Vighnesh Deshpande

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Education

Indian Institute of Technology Guwahati, India — Nov 2020 - Jun 2024
Bachelors of Technology in Electronics and Communication Engineering — GPA: 8.72/10.0

Experience

Oracle India Private Limited — June 2024 - Present
Member of Technical Staff 1 — Bengaluru

- Led the architecture and end-to-end development of Oracle Support's **Unified Patching & Upgrade Troubleshooting Framework** in **Java**, automating log acquisition, cross-log error correlation, workflow orchestration, and search–based recommendations, now resolving **4% of all Oracle Database Service Requests** and improving global support efficiency.
- Contributed to the development of a generalized, **config driven Parsing Engine** in **Java** that enables automation developers to define **parsing logic as rule files**; the engine dynamically interprets these configs to extract structured insights from heterogeneous log formats, powering large portions of the troubleshooting framework's automation and **significantly reducing parser development time**.
- Built OASIS, a **multi-agent LLM workflow builder** that lets support teams create their own AI-driven troubleshooting pipelines, owned **backend architecture (Python), context management, RAG-based intent search, tool-integration framework, and major frontend components (Next.js)**.

Oracle India Private Limited — May 2023 - July 2023
Software Development Intern — Remote

- Designed a **fault-tolerant backup microservice** using **Spring Boot** in **Java** capable of handling multi-gigabyte datasets, implementing **chunked transfer** and **resumable uploads** to ensure data integrity during network disruptions.
- Optimized database interaction for high-throughput transfers by implementing **custom SQL pagination**, preventing memory stalls during large-scale data retrieval.
- Built and deployed a full testing dashboard in **React**, containerized the services using **Docker and Kubernetes**, and set up **Eureka Service Discovery** along with **Prometheus + Grafana** monitoring to ensure scalable, observable operations.

Research Projects

Optimal Placement of Aerial Base Stations in Cell Free Networks — Aug 2022 - May 2024
Bachelor's Thesis Project, Prof. Arghyadip Roy and Prof. Salil Kashyap, IIT Guwahati — Report

- Implemented a **GS-GB optimization method using Gibbs Sampling** and **Gradient Refinement** to maximize min-SINR and enhance coverage stability in dynamic cell-free networks.
- Developed a scalable **PPO based Deep Reinforcement Learning policy** that handled high-dimensional network control for real-time Access Point (AP) placement decisions. Also built a simulator to visualize the movement of the APs.
- Developed a **custom drone integrated with a wireless networking unit** to prototype and assess emergency communication coverage during natural calamities, demonstrating strong gains through alternate Line of Sight creation.

Volunteering Work

People+ai — Oct 2024 - Dec 2024
Volunteer Software Developer — OCC| City AI Engine

- Built and field-tested the City AI Engine, a **multimodal LLM-based system that grades walkability** from citizen-uploaded road images and generates geospatial road-quality maps for government planners, validated through real-time deployment at a Bangalore walkathon.
- Developed an **interoperable compute-discovery POC** for the Open Cloud Compute (OCC) initiative, designing a vendor-neutral marketplace layer using standardized APIs that enabled cross-vendor comparison and provisioning across partners

Projects

FPGA Implementation of Euler-Modeled Spiking Neural Networks — Mar 2024 - May 2024
Course Project for EEE605 Machine Learning Architectures — GitHub

- Designed and implemented a two-layer **Spiking Neural Network** using **Poisson spike generators** and **LIF neurons**, applying Euler-based numerical modeling to capture biologically realistic temporal dynamics.
- Developed modular Verilog components, including **spike generators, LIF neuron units**, and interconnect logic and validated system behavior through comprehensive testbench simulations of **membrane potentials, spike timing, and refractory cycles**.
- Added IEEE-754 **32-bit floating-point support** by integrating **priority encoders, arithmetic modules, and comparators**, demonstrating correct functionality in both pre and post-synthesis FPGA simulations.

Placement Portal Aug 2023 - Sep 2023
Student's Web Committee, IIT Guwahati Website | Demo

- Led the development of IIT Guwahati's official recruitment management portal, the platform that runs the institute's annual job fair style hiring season, supporting **1500+ students and 200+ companies** with a team of 15 developers.
- Built key **frontend and backend features** for student registration, company registration, job applications, candidate tracking, and scheduling of tests and interviews, ensuring smooth operations at large scale.
- **Implemented automated notifications** for new job postings, and assessment results, improving communication and reducing manual coordination for students and recruiters.

Election Portal Feb 2024 - March 2024
Student's Web Committee, IIT Guwahati Website

- Developed a secure end-to-end platform for IIT Guwahati's Student Body Elections, facilitating **6000+ students** through candidate registration, screening, voting, vote counting, and result declaration.
- **Added client-side vote encryption** with admin-controlled decryption keys to ensure fair elections, and contributed to **frontend development, integration, and deployment** of the system.

Last Mile Delivery Optimization Jan 2023 - Feb 2023
Inter IIT Tech Meet 11.0, Kanpur GitHub

- Built a last-mile delivery optimization system using OR-Tools by modelling the problem as a **Capacitated Vehicle Routing Problem** with dynamic pickups, using OSRM data, and adding **3D Bin Packing** for efficient bag arrangement.
- Created a smart order prioritization method using **delivery date penalties and location-density scores**, which improved route planning and reduced the number of orders carried over to the next day.
- Improved the system's scalability by adding features like **dynamic rerouting, weather based cost updates, better load balancing**, and clustering using the **Sweep Algorithm**, allowing it to handle **large datasets (up to 5000+ orders)** while still staying close to the **best-known solutions (4–12% gap)**.

Deep Learning–Based Loop Closure Detection for Visual SLAM Oct 2024 -Nov 2024
Course Project for CS590 Deep Learning GitHub

- Built a deep-learning-based **Loop Closure Detection system** using **EfficientNet encoders** and **triplet-loss contrastive training**, achieving significantly improved feature retrieval accuracy for **Visual SLAM**.
- Designed a sequence-descriptor matching framework that enhanced place-recognition robustness and consistently **boosted Recall@K performance** in ablation studies.
- Developed a scalable **image-retrieval pipeline** using **PASS-based feature storage** and validated it through end-to-end training, benchmarking, and small-scale localization demos.

HMM Based Sequential Network Attack Detection Mar 2023 - Apr 2023
Course Project for EE336 Modelling and Simulation of Dynamic Systems GitHub

- Developed a **Hidden Markov Model** based intrusion detection framework that infers cyber-attack stages from noisy alert sequences, enabling effective identification of malicious activity beyond raw alert patterns.
- Implemented the **Baum–Welch** algorithm to learn optimal transition and emission probabilities from real alert data, and applied the **Viterbi algorithm** to accurately predict the most likely attack state sequence.
- Achieved **strong prediction accuracy** under uniform initialization, validating HMMs as a reliable tool for early attack detection and state forecasting in network security.

ShopAI: Conversational Outfit Recommender August 2023
Flipkart Grid 5.0 Semi-Finals GitHub

- Developed a **Conversational Chat Interface** to recommend fashionable outfits to users according to their needs.
- **Scraped data about recent trends** from Instagram and interpreted them using **GCP Vertex AI's Image Captioning Service** and generated outputs using **OpenAI's GPT 3.5 Turbo LLM**. The interface was built using **React.js** and **FastAPI**.
- Personalized inference using **chain-of-thought prompting**, purchase history, browsing data along with live cart details.

Technical Skills

Programming languages: C++, C, Python, Java, JS, Perl
DevOps: Docker, Kubernetes, Helm, Rancher
Web Technologies: Spring Boot, Django, Node.js, React.js
Miscellaneous: SQL, MATLAB, Git, Shell, Latex

Relevant Coursework

Computer Science: Data Structures & Algorithms, Operating Systems, Computer Networks, Software Engineering
Mathematics: Probability and Random Processes, Linear Algebra, Game Theory and Economics
Other: Deep Learning, Reinforcement Learning, Information Theory, Modelling and Simulation of Stochastic Systems, Fuzzy Logic and Neural Networks, Machine Learning Architectures

Positions of Responsibility

Overall Coordinator, Student's Web Committee: 2023 - 2024.
Leading a team of 50+ Developers working to build products to be used by the 6000+ campus students

Contingent Manager, Inter IIT Tech Meet 12.0: 2023 - 2024
Managed and led a team of 80+ students to 4th position in Inter IIT Tech Meet 12.0 hed at IIT Madras.