HARSH S. DESAI

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Research Interests

Energy-harvesting computers, Computer Architecture, Batteryless Computing, Ultra-low-power computing

Education

Carnegie Mellon University, Pittsburgh, PA.   August 2018 - Present
Ph.D. in Electrical & Computer Engineering   **Advisor: Brandon Lucia**

Clemson University, Clemson, SC.   Aug 2016 - Present
Master of Science in Computer Engineering   **Advisor: Jacob Sorber**

Mumbai University, Mumbai, India.   Aug 2011- Aug 2015
Bachelor of Engineering in Electronics Engineering

Research Experience

PHASE – Modeling Performance in Energy-Harvesting Systems   December 2019 - Present
- First Performance Model for Energy-harvesting systems
- Recharging energy causes variable delays in system performance, depending on environmental input power level
- Architectures should adapt according to input power, to maximize end-to-end performance
Publication [CAL 2020]: https://ieeexplore.ieee.org/document/9078058

Camaroptera – Batteryless Smart Image Sensing   August 2018 - Present
- Designed and developed a tiny smart camera that runs without batteries and sends images over kilometers
- Equipped with on-board machine learning for sophisticated image processing on the edge
- Ultra-low-power camera, LoRa radio for kilometer-scale communication
Publication [ENSSys 2019]: https://dl.acm.org/citation.cfm?id=3363491

Batteryless Occupancy Monitoring with Reflected Ambient Light   January 2017-July 2018
- Monitoring the occupancy status of a room using Solar panels
- Ambient Light acts as a dual power-signal source
- Developed custom hardware and full software stack

Energy Harvesting in Pipelines   January 2017-July 2018
- Evaluating the energy harvesting potential of surface vibrations and flow turbulence caused by liquids flowing in pipelines using Piezoelectric crystals
Publications at 2019 Pipelines Conference and Construction Research Congress 2018

Work Experience

Saaz Technologies, Intern   Dec 2016 – Jan 2017, Simi Valley, CA.
- Developed a Raspberry Pi-based smart camera platform for testing imaging algorithms

Accenture, Associate Software Engineer   Aug 2015 – July 2016, Mumbai, India.
- Spearheaded maintenance of over 20 remote workstations for the Royal Mail Group, coordinating weekly team calls

Technical Skills

Programming Languages	C, C++, Python, CUDA, Assembly-Level (8085/86)	Application Platforms, Tools & Softwares	MSP430-based systems, gem5, McPAT, Ramulator, DRAMPower, Raspberry Pi, Circuit Design EDA (Eagle, Altium), Matlab

Awards

- **Carnegie Mellon University Presidential Fellow 2019-20**, sponsored by Tata Consultancy Services
- **CONIX Annual Review Best Demo Award 2019** for Camaroptera