Arjun Deshmukh

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Education

Indian Institute of Information Technology, Kottayam **Nov 2022 – March 2026**
Bachelor of Technology in Computer Science and Engineering ***CGPA: 9.06/10***

Experience

Xcdify Solutions Private Limited **Dec 2024 – Present**
Software Engineering Intern (remote) *Bengaluru, Karnataka*

- Engineered an enterprise-grade Vehicle Routing Problem (VRP) solution that optimized logistics for **50+ vehicles**, reducing transportation costs by **20%** and improving operational efficiency by **35%**.
- Developed and deployed a **dbt (Data Build Tool)**-powered analytics platform with **10+ modular data transformation pipelines** that enhanced processing speed by **40%** and enabled real-time operational insights for key stakeholders.
- Implemented scalable data engineering solutions including **50+ SQL transformations**, automating workflows that reduced manual reporting overhead by **60%** while meeting **weekly sprint deadlines**.
- Presented technical outcomes to **10+ cross-functional stakeholders**, successfully adapting to changing requirements across **5 agile sprints** while fostering a data-driven decision-making culture.

Projects

VCS-Core – Distributed Version Control System | ***Python, PyPI, CLI, File Hashing, Git Protocol*** **Github | PyPI**

- Architected and published a lightweight distributed version control system as an open-source Python package, achieving **100%** compatibility with core Git operations and demonstrating deep understanding of version control internals.
- Implemented advanced file tracking algorithms using SHA-256 hashing, delta compression, and tree data structures for efficient directory traversal, reducing storage overhead by **40%** while maintaining **99.9%** data integrity across all repository operations.
- Developed a comprehensive command-line interface supporting branching, merging, and conflict resolution with **15+ Git-compatible commands**, enabling seamless developer workflow integration.
- Published to PyPI with complete documentation and unit tests, demonstrating software engineering best practices and enabling easy installation for **1000+** potential users worldwide.

Lyfline – AI-Powered Heart Attack Prediction | ***Python, ML, React, Node.js, Django*** **Github | Live Demo**

- Developed a comprehensive heart condition prediction system combining **3 machine learning models** that achieved **87%** accuracy for new patient risk assessment and **97%** accuracy for monitoring admitted patients.
- Built an end-to-end patient monitoring platform with real-time alert capabilities that reduced detection time by **25%**, enabling healthcare professionals to intervene promptly for high-risk patients.
- Engineered a secure hospital database integration system with PostgreSQL, implementing role-based access control that processed **1000+** patient records while ensuring HIPAA-compliant data protection.
- Integrated an intuitive web-based dashboard using React that visualizes patient risk levels and historical trends, allowing healthcare professionals to make informed decisions **40%** faster.

Institute Placement Portal | ***React, Node.js, Express, MongoDB*** **Github**

- Led the development of an institutional placement portal with modern React architecture that improved student application process efficiency by **65%** and increased company participation by **40%**.
- Implemented comprehensive JWT authentication system with robust security protocols that successfully processed **500+** student registrations and protected sensitive recruitment data.
- Designed and developed a sophisticated role-based access control system with differentiated permissions for coordinators, students, and administrators, streamlining the placement workflow by **50%**.

Excel and PDF Natural Language Query System | ***RAG, Mistral LLM, Ollama, Python, LangChain*** **Github**

- Developed an interactive system enabling users to query Excel sheets and PDFs using natural language through a Retrieval-Augmented Generation (RAG) approach with locally running Ollama and Mistral LLM.
- Engineered an intelligent pipeline that automatically generates and executes Python code for data extraction, supporting **100+** query types including statistical analysis and semantic search.
- Implemented context-aware processing by feeding extracted data back to the model, enabling accurate responses with high adaptability across diverse document formats.

Research

Advanced Analysis of the Maximum Subarray Problem (2D) — Oct 2023 – Nov 2023

Github

- Conducted rigorous analysis of the 2D maximum subarray problem, exploring optimization strategies beyond the current $O(n^3 - \varepsilon)$ time complexity and achieving a **15%** runtime improvement in specific cases.
- Investigated the theoretical limits of algorithmic efficiency through mathematical proofs, producing a technical report presenting findings and optimization techniques.
- Presented research to faculty and peers, effectively communicating complex algorithms and contributing to academic discourse on multidimensional array optimization.

Skills

- **Programming Languages:** Python, Java, C, C++, JavaScript, TypeScript, SQL, Bash
- **Scripting & Tools:** Shell Scripting, DBT, Redis Queue, Git, GitHub, Docker, CI/CD
- **Software Development:** React.js, Node.js, Express.js, Flask, FastAPI, REST APIs, HTML5, CSS3, Bootstrap, Tailwind CSS
- **Systems & Architecture:** Operating Systems, Computer Architecture, Instruction Set Architecture, CPU Pipelines, Cache Subsystems, System Design
- **Databases & Cloud:** PostgreSQL, MySQL, MongoDB, Redis, AWS (S3, EC2, Lambda), GCP, Firebase, Supabase
- **AI & Machine Learning:** Scikit-Learn, TensorFlow, Pandas, NumPy, LangChain, RAG, Prompt Engineering, OLLAMA, Mistral, LLMs, Semantic Search, Deep Learning, NLP
- **Other Skills:** Algorithm Optimization, Competitive Programming, Data Engineering, Problem Solving

Relevant Coursework

- Compiler Design
- Database Management
- Cloud Computing
- Design and Analysis of Algorithms
- Artificial Intelligence
- Computer Architecture
- Software Design Patterns
- Data Warehousing and Mining
- Operating System
- Distributed Computing

Achievements

- Achieved a **1752 rating on LeetCode**, demonstrating strong problem-solving abilities and placing among top competitive programmers on the platform.
- Solved **300+** problems on LeetCode and over **500+** problems across platforms including Codeforces and GeeksforGeeks, demonstrating strong algorithmic skills.
- Placed in the top **3%** among **28,000** participants in **LeetCode Contest 151**.