

# Khushwant Singh

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## EDUCATION

Shiv Nadar University August 2023 - May 2027  
Bachelors in Technology - Electrical and Computer Engineering GPA: 8.21/10

## EXPERIENCE

Software Engineering Intern, Arakoo June 2025 – August 2025

- Containerized and deployed a **Next.js full-stack application (dashboard + backend APIs)** using **Docker** and **Google Cloud Run** for scalable, serverless execution.
- Implemented **real-time data streaming** of encrypted screen and audio using **Aply + tRPC**, consistently achieving **sub-500ms latency**.
- Designed a **multiagent AI system** with specialized agents for audio-based and screen-based queries, allowing context-aware assistance.
- Integrated a **Retrieval-Augmented Generation (RAG) pipeline** with **pgvector + Google Cloud SQL (Postgres)**, improving retrieval relevance by **~30% via hybrid search**.

## PROJECTS

**Real-Time Waste Classification using Deep Learning** | *React Native, Node.js, Express.js, MongoDB, TensorFlow Lite, REST APIs-* (Link) September 2025

- Engineered a **cross-platform mobile app** with camera-based waste scanning, achieving **97% classification accuracy** and enabling users to verify recyclability of items pre-purchase.
- Implemented **real-time telemetry and analytics dashboards** with secure REST APIs and MongoDB, allowing households and municipalities to track bin fill levels, waste composition, and optimize collection logistics.
- Deployed a **lightweight CNN model (TensorFlow Lite)** on-device for classifying waste, reducing server dependency and cutting inference latency to **<200ms**.

**Contextual Learning Assistant** | *Node.js, Express.js, MongoDB, React, Vite-* (Link) January 2025

- Developed a **Chrome extension** to scrape lecture/tutorial PDFs from Blackboard and store them efficiently on Amazon S3.
- Engineered an **AI-powered chatbot** with Gemini + RAG, delivering context-aware responses across multiple documents.
- Added **note-taking, lab report generation, and tutorial solutions**, boosting student productivity.

**InsightScholar** | *React.js, Tailwind CSS, Node.js, Express.js, MongoDB, Socket.io-* (Link) January 2025 – March 2025

- Built a **reputation-driven Q&A platform** that promotes users to mentor roles through a **karma-based contribution system**.
- Engineered **real-time global chat and discussion forums** using Socket.io, supporting scalable and interactive user engagement.
- Developed a **secure payment verification and admin approval workflow** for mentorship sessions, ensuring trust and accountability within the platform.

## SKILLS

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- **Languages:** JavaScript, TypeScript, C, SQL, HTML/CSS
- **AI/ML:** Retrieval-Augmented Generation (RAG), Vector Databases, Generative AI, AI Agents, Random Forest, Convolutional Neural Networks (CNN)
- **Frameworks & Libraries:** Node.js, Express.js, React, Next.js, TailwindCSS, MongoDB, Chakra UI, EJS, Chart.js, tRPC
- **Platforms & Tools:** Git, GitHub, Google Cloud Run, Google Cloud SQL (Postgres), Docker, Firebase, Supabase, pgvector
- **Technical:** RESTful APIs, Web Scraping, WebSockets
- **Relevant Coursework:** Data Structures and Algorithms, Operating Systems, Cloud Computing (Basics), Introduction to C Programming

## ACHIEVEMENTS

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- Awarded with **Dean's List** for Monsoon 2023 semester: Awarded to the **TOP 10%** of the class
- **3rd Place**, Envisage Hackathon (SNU), Dec 2024: Built a contextual learning assistant Chrome extension powered by AI agents and RAG.
- **2nd Place**, CodeJam-V5 Hackathon (JIIT), Dec 2024: Built a classroom content organization Chrome extension with filtering and note-taking features, powered by RAG and AI agent.
- **5th Place**, Smart Student Hackathon (College level for Smart India Hackathon), 2025: Engineered a cross-platform waste management app with on-device CNN (TensorFlow Lite) achieving **97% accuracy** and <250ms inference, with real-time analytics dashboards for municipalities.

## LEADERSHIP

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- **Treasurer**, ACM Chapter, Shiv Nadar University
- **Tech Lead, Breeze (Annual Techno-Cultural Fest, SNU)**: Lead developer for a fest with **10,000+ footfall**, building and maintaining the central website.
- **Tech Lead, Entrepreneurship Cell (E-Cell), SNU**: Built the website for a flagship event that achieved **1M+ impressions on Unstop**.
- **Tech Lead, Finvest Club, SNU**: Developed the event website for a Dalal Street simulation with **300+ participants**.