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Education

University of California, San Diego

Masters in Intelligent Systems, Robotics and Control, GPA: 4.0/4.0

Indian Institute of Technology, Kharagpur

Master and Bachelor of Technology in Electronics and Communication Engineering, GPA: 8.53/10.0

Relevant Coursework

- Embedded Systems Design
- Computer Networks Parameter Estimation

• Dynamical Systems

- Deep Learning
- Bayesian Learning
- **Reinforcement Learning Robotics**
 - Statistical Signal Processing

Technical Skills

Programming: Python, C, C++, MATLAB, Perl, Linux

Technology: PyTorch, OpenCL, CUDA, ROS, Tensorflow, Kubernetes, Docker, Unity, Arduino, GitHub, Perforce, 3GPP 5G NR NSA & SA, LTE, JIRA.

Others: GenAI, LLMs, NLP, Design Patterns, OS, HPC, Testing, Project leadership.

Academic Research and Projects

Prompt-based Image Generation | *Diffusion model*, *CLIP*, *PyTorch*, *Kubernetes*

- Implemented Transformer and the Denoising Diffusion Probabilistic Model (DDPM) from scratch using PyTorch.
- Leveraging **CLIP** to condition the generation of images based on textual prompts.

Image inpainting using GAN | Computer Vision, CNNs, PyTorch link

• Developed an algorithm inspired by Google's MagicEraser to remove specified objects from images.

• Utilized instance segmentation and **Pix2Pix** model for image reconstruction, achieving background recovery.

Tensor Library in C++ | OpenCL, High-Performance Computing, Object-Oriented link Mar 2024 – Present

• Created a simple tensor library with core operations mirroring PyTorch tensors, including tensor indexing and slicing.

- Engineered **memory-efficient** broadcasting for matrix and vector operations, by avoiding data duplication.
- Utilized OpenCL and Intel oneAPI framework for **parallel programming**, accelerating matrix multiplication and aiming to introduce computation graph support for machine learning models.

Super-Resolution from Limited Measurements | Generative models, MATLAB

- Improved the spike sequence-search speed by 54% by incorporating Median-split Search Tree.
- Developing a model to estimate neuron firing rates from low-rate calcium fluorescence data, overcoming imaging equipment limitations, by leveraging downsampling within a **Bayesian generative model** framework.
- Applying expectation-maximization algorithm for the model's parameter estimation, where the posterior probability is approximated using variational inference.

Haptic Game Controller | HW-SW co-design, low-latency, C#, Unity link

- Led a collaborative effort to build a 2-DoF game controller from inception to completion.
- Integrated Unity with Arduino to enable realistic force feedback from interacting with a 3D virtual environment.
- Demonstrated adeptness in HW-SW co-design, reducing **latency** and delivering a seamless gaming experience.

SLAM & Motion Planning | Perception, Sensor fusion, Python, Object-oriented Jan 2023 - May 2023

- Implemented sensor fusion with IMU and camera data from a mobile vehicle, using Extended Kalman Filter. link
- Implemented Particle Filter-Based SLAM, leveraging LIDAR data for **environment mapping**.link
- Implemented dynamic programming for dynamic 2D environments for shortest path and obstacle avoidance. link
- Implemented and compared A* and RRT algorithms for generating optimized safe paths in complex environments. link

• Computer Vision

- Linear Algebra
- Software Foundations (C++)
- Data Structures, Object-oriented

Jul 2013 – May 2018

San Diego, USA

Apr 2023 – Jun 2023

Apr 2024 – Present

Nov 2023 - Dec 2023

Jan 2024 - Present

Sep 2022 – Mar 2024



Kharaqpur, India

Experience

Samsung R&D Institute, India

Lead Engineer

- Resolved issues identified through logs generated during IOT, IODT and field tests of QCOM chip-based mobile phones across various network infrastructures including Ericsson, Nokia, and Samsung.
- Developed a comprehensive understanding of the 5G/LTE modem protocol stack.
- Played a pivotal role in the successful deployment of Voice over New Radio (VoNR) and New Radio Carrier Aggregation (NR CA) technologies for major U.S. 5G operators, by pinpointing and resolving protocol issues within NR MAC, PDCP, RLC, and RRC layers.
- Led data protocol debugging and validation for 5G modems, effectively customizing features throughout the commercialization lifecycle.
- Received the Samsung Citizen Award for Q1 2020 and earned a Software Development Professional certification.

Samsung R&D Institute, India

Senior Software Engineer

- Acquired expertise in analyzing user equipment (UE) and network (NW) logs.
- Co-designed and developed a Python-based log analyzer tool that integrates with mobile device logging tools, reducing issue resolution times by 50%.
- Supported the testing and debugging of the L2 data protocol stack for QCOM-chip based 5G mobile phones for key operators such as Verizon, TMobile, AT&T, and US Cellular.
- Practical experience with test equipment such as KeySight, Anritsu, and R&S for protocol, data performance.

Samsung R&D Institute, India

Intern

- Developed unit test programs for the PDCP, RLC, and MAC layers within the 5G protocol stack.
- Designed and implemented a MAC Packet Data Units generator to emulate data processing in a 5G protocol stack, facilitating comprehensive system testing and validation.

Leadership / Extracurricular

Teaching

Teaching Assistant/Tutor

- Facilitated interactive discussions on classroom topics in Cognitive Science course.
- Instructed 45 undergraduates in problem solving for Signals and Systems course.

Volunteering

Community Outreach Coordinator, ECE Graduate Student Council

• Led 25 elementary school students on a UC San Diego campus tour, showcasing diverse labs and supervised their hands-on robot construction project.



Oct 2022 - Present

UC San Diego

Bangalore, India

Bangalore, India

Jul 2018 – Mar 2020

May 2017 - Jul 2017

Bangalore, India

Mar 2020 – Jun 2022