Ishan Bansal

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Summary

Software Engineer with 4 years of experience having strong expertise in designing and developing software. Possessing excellent communication and problem-solving skills, I thrive in cross-functional teams and multitasking. Proven record of completing 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
Master of Science, Electrical & Computer Engineering — GPA: 3.75/4.0 — *September 2023 – Present*

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

Research

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

- **Fully funded** graduate research student with Prof. Dinesh Bharadia working on developing wireless, batteryfree sensing technology.
- Developed the software for interfacing an RFID reader and capturing the hopping radio frequency signal information in **real-time**.
- Developed the algorithm for resolving signal parameters with **minimal latency** for computing natural stimuli.
- Able to sense stimuli like force, soil moisture and luminosity in real-time with over **95% accuracy** using cost-effective commercial sensors and RFIDs.
- Able to improve throughput by **1000%** reducing the sensory resolution time by **95%** enabling **multi-sensor platforms** and **sub-second sensing**.
- Built an **Augmented Reality app** for Android that **detects sensors** and displays **real-time stimuli** from a **live camera feed**.
- Exploring deep learning algorithms like **recurrent neural networks** in-order to enable applications like **GAIT analysis**.
- Published work at the **ACM SenSys Conference** for 2024. Demonstration published at the **ACM MobiCom Conference** for 2024.
- Won the **Best Demo - Runner Up** award at MobiCom 2024 while being awarded **all artifact evaluation badges** at SenSys 2024

Publications

- ZenseTag: An RFID assisted Twin-Tag Single Antenna COTS Sensor Interface. In Proceedings of the 22nd ACM Conference on Embedded Networked Sensor Systems (**SenSys '24**). Association for Computing Machinery, New York, NY, USA, 336–350.
- Demo - ZenseTag: Real-Time Passive RFID Sensing. In Proceedings of the 30th Annual International Conference on Mobile Computing and Networking (**ACM MobiCom '24**). Association for Computing Machinery, New York, NY, USA, 1757–1759.

Professional Experience

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

- Developed software in **Scala, Python and Java** for install and upgrade for HyperFlex, a cloud infrastructure management service.
- Accelerated feature integration achieving a **reduction of 22% in upgrade times**.
- High performer with a **93% bug closure rate** resulting in a **reduction of 70%** in incoming bugs in upgrade software.
- Implemented infrastructure as code practices using Terraform and Ansible, improving **deployment efficiency by 25%**.
- Engineered **automation tools** to manage test scripts and test statistics for Intersight, a cloud-operated infrastructure management platform.
- Developed a CI/CD pipeline-integrated tool for test script review, saving **100 work hours** per week previously spent on code review.
- Implemented **monitoring and alerting systems** using Elasticsearch, Grafana, and Kibana.
- Designed and launched a web application to **track verification activities** for hundreds of deployed microservices.
- 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**.

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 estimated 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 all 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.

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

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 surfing, swimming, and playing badminton for personal rejuvenation.