SAVITHA VISWANADH KANDALA

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RESEARCH FOCUS

Low-power systems and networks for embedded devices with focus on multi-microcontroller platforms and edge AI

EDUCATION

Ph.D. in Computer Science,
National University of Singapore (NUS) Aug 2024 intake
Advisor: Dr. Ambuj Varshney

B.Tech. and M.S. by Research in Electronics and Communication Engineering,
International Institute of Information Technology, Hyderabad (IIIT-H) 2019–2024
CGPA: 9.01/10.0

RESEARCH EXPERIENCE

National University of Singapore Aug 2024 - Present
Graduate Researcher

1. **MicroSymphony** – Multi-microcontroller platform for energy-harvesting systems
   - Designed and implemented a 4-MCU testbed using MSP430s for concurrent distributed execution
   - Enabled shared memory access, multi-drop UART communication, and board stacking for scalable compute
   - Developed a custom bootloader and protocol for parallel firmware flashing of connected controllers
   - Building system support for parallel task scheduling and distributed on-device machine learning
2. **Tag-to-Tag Networks** – Extending backscatter communication to long-range, multi-hop links
   - Designed ultra-low-power receiver tags achieving up to 70 m range (14× improvement over SoTA)
   - Observed over 100s of meters communication in non-line-of-sight simulations using signal-gain mechanisms
3. **TinyLLM** – Lightweight foundational models for embedded sensor processing
   - Trained 30–120 M-parameter small language models (SLMs) for IoT and sensor analytics
   - Curated 10 B-token dataset combining web, sensor, and code data for edge-optimized pre-training
   - Released tiny models matching Phi-3 and Llama-3 performance within <1 GB memory footprint
   - Utilized 2000+ GPU hours for pre-training and fine-tuning domain-specific SLMs

National University of Singapore Jan 2024 - Jun 2024
Visiting Scholar

- Benchmarked performance of LLMs (Phi, Gemma, and Llama) on various single-board computers
- Analyzed the capabilities of fine-tuned LLMs for wireless sensing and sensor datasheet interpretation
- Explored distributed inference of the Llama model across multiple single-board computers

Signal Processing and Communications Research Centre, IIIT-H Dec 2020 - Jan 2024
Undergraduate Researcher

- Developed a low-cost remote labs solution - RLabs with 5+ hardware experiments
- Collaborated with 6 professors, led a team of 5 research students and 15 interns
- Agastya (NGO) has utilised the platform to educate over 300 rural Indian students
- Previously, performed a security analysis on a large-scale IoT-based air pollution monitoring deployment

OTHER EXPERIENCES

Walmart Global Tech India May 2023 - July 2023
Software Developer Intern

- Built a RetinaNet-based retail object detector using Vision Transformer and FAISS, for identifying retail items
- 30+ objects were successfully recognised from single images with ≥95% accuracy

Teaching Assistantships
National University of Singapore (NUS): Wireless Communications (Spring 2025)
IIIT-Hyderabad: Electronics Workshop (Spring 2023), Embedded Systems Workshop (Monsoon 2022), Value Education (Spring 2022), Communications and Controls in IoT (Monsoon 2021), Statistical Methods in AI (selected, Monsoon 2023)

PUBLICATIONS

- *"TinyLLM: A Framework for Training and Deploying Language Models at the Edge Computers"*
  K. S. Viswanadh et al., ArXiv 2024
- *"A Framework for Training and Deploying Foundational Language Models for Embedded Sensing"*
  K. S. Viswanadh et al., ACM MobiCom S3 Workshop 2024
- "*Engineering Affordable and Scalable Remote Labs using IoT-based Retrofitting*"
  K. S. Viswanadh et al., IEEE Access 2024
- "CV and IoT-based Remote Triggered Labs: Use Case of Conservation of Mechanical Energy"
  K. S. Viswanadh et al., IEEE FiCloud 2022
- "Using Miniature Setups and Partial Streams for Scalable Remote Labs"
  Animesh Das, **K. S. Viswanadh** et al., IEEE FiCloud 2023
- "Security Analysis of Large Scale IoT Network for Pollution Monitoring in Urban India"
  G. V. Ihita, **K. S. Viswanadh** et al., IEEE WF-IoT 2021
- Under review at IEEE INFOCOM 2026

POSTERS & PATENTS

- *"Posters: Your Data, Your Model: A Framework for Training and Deploying Foundational Language Models for Embedded Devices"*
  K. S. Viswanadh et al., accepted at ACM MobiCom 2024
- *"Posters: Simplifying the Networking of Wireless Embedded Systems using a Large Language Model"*
  P Medaranga*, D Shah*, **K. S. Viswanadh*** et al., ACM SIGCOMM 2024
- *"System and method for implementing an experiment remotely and determining an output using a computer vision model"*, US Patent App. 18/241,852, 2024
- *"Refraction Detection Rod"*, Indian Design Patent App. 389763-001, 2023

SKILLS

Programming	C/C++ , Python, Bash, Matlab, Java, HTML, JavaScript
Others	Linux, Git, Slurm, Docker, LaTeX, Wireshark, Embedded Boards

AWARDS & ACHIEVEMENTS

- ACM Mobicom 2024 Travel Grant
- NUS PhD Research Scholarship Awardee - 2024
- TIH-IoT CHANAKYA Fellow '2022-2023
- Institute's Best All-Rounder Award - 2023 (IIIT-H)
- Dean's (2019-23) & Research List (2021-22) (IIIT-H)
- Best Poster Award at IIIT-H's R&D Showcase 2022
- Solved 'IBM Ponder This' - July, Aug, Sept 2023; May, July 2022 (First Indian to solve in May 2022)

ACTIVITIES

- Head at Electronics and Robotics Club, IIIT-H and NSS chapter of IIIT-H
- Coordinator at Student Placement Committee, IIIT-H
- Secretary at Mess Committee, IIIT-H
- Volunteer at Asha Kiran, an organisation for educating under-privileged students