Sharath Ram Kumar

PhD Researcher in AI-Driven Building Energy Management

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SUMMARY & KEY SKILLS

- **Expertise** - Expert in hybrid modelling of buildings as coupled thermal-electric systems, integrating physics-based and data-driven approaches. Specialized in knowledge-driven reinforcement learning controls for demand response and energy flexibility applications.
- **Technical Skills** - Research-oriented skillset in modelling, simulation, and control of energy systems; strong programming skills (Python, C, C++); deep learning frameworks (PyTorch); embedded implementation and deployment (STM32, FreeRTOS, Docker, Git).
- **Cross-functional Experience** - Proven track record of hands-on research in international, interdisciplinary settings, spanning academia, startups, and corporate R&D. Experienced in bridging theory and practice through experimental validation and scalable implementation.

WORK EXPERIENCE

CNRS@CREATE Ltd. **Singapore**

Doctoral Researcher *2022 - Present*

Skills: Research, Python, PyTorch, Docker, RL, Optimization, EnergyPlus, Deep Learning, ACMV Control

- PhD on integrating domain knowledge into data-driven workflows for building energy management, with a focus on knowledge-informed RL for demand response at both building and aggregator levels.
- Developed practical RL controllers achieving 5-10% cost savings and improved thermal comfort at the building level, and effective peak load shaving (20% reduction) through coordinated DR at the aggregate level.
- Real-world pilot tests ongoing using hybrid modelling approaches that combine physics-based and data-driven methods.
- Multiple publications, teaching experience, and organization of hackathons/workshops for interdisciplinary audiences.

Ansys Software Pvt Ltd **Bangalore, India**

Application Engineer II *2018 - 2020*

Skills: Ansys Tools, Python, VLSI, EMIR Analysis, Timing Analysis, MapReduce, Technical Consulting

- Supported Tier-I customers in the VLSI industry to design simulation-driven solutions for highly technical problems.
- EMIR signoff and Timing analysis using Ansys RedHawk, RedHawk-SC and FX tools.
- Deployed complex and customized flows on-time, leading to several successful tapeouts.
- Product owner for an innovative FX+RHSC solution for top vendors across the world.

EDUCATION

- **Doctor of Philosophy**, *Université Grenoble-Alpes and NTU Singapore* Present
  Topic: Hybrid-AI Techniques for Control of Energy Systems.
  Full scholarship under the DesCartes research project in Singapore. Expected graduation: **October 2025**
- **Master of Science**, *NTU Singapore and TU Munich* May 2022
  Field: Green Electronics (Microelectronics and Nanotechnology)
  Best Student and Class Valedictorian (CGPA: 4.96 / 5.0)

ENGINEERING & RESEARCH ROLES

- **Master Thesis Intern**, *Accelerated Materials Development Lab, IMRE, Singapore* Jul 2021 - Apr 2022
  Skills: Research, Python, C++, OpenCV, Modbus, Raspberry Pi, Ansys, 3D Printing
  Designed and built a fully custom Automated Thermodynamic Characterization System, including mechanical, thermal, and software subsystems; currently under patent review.
- **Embedded Systems Engineer**, *Satellite Research Center, NTU, Singapore* Dec 2020 - Jun 2021
  Skills: C, C++, STM32 ARM Development, FreeRTOS, Hardware Debugging (logic analyzers, JTAG, SDR)
  Developed the OBC firmware and command architecture for the SCOOB-I Cubesat project. Succesfully launched as part of ISRO's PSLV-C53 Mission.
- **Co-Founder and Embedded Systems Lead**, *Amplefresh Pte Ltd, Singapore* Mar 2021 - Sep 2022
  Skills: C, C++, AtMega Microcontrollers, Entrepreneurship
  Co-founded an urban farming startup in Singapore with 4 fellow students. Designed automated monitoring and nutrient-dosing systems. Built a successful proof-of-concept.

CERTIFICATIONS & AWARDS

Best Poster Award, BuildSys '23 | *Istanbul, Turkey* 2023

Best Student Award, DAAD Scholarship Recipient (2020-2022) | *Singapore* 2022

Deep Learning Specialization | *deeplearning.ai* 2020

ADDITIONAL INFORMATION

Hobbies Reading, Football, Guitar, DIY Electronics

Languages English, Malayalam, Hindi, French (B1)

References

[1] S. R. Kumar, A. Easwaran, B. Delinchant, and R. Rigo-Mariani. Behavioural cloning based RL agents for district energy management. In *Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, pages 466–470. ACM.

[2] S. R. Kumar, A. Easwaran, B. Delinchant, and R. Rigo-Mariani. Real-time Retail Electricity Pricing Using Offline Reinforcement Learning. In *Proceedings of the 15th ACM International Conference on Future and Sustainable Energy Systems*, pages 454–458. Association for Computing Machinery.

[3] S. R. Kumar, R. Rigo-Mariani, B. Delinchant, and A. Easwaran. Towards Safe Model-Free Building Energy Management using Masked Reinforcement Learning. In *2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)*, pages 1–5. IEEE.

[4] S. Ram Kumar, A. Easwaran, B. Delinchant, and R. Rigo-Mariani. Improving Demand Response Programs Using Override Signals with Reinforcement Learning. In *Proceedings of the 16th ACM International Conference on Future and Sustainable Energy Systems*, E-Energy '25, pages 603–611. Association for Computing Machinery.