Ishan Bansal

858-291-2491 | isbansal@ucsd.edu | b-ishan.github.io

Summary

PhD candidate in Computer Engineering researching low power sensing; published in flagship venues with multiple awards. Software Engineer with 4 years' experience in design, development, problem-solving. Proven collaborator and multitasker, delivering 25+ projects and resolving 15+ customer escalations.

Technical Skills

Languages: Python, Go-Lang, C/C++, CUDA, Java, Scala, Kotlin, SQL, MongoDB, Bash, Batch, YAML, Perl, JavaScript, HTML/CSS
Frameworks: TensorFlow, PyTorch, Django, Flask, FastAPI, GraphQL, SpringBoot, Hibernate, Apache, Flutter, Express, React, Angular, Bootstrap
Developer Tools: Git, CI/CD, Docker, Kubernetes, Jenkins, Ansible, Elasticsearch, Grafana, Kibana, Logstash, Terraform, Jira, Postman, Splunk
Technologies: Machine Learning, Deep Learning, AR/VR, REST API, Quality Assurance, Cloud, Automation, Database Management, Linux
Cloud: Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, Cisco HyperFlex, Cisco Intersight, VMWare VSphere

Education

University of California San Diego — San Diego, United States
Doctor of Philosophy, Electrical & Computer Engineering — *July 2025 – Present*

University of California San Diego — San Diego, United States
Master of Science, Electrical & Computer Engineering — GPA: 3.76/4.0 — *September 2023 – June 2025*

Birla Institute of Technology and Science, Pilani — Hyderabad, India
Bachelor of Engineering, Electronics & Communication Engineering — GPA: 8.79/10 — *August 2016 – June 2020*

Research

Wireless and Batteryfree Universal Sensing Platform *(Patent Submitted)* — April 2024 – Present

- Graduate research student advised by Prof. Dinesh Bharadia working on developing **wireless, batteryfree remote sensing** technology.
- Built the algorithm and software technology for **retrieving accurate data** for force, luminosity, temperature and soil moisture in **real time**.
- Developed an end-to-end solution for **automatically detecting sensors** and integrating it using **Augmented Reality** through live camera feed.
- Won **Best Paper** award at **IEEE RFID 2025** which presented SenSync, the algorithm behind the platform.
- Won the **Best Demo** - Runner Up awards at **MobiCom '24** and **SenSys '25**.
- Demonstrated a commitment to **reproducible research**, earning **all evaluation badges** for publishing artifacts for ZenseTag at SenSys '24.

Publications

- **I. Bansal**, N. Bhat, H. Govindarajan, A. Gupta and D. Bharadia, "*TuneTag: Impedance-Matched RFID Tag for Long-Range and Reliable Battery - Free Sensing*" - IEEE Journal of RFID (Vol. 9).
- **I. Bansal**, N. Bhat, A. Gupta, H. Govindarajan and D. Bharadia, "*SenSync: Real-Time and Accurate Passive Sensing*" - IEEE RFID'25 (Won **best paper** award).
- N. Bhat, A. Gupta, **I. Bansal**, H. Govindarajan, and D. Bharadia, "*ZenseTag: An RFID assisted Twin-Tag Single Antenna COTS Sensor Interface*" - ACM SenSys'24.
- **I. Bansal**, N. Bhat, A. Gupta, H. Govindarajan and D. Bharadia, "*Demo - SIGAR: Sensor Integration Gateway using Augmented Reality*" - ACM SenSys'25 (Won **best demo** - runner up award).
- **I. Bansal**, N. Bhat, A. Gupta, H. Govindarajan and D. Bharadia, "*Demo - ZenseTag: Real-Time Passive RFID Sensing*" - ACM MobiCom'24 (Won **best demo** - runner up award).

Professional Experience

Senior Software Developer — January 2020 – July 2023
Cisco Systems Pvt Ltd — *Bangalore, India*

- Developed software in **Scala, Golang, and Python** for install and upgrade of HyperFlex, for managing public and private cloud infrastructure.
- Accelerated feature integration achieving a **reduction of 22% in upgrade time** through a series of software optimizations in architecture.
- High performer with a **93% bug closure rate** resulting in a **reduction of 70%** in bugs in upgrade software enhancing cluster lifecycle management.
- Implemented infrastructure as code practices using Terraform and Ansible, improving **deployment efficiency by 25%**.
- Integrated **automated testing and continuous monitoring**, into DevOps pipelines for rapid and reliable software releases.
- Engineered **automation tools** to manage test scripts and test statistics for Intersight, a cloud-operated infrastructure management platform.
- Used Kubernetes to manage **containerized core infrastructure** components within Intersight, improving scalability, efficiency, and resilience.
- Developed a CI/CD pipeline-integrated tool for test script review, saving **100 work hours** per week previously spent on code review.
- Integrated Elasticsearch, Grafana, and Kibana into the CI/CD pipeline for **real-time monitoring and alerting**, enabling proactive issue resolution.
- Designed a web application to **track verification activities** for hundreds of kubernetes orchestrated microservices deployed on containers.
- Implemented an automated solution to identify security vulnerabilities and user-experience flaws, saving **50 work hours** per week.
- Created a chatbot for real-time reporting of ongoing and past verification activities, reducing data retrieval time by **40 work hours** per week.
- Honored with the **"Employee of the Quarter"** award in Q1-FY2021 for exceptional contributions to **new feature development**.

Coursework

Algorithms, Cloud Computing, Computer Architecture, Computer Networks, Database Management, Data Structures, Digital Signal Processing, Machine Learning, Object Oriented Programming, Operating Systems, Parallel Computing, Recommender Systems, Software Engineering, VLSI System Design

Certifications

Deep Learning Specialization, Coursera
AWS Fundamentals Specialization, Coursera
TensorFlow in Practice Specialization, Coursera
Machine Learning A-Z™: AI, Python & R, Udemy

Internships

Software Intern June 2024 – September 2024
Peco Pallet Inc *New York, United States*

- Implemented custom pipeline for **data cleaning, geocoding, and reporting** using Python and Excel for managing large corporate data.
- Engineered a **one-click solution** for analyzing extensive datasets and generating customized reports to estimate optimal pricing strategies.
- Built the entire application in-house improving data quality and saving over **70%** of the work hours spent in data management.
- Enhances the pricing process and expedites the delivery of pricing by **40%**, increasing the probability of conversion by **25%**.

Summer Intern May 2019 – July 2019
Western Digital *Bangalore, India*

- Developed a code-coverage tool for **functional coverage** for firmware verification of removable flash-based storage devices.
- Designed an efficient **data structure and algorithm** to compute and store coverage results within a **50kB on-disk space** constraint.
- Integrated the tool with a **user-friendly interface** to display results and **suggest actions** for test coverage improvement.
- Built the tool in-house, saving an estimated **US $50,000** annually.

Research Intern May 2018 – July 2018
Indian Meteorological Department *Pune, India*

- Developed an IoT-based system to **display real-time meteorological data** from an Automatic Weather Station on a mobile app
- Implemented a **primary-secondary topology** using Raspberry Pi and Arduino Nanos for efficient data collection and processing
- Programmed **embedded C code** for digital sensor interfaces and **Python** for real-time data streaming to a cloud server
- Integrated various sensors (temperature, humidity, wind, rainfall, soil moisture) using **I2C, UART, and RS-485** protocols
- Ensured **100% uptime in harsh environments** by incorporating LTE, GPS, WiFi, and Ethernet connectivity options

Projects

Recommender System for an eCommerce based Rental Clothing Store November 2024 – December 2024

- Developed a **custom latent factor model**, **achieving an MSE of 0.317**, outperforming baseline and advanced models like **TF-IDF and SVD**.
- Implemented a novel approach to product definition by treating all sizes of an item as a single product, effectively **reducing data sparsity** and **improving prediction accuracy**.
- Designed and evaluated multiple predictive models, including **linguistic feature-based** and **physical characteristic-based** approaches, to analyze user satisfaction in clothing rentals.
- Created a **practical recommender system** capable of generating **personalized item recommendations** with ratings for individual users.

Design and Development of Branch Predictors May 2024 – June 2024

- Implemented a Tournament branch predictor combining global and local prediction strategies, **achieving a 1.48% misprediction rate** across traces
- Designed and developed a **Custom Predictor** utilizing **Gshare and local prediction techniques**, resulting in a 1.64% misprediction rate.
- Optimized hardware **budget allocation for predictors**, balancing performance and resource utilization within a **72-128 kilobit** range.
- Analyzed predictor performance across **multiple benchmarks** (GCC, ASTAR, H264ref, NAMD), demonstrating consistent improvements over baseline Gshare predictor.
- Utilized advanced branch prediction techniques including **Pattern History Tables, Branch History Tables, and meta-predictors** to enhance CPU performance.

Parllelization of Genetic Pairwise Alignment for ClustalW January 2024 – March 2024

- Implemented **wavefront parallelism** to optimize the pairwise alignment step of ClustalW, achieving a **1000x speedup**.
- Developed a **GPU-based algorithm using CUDA** to parallelize sequence alignments across different kernel blocks.
- Integrated the **X-Drop heuristic** to enable early termination of suboptimal alignments, further improving efficiency.
- Utilized **shared memory** for storing anti-diagonals and implemented **parallel reduction** techniques to maximize GPU performance.
- Achieved a **770x speedup on GPU compared to CPU** for sequence alignment tasks using optimized grid and block sizes.

Dual-Band MIMO Circular Patch Antenna Design and Isolation Analysis January 2019 – May 2019

- Designed **dual-band circular microstrip patch** antenna (3.5 GHz and 4.5 GHz) on FR4 Epoxy substrate.
- Achieved S11 parameters of **-38.46 dB at 3.5 GHz** and **-40.72 dB at 4.5 GHz**.
- Implemented and compared **four DGS isolation techniques** for MIMO configuration.
- Attained up to **28 dB isolation** between antenna elements using dual strip DGS.
- Analyzed **S-parameters and radiation patterns** to evaluate antenna performance using Ansys HFSS.
- Optimized design for **compact MIMO applications** in wireless communication systems.

Extra-Curricular Activities

- Organized and hosted approximately 50 guest lectures for students and faculty at BITS Hyderabad from August 2016 to May 2019.
- Conducted financial literacy programs as a Finance Club member at BITS Hyderabad from August 2016 to May 2018.
- Served as Teaching Assistant for the Department of Economics and Finance at BITS Hyderabad from January 2019 to May 2019.
- Avid traveler, having visited over 20 cities across the United States, China, and India in recent years.
- Enjoy hiking, swimming, surfing, biking and playing badminton for personal rejuvenation.