

# SUDIP DE

Delhi, India

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Software engineer 1.5+ years of academic research, project, and industry experience across mobile, full-stack, and AI systems. Proficient in building scalable, high-performance applications using modern frameworks, cloud infrastructure, containerized deployments, and clean system architecture.

## EDUCATION

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**Indian Institute of Technology Delhi**, *M.Sc in Mathematics* | Delhi, India

Jul 2023 - Ongoing

**Vidyasagar University**, *M.Sc in Applied Mathematics* | Midnapore, India

Nov 2021 - Sept 2022

(Completed first-year coursework before transferring)

**Panskura Banamali College**, *B.Sc (Hons.) in Mathematics* | Panskura, India

Jul 2018 - Aug 2021

**Courses:** C & C++ Programming | Linear Algebra | Graph Theory | Optimization | Operations Research | Numerical Methods | Probability Theory | Statistics | Multiple Decision Procedures | PDE | Image & Signal Processing

## WORK EXPERIENCE

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**OAE IIT Delhi**, *Software Developer Intern* | On-site (IIT Delhi, Delhi, India)

Nov 2025 - Jan 2026

- Architected and developed a scalable **cross-platform mobile application using React Native**, which included dedicated dashboards for students and drivers for courses, ride booking, billing, and academic schedule tracking.
- Built a scalable **admin panel** using **TypeScript** and **React (Vite)** for the purpose of user management, role-based access control, course management, and analytics visualization by securely integrating APIs.
- Designed and implemented **backend services** that integrated **Fiber (Go)**, **MongoDB** and **Redis**, ensuring a secure, low-latency, real-time, and scalable data flow for both mobile and web clients
- The ride updates in **real-time** were implemented with **WebSocket** communication
- Collaborated on **UX/UI guidelines**, to enhance the user experience on both **iOS** and **Android platforms**
- Containerized services using **Docker** and deployed them on **Kubernetes on Azure**
- Built and maintained **CI/CD pipelines** to automate build, test and deployment workflows
- Successfully published and maintained production applications on **Google Play Store** and **Apple App Store**.

**Watmonk Technologies**, *AI Engineer Intern* | Full-time (Gurgaon, Haryana, India)

Jul 2025

- Designed and implemented **AI-driven automation solutions** to enhance business workflows and operational efficiency.
- Collaborated with **engineering**, **product**, and **operations teams** to identify and integrate high-impact AI applications.
- Built, tested, and deployed **machine learning models** using **Node.js**, **Gemini**, and other relevant AI frameworks.
- Contributed to **intelligent decision systems** that improved data accuracy and real-time processing speed.

**SBI Life Insurance Co. Ltd.**, *Insurance Advisor* | Part-time (Ghatal, WB, India)

Nov 2022 - Dec 2024

- Managed **policy advisory**, **onboarding**, and **customer relationship management** for **100+ clients**
- Increased renewal rates from **60%** to **83%** by following up with clients.
- Achieved **100% policy persistency**, Leveraged **RMI analytics** to monitor performance metrics and improve business outcomes.

## RESEARCH & LAB EXPERIENCE

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**Research Project**, *Under the guidance of Prof. Sumer Singh* | IIT Delhi (Delhi, India)

Jan 2025 - May 2025

- This research on the modeling and reduction of vehicular  $CO_2$  emissions as a part of Delhi's roadmap to carbon neutrality.
- Applied stochastic and data-driven models on emissions trends and potential opportunities for emissions reduction.
- Ran scenario based modeling simulations and comparative emissions data analyses, assessed the effectiveness of emission control policy option might be.

## SKILLS

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Programming Languages	C/C++, JavaScript, TypeScript, Dart, Java, Go, Python, SQL
Frontend	HTML, CSS, Vite, React, Angular, Redux, Tailwind CSS, Bootstrap
Backend & APIs	Node.js, Spring Boot, Gin/Fiber, FastAPI, Django, REST & LLM APIs
Mobile	React Native, Flutter, Android (Kotlin), iOS (Swift)
Databases	PostgreSQL, MySQL, MongoDB, SQLite, Redis, Firebase
Cloud & DevOps	Docker, Kubernetes, Terraform, Jenkins, CI/CD, Git, GitHub Actions, AWS, GCP
Testing & Quality	Unit, Integration, Component, End-to-End Testing using Vitest, PyTest, Playwright
Software Tools	Linux, Docker, VS Code, Xcode, Android Studio

## PROJECTS EXPERIENCE

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- AutoFE-X | Self-Initiated Project** Nov 2025 - Ongoing
- Built **AutoFE-X**, an open-source Python framework that automates feature engineering workflows for machine learning pipelines.
  - Designed a **modular architecture** for data preprocessing, feature extraction, and feature transformation.
  - Reduced manual feature engineering effort using **intelligent heuristics and optimization strategies** for feature generation and selection.
  - Improved downstream model performance and experimentation speed by standardizing and automating repetitive data preparation tasks.
  - Published and maintained the package on **PyPI**: (<https://pypi.org/project/autofex/>); source code available on **GitHub**: (<https://github.com/sudo-de/autofe-x>).
- Portfolio Optimization for US and Indian Equities: A Probabilistic Expert Fusion** Nov 2025 - Nov 2025
- Approach** | Under the guidance of Prof. Aparna Mehra | IIT Delhi
- This research on **Probabilistic Expert Fusion (PEF)**, a dynamic Bayesian predictive synthesis framework that extends classical Bayesian Model Averaging to non-stationary multivariate return processes via time-varying expert aggregation weights.
  - Applied the model to **20 large-cap equities** from the S&P 500 and Nifty 50 over January 2015–September 2025, PEF generates a coherent posterior predictive distribution that simultaneously informs **mean-variance**, **CVaR-constrained**, and **risk-parity portfolio decisions** under long-only constraints.
- SolarAI: Intelligent Rooftop Energy Analysis** | Self-Initiated Project Aug 2025 - Sept 2025
- Built an AI system to convert aerial imagery into **3D roof models** and **ROI projections**, achieving **6X faster processing** than standard tools.
  - Designed a rooftop detection and segmentation pipeline using **YOLOv11** and **SegFormer**, achieving a **97.3% mAP** and reducing **false positives by 42%**.
  - Implemented a **3D Roof Reconstruction Engine with less than 2% error in surface area estimation**, supporting automatically optimized solar panel layouts.
  - Migrated the **backend from FastAPI to Next.js** and optimized **containerization using multi-stage Docker builds**, which is improving **99.9% uptime**, **1.8s** time-to-interactive, and overall deployment size by **63%**.
  - Source code available on **GitHub**: (<https://github.com/sudo-de/ai-solar-rooftop-analysis>)
- X-Crypto-Vault** | Self-Initiated Project Jan 2025 - April 2025
- Designed and implemented a **secure CLI Bitcoin wallet using C++** with deterministic key generation and recovery.
  - **BIP-39 mnemonic seed phrases** and **Hierarchical deterministic (HD) wallet architecture** for secure key management.
  - Built cryptographic workflows for **key derivation**, **address generation**, and **wallet restoration**, emphasizing correctness and security.
  - Source code available on **GitHub**: (<https://github.com/sudo-de/x-crypto-vault>).
- HyperLogic AI ChatBot** | Self-Initiated Project Jan 2025 - April 2025
- Architected a modular **modular FastAPI backend** with support for multiple LLM providers (including Gemini), incorporates automatic fallback logic and streaming responses
  - Created a **responsive TypeScript & React (Vite)**, features a clean UI, switchable themes, typing indicators, and real-time chat implemented with WebSockets.
  - Configured dynamic database switching between **PostgreSQL** and **SQLite** and managed end-to-end deployment using **Docker Compose** and **Nginx**.
- Deep Vision System for Biomedical Image Segmentation and Diagnosis** | Under the guidance of Prof. Anup Singh | IIT Delhi Jan 2024 - May 2024
- Developed an **deep learning-based biomedical image analysis system** for MRI, CT, and microscopy data.
  - Implemented **deep learning pipelines** for image segmentation, feature extraction, and multi-class disease classification using **CNN** and **Vision Transformer** models.
  - Developed **3D visualization** and **image registration modules** to support comparative anatomical studies and volumetric tissue mapping across time-series scans.
  - Automated **diagnostic workflows**, reducing manual analysis time and improving reproducibility.
  - Integrated the platform with **PACS/EMR systems** for seamless clinical data access.
- Smart Healthcare Assistant (AI + IOT)** | Self-Initiated Project Jul 2023 - Nov 2023
- Designed a **real-time IoT** health monitoring system for tracking heart rate, temperature, and oxygen levels.
  - Built an **AI-based diagnosis** that analyzes symptoms and generates data-driven condition forecasts.
  - Developed a **React Native** mobile app that provides real-time health insights to both patients and healthcare professionals.
  - Implemented real-time alerting using **WebSockets** and **push notifications** for rapid response to critical changes.
  - Added encrypted **cloud storage** and access control for secure, **HIPAA-compliant data management**.
  - Optimized IoT communication to reduce latency and improve system performance.

## CERTIFICATES

<i>React Native, Udemy</i>	Dec 2025
<i>Flutter &amp; Dart, Udemy</i>	Nov 2025
<b>AWS Summit India, Amazon Web Services (AWS)</b> , Bangalore, India	Jun 2025
<b>Google Cybersecurity, Coursera</b>	Apr 2025
<b>Deep Learning, GDSC NSUT</b> , Delhi India	Jan 2024
<b>LaTeX, GITAM</b> , Bangalore, India	July 2021

## ACHIEVEMENTS & AWARDS

<b>Qualified GATE 2025 in Mathematics</b> , <i>Organized by IIT Roorkee</i> , Roorkee, India	Apr 2025
<b>Best Wordsmith Award</b> , Securing 1st position <i>NISHAAN IIT Delhi</i> , Delhi, India	Feb 2025
<b>Rising Star Award, SBI Life Insurance Co. Ltd.</b> , Ghatal, India	Jul 2023
<b>Qualified JAM 2023 in Mathematics</b> , <i>Organized by IIT Guwahati</i> , Guwahati, India	Apr 2023
<b>Qualified JAM 2021 in Mathematics</b> , <i>Organized by IISc Bangalore</i> , Bangalore, India	Apr 2021