

# Muhammad Ali

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## SUMMARY

Competitive programmer (Codeforces Expert peak 1679, CodeChef 4-star peak 1849) with deep expertise in algorithms, data structures, and cryptanalysis. Conducted research on ARX stream ciphers at IIT Hyderabad. Built ML recommendation systems and modern full-stack web applications. Proficient in C++, Python, JavaScript, TensorFlow, and Next.js.

## EDUCATION

<b>Maharaja Agrasen Institute of Technology, Delhi, India</b>	2021- 2025
B.Tech in Artificial Intelligence and Machine Learning	CGPA: 8/10
<b>St. John's Academy, Delhi, India</b>	2021
Senior Secondary Examination CBSE- Class XII (PCM)	Percentage: 88.4/100
<b>St. John's Academy, Delhi, India</b>	2019
High School Examination CBSE- Class X	Percentage: 92/100

## RELEVANT COURSEWORK

**Courses:** Object-Oriented Programming, Data Structures and Algorithms, Probability Statistics and Linear Algebra, Computer Networks and Internet Protocols, Operating Systems, Database Management System, Machine Learning, Deep Learning, Data Science, Computational Methods, Natural Language Processing, Mobile Application Development, Cloud Computing

## TECHNICAL SKILLS

**Languages:** C/C++, Java, Python, JavaScript, SQL

**ML/DL:** TensorFlow, Scikit-learn, NLTK, Pandas, NumPy, Matplotlib

**Web/Backend:** Next.js, Node.js, Tailwind CSS, Vercel

**Other:** Git, Unix Shell, MySQL, C++ STL

**DSA:** Advanced algorithms & data structures (1370+ competitive programming problems solved)

## EXPERIENCE

**Research Intern** | Center for Cryptography and Cybersecurity, IIT Hyderabad Sep 2025 – Dec 2025

- Implemented reduced-round versions of ARX-based stream ciphers (ChaCha, Salsa, Forró) from scratch in C++ for differential cryptanalysis.
- Designed and evaluated boomerang distinguishers on these ciphers; analyzed success probabilities, time, and data complexities.
- Built tooling to analyze differential propagation, diffusion, and structural weaknesses in modern stream ciphers.

**Research Intern** | Maharaja Agrasen Institute of Technology Mar 2023 – Jun 2023

- Designed and implemented scalable music recommendation pipelines using TensorFlow Universal Sentence Encoder and Scikit-learn.
- Performed NLP preprocessing and model optimization; co-authored paper presented at ICDAM-2023.

## PROJECTS

**Personal Portfolio Website** | Next.js 15, TypeScript, Tailwind CSS, Vercel ([Link](#))

- Built a high-performance personal website with Next.js 15 and React 19 using Server Components for strong SEO.
- Designed a monochrome Tailwind CSS UI and mitigated React2Shell vulnerabilities via dependency management.

**Music Recommender** | Python, TensorFlow, Scikit-learn, NLTK, Git ([Link](#))

- Developed hybrid recommendation system combining collaborative filtering, content-based, and NLP-based approaches.
- Used TensorFlow Universal Sentence Encoder for semantic embeddings; improved personalization and recommendation relevance.

## ACHIEVEMENTS

**Codeforces** | [BeyonderrX](#) Present

- Peak Rating: 1679 (Expert) Best Global Rank: 583
- India Rank 5/20,000+ in Codeforces Round 951 (Div. 2)

**CodeChef** | [xbeyonderrx](#) Present

- Peak Rating: 1849 (4-star)

**Codefest'25 Prelims** | IICPC Mar 2025

- Ranked 1263 / 45,000+ in national contest sponsored by HRT, Jane Street, Jump Trading, Citadel, D. E. Shaw