Windows, Unix.
- Others     Git, GitHub, Latex, MS office

## Honors & Awards

- Aug' 24     Received **Tickle College of Engineering Fellowship** from Dept. of EECS, UTK.
- Aug' 23     Received **Rowland Family Graduate Fellowship** from Dept. of EECS, UTK.
- May' 22     Received **Deans Award** from Dept. of EEE, BUET.

## References

Available on Request