Shruthi Hiremath

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Research Interest

My research interest broadly focuses on building novel activity recognition pipelines for nearable sensing devices. I focus on activity monitoring in smart homes, by observing data collected from residents in smart homes using nearable sensors. As such I propose a **"lifespan" of a human activity recognition system in smart homes**, which includes (a) initial bootstrapping procedure - aimed at 'jump-starting' the activity recognition system in the home, with minimal supervision from the resident; (b) updating and extending the activity recognition system - aimed at improving the recognition capabilities of the initial bootstrapped system; (c) routine assessment - aimed at behavior monitoring of residents over extended periods of observation.

Education

Aug '18 - Dec '24 (expected)	**Ph.D.** in Computer Science Georgia Institute of Technology Thesis: "Deriving Bespoke Human Activity Recognition Systems for Smart Homes" Doctoral Committee: Thomas Plötz (Advisor), Sonia Chernova, Diane Cook, Gregory Abowd, Uichin Lee	Atlanta, GA
Aug '15 - May '17	**M.S.** in Computer Science Georgia Institute of Technology	Atlanta, GA
Aug '10 - July '14	**B.Tech** in Computer Science VIT University	Vellore, India

Publications

Refereed Conference, Journal and Workshop Papers

P1. **Shruthi K. Hiremath** and Thomas Plötz.(2024). Game of LLMs: Discovering Structural Constructs in Activities using Large Language Models. Arxiv (Under Review).

P2. Sourish Dhekane, Megha Thukral, **Shruthi K. Hiremath**, Harish Haresamudram and Thomas Plötz.(2024). Layout Agnostic Human Activity Recognition in Smart Homes through Textual Descriptions Of Sensor Triggers (TDOST). Arxiv (Under Review).

P3. **Shruthi K. Hiremath** and Thomas Plötz.(2024).Maintenance Required: Updating and Extending Bootstrapped Human Activity Recognition Systems for Smart Homes. The 6th International Conference on Activity and Behavior Computing (ABC).

P4. **Shruthi K. Hiremath** and Thomas Plötz.(2023).The Lifespan of Human Activity Recognition Systems for Smart Homes. Sensors 2023, 23(18), 7729; DOI: 10.3390/s23187729

P5. **Shruthi K. Hiremath,** Yasutaka Nishimura, Sonia Chernova and Thomas Plötz.(2022). Bootstrapping Human Activity Recognition Systems for Smart Homes from Scratch. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), 6(3), 1-27; DOI: 10.1145/3550294

P6. Yulai Cui, **Shruthi K. Hiremath** and Thomas Plötz (2022). ROAR: Reinforcement Learning Based Online Active Learning for Human Activity Recognition. In 2022 International Symposium on Wearable Computers (ISWC) (pp. 2327); DOI: 10.1145/3544794.3558457

P7. Mindy Scheithauer, **Shruthi K. Hiremath**, Audrey Southerland, Agata Rozga, Thomas Plötz, Chelsea Rock, Nathan Call (2022). Feasibility of accelerometer technology with individuals with autism spectrum disorder referred for aggression, disruption, and self-injury. Research in Autism Spectrum Disorders, 98, 102043; DOI: 10.1016/j.rasd.2022.102043

P8. **Shruthi K. Hiremath** and Thomas Plötz. (2021). On the Role of Context Length for Feature Extraction and Sequence Modeling in Human Activity Recognition. In 2021 International Symposium on Wearable Computers (ISWC) (pp. 13-17); DOI: 10.1145/3460421.3478825

P9. **Shruthi K. Hiremath** and Thomas Plötz.(2020). Deriving effective human activity recognition systems through objective task complexity assessment. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), 4(4), 1-24; DOI: 10.1145/3432227

P10. **Shruthi K. Hiremath**, Pallavi Chandra, Anne M. Joy, and B. K. Tripathy (2015). Neighborhood rough set model for knowledge acquisition using MapReduce. International Journal of Communication Networks and Distributed Systems (IJCNDS), 15(2-3), 212-234; DOI: 10.1504/IJCNDS.2015.070975

P11. **Shruthi K. Hiremath** and Govinda K(2014). Rainfall Prediction Using Artificial Neural Network. International Journal Applied Engineering Research, 9, (pp. 21243-21254).

Professional Experience

Aug '18 - Present	**Graduate Research Assistant** Georgia Institute of Technology I developed data-driven technologies for wearable and nearable based application scenarios to build deployable human activity recognition systems, with a focus on providing health monitoring.
May - July '16	**Data Science Intern** ADP My work involved development of data analysis procedures to analyze and gather insights from collected payroll data.
Aug '14 - July '15	**Software Developer** Deloitte USI (Hyderabad, India) I was involved in building a tool that served as an interface between end users and project management activities(PMC) aimed as reducing the number of manual tickets raised for changes to a project team. The tool successfully contributed to a 70% reduction in costs associated with handling tickets, thereby achieving significant cost savings.

Teaching Experience

Teaching Assistant

Summer '19, '20, '21	CS 6601: Artificial Intelligence	Georgia Institute of Technology
Summer '22	CS 7470: Mobile & Ubiquitous Computing	Georgia Institute of Technology
Fall '16, '17	CS 4400: Database Systems	Georgia Institute of Technology

Funding

2019 - 2020	**Georgia Clinical and Translational Science Alliance Grant** (PI: Dr. Thomas Plötz), $15,000 [Read More].	
	Optimizing context length for improved activity recognition in wearable sensing.	Lead Researcher
2018 - 2019	**Pilot Grant from NIH** via **Georgia Institute of Technology** (PI: Dr. Thomas Plötz)	
	Analyzing the feasibility of using accelerometers to identify episodes of server behavior in youth on the Autism Spectrum Disorder (ASD)	Lead Researcher
2022 - 2024	**Collaboration with KDDI Corporation** (PI: Dr. Thomas Plötz and Dr. Sonia Chrernova)	
	Novel Human-in-the-Loop Learning for realization of real-world AI	Lead Researcher

Awards and Recognitions

2023	**N^2 Women Young Research Fellowship ($1000)**, Percom 2023
2022	**Student Travel Grant ($500)**, Ubicomp 2022 (by Georgia Institute of Technology)
2021	**N^2 Women Young Research Fellowship ($1000)**, Ubicomp 2021
2019	**Imlay pre-proposal selected**, Georgia Tech
2015, 2018, 2021	**Grace Hopper Scholar**, Georgia Tech
2014	**Merit Scholar**, VIT University

Invited Talks

2024	Maintenance Required: Updating and Extending Bootstrapped Human Activity Recognition Systems in Smart Homes @ ABC (International Conference on Activity and Behavior Computing)
2022	ROAR: Reinforcement Learning Based Online Active Learning for Human Activity Recognition @ Ubicomp
2022	Bootstrapping Human Activity Recognition Systems for Smart Homes from Scratch @ Ubicomp
2021	Deriving effective human activity recognition systems through objective task complexity assessment @ Ubicomp
2021	On the Role of Context Length for Feature Extraction and Sequence Modeling in Human Activity Recognition @ Ubicomp
2018	Detecting severe behavior episodes in youth on the Autism Spectrum Disorder @ Georgia Tech

Professional Service

Reviewer

2018 - 2024	ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)
2024	Ubicomp Posters and Demos
2024	UbiComp/ISWC 2024 Workshop on AI-infused Physical Systems
2024	Nordic Conference on Human-Computer Interaction (NordiCHI)
2023	Workshop on Ubiquitous and Multi-domain User Modeling (UMUM)
2022	International Conference on Pervasive Computing and Communications (Percom)
2021	ACM Special Interest Group on Knowledge Discovery and Data Mining (SIGKDD)

Program Committee Member

2023	Served on the Program Committee for 'The Second Workshop on Ubiquitous and Multi-domain User Modeling (UMUM2023)'. Held in Conjunction with PerCom 2023. [Read More]

Community Service

2018 - present	**Mentor**, Georgia Tech: mentored undergraduate and graduate student interested in research
2023	**N^2 Women Event**, Percom 2023
2022	**Organizing Committee (Web Chair)**, Ubicomp 2022
2021	**N^2 Women Event**, Ubicomp 2021
2020 - 2023	**Social Chair**, Ubicomp Lab @ Georgia Tech
2015 - 2022	**Volunteer**, India Club @ Georgia Tech
2010 - 2014	**Core Member**, Robotics Club @ VIT University