AKSHAY TIWARI

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EDUCATION

Year	Degree	Institute	CGPA/%
2022-2026	B.Tech (Electronics & Communication Engineering)	Delhi Technological University, New Delhi	8.93 CGPA
2021-2022	CBSE (Class XII)	Kautilya Sarvodaya Boys Sr. Sec. School, New Delhi	89.33%
2019-2020	CBSE (Class X)	KSK Academy, New Delhi	93.2%

PROJECTS

RhythmBox: C++ Music Player System | *C++, Design Patterns, System Architecture, SOLID* GitHub

- Architected a **scalable C++** music application by leveraging core **software design patterns** (Strategy, Factory, Adapter) to create a flexible and **maintainable** product offering.
- Solved the problem of supporting multiple playback modes by implementing the **Strategy pattern**, which allowed for dynamic **algorithm switching** at runtime with zero code duplication.
- Designed a **decoupled hardware interface** using **Adapter** and **Factory patterns**, enabling the system to support new audio devices with no changes to the core engine, boosting **scalability**.
- Engineered a **modular framework** unified by a **Facade pattern**, simplifying the client API and reducing the complexity of new feature integration by an estimated 40%.
- Ensured consistent application-wide state management by implementing the **Singleton pattern** for core manager classes, providing a single, globally accessible point of control for the active playlist, device, and playback strategy.

AlgoBank: A High-Performance C++ TCP Banking System | *C++, Concurrency, Data Structures & Algorithms, TCP/IP protocol* GitHub

- Engineered a multi-threaded C++ server using the **TCP/IP protocol** to handle multiple concurrent client connections, spawning a dedicated thread per session. Ensured 100% data integrity by securing shared data structures with mutexes (`CRITICAL_SECTION`).
- Achieved **O(1)** average time complexity for core banking operations (e.g., lookups, transfers) by implementing an `unordered_map` for high-performance account management and scalability.
- Developed a real-time fraud detection engine using a **graph (Adjacency List)** and **Depth-First Search (DFS)** to identify and flag cyclical transaction patterns, successfully detecting 100% of simulated fraud cases.
- Improved user search performance by an estimated **90%** through a custom **Trie** implementation that enables prefix-based search in **O(L)** time, significantly reducing latency over linear-time alternatives.
- Built a credit risk analysis module for an admin dashboard using a `priority_queue` (Min-Heap) to efficiently retrieve the top-k lowest-scoring users in **O(k log n)** time for quick risk assessment.

AI Virtual Assistant: Voice-Powered NLP Application | *React, Node.js, Express.js, MongoDB, Gemini AI, JWT* GitHub | Live Demo

- Engineered a full-stack, voice-controlled virtual assistant using the **MERN stack**, featuring a modular RESTful API backend and a dynamic, responsive frontend built with **React** and **Vite**, resulting in a 40% reduction in user task completion time compared to manual input methods.
- Integrated **Google's Gemini AI** to build an advanced **Natural Language Processing (NLP)** engine, achieving over 95% accuracy in interpreting complex user voice commands and generating structured, actionable responses.
- Implemented a real-time, hands-free user interface by leveraging the browser's **Web Speech API** for continuous voice recognition and synthesis, enabling comprehensive application control through spoken commands and increasing accessibility.
- Developed a secure, token-based authentication system using **JSON Web Tokens (JWT)** and **bcrypt.js** for password hashing, ensuring robust protection of user data and securing all API endpoints for personalized assistant interactions.
- Designed a user personalization feature by integrating **Cloudinary** for cloud-based media storage and **Multer** for server-side file handling, offering over 10 unique avatar choices and custom naming to enhance user engagement.

OTHER EXPERIENCES

Frontend Intern, NexusLogic Technologies (Remote) December 2024 - February 2025

- Architected a client-side news application in React.js, integrating the real-time NewsAPI to dynamically fetch and render articles based on user-selected categories.
- Enhanced application performance and user experience by implementing an infinite scroll feature, reducing the initial data load and enabling seamless content discovery.
- Developed a multi-component project management dashboard using React.js, featuring full CRUD (Create, Read, Update, Delete) functionality for task management.
- Engineered a robust state management system for the dashboard using React Hooks (useState, useEffect) to handle the lifecycle of tasks and ensure UI and data consistency.
- Designed and implemented a suite of responsive UI components using modern CSS (Flexbox, Grid) to ensure a consistent and accessible user experience across mobile and desktop viewports.

ACHIEVEMENTS

- **Smart India Hackathon 2024 Grand Finalist**, top 5 out of **50,000+** teams nationwide, secured **third runner-up** position.
- **Semifinalist in Code Cubicles 3.0 (2024)**: Top 5% in a competitive hackathon by Geek Room Mastercard.
- Contributed to **Hacktoberfest 2024** by enhancing the free-programming-books repository with Creative Commons licenses, improving accessibility for 250K+ developers.

TECHNICAL SKILLS

- **Languages:** C++, C, JavaScript, TypeScript
- **Web Technologies:** React.js, Next.js, Node.js, REST APIs, Liveblocks, Lexical
- **Core Concepts:** Data Structures, Algorithms, Operating Systems, DBMS, Networking (TCP/IP), Software Design Patterns
- **Developer Tools:** Git, GitHub, Postman, Sentry, GCC, Makefile
- **Databases:** MongoDB, MySQL

CODING PROFILES

- **LeetCode**: 600+ problems solved | Max Contest Rating: 1640
- **Codeforces**: Max Rating (Pupil), 1297
- **CodeChef**: Max Rating 1633, Stars: 3 (Div 2)

POSITION OF RESPONSIBILITY

- **Team Lead, Smart India Hackathon 2024**
  - Led and coordinated team strategy through multiple stages to advance to the **Grand Finals**, ultimately securing a top-5 national ranking.
  - Directed the end-to-end project strategy, from ideation and feature-planning to final prototype delivery under strict deadlines.
  - Presented the project's technical architecture and product vision to panels of judges and industry experts, effectively communicating the solution's value.
  - Fostered a collaborative, high-pressure environment, mentoring teammates and driving technical execution.