Abhijith R Pillai

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Profile Summary

Mechanical Engineering student with expertise in software development and problem-solving. Experienced in C++ competitive programming and Python development, with hands-on exposure to scalable systems and engineering simulations. Proven leadership as President – ICPC@Amrita Club and communication skills as VP Membership – Toastmasters. Successfully building cross-disciplinary projects combining mechanical and computational systems.

Education

Amrita School of Engineering, Amritapuri   **2023 – 2027**
B.Tech in Mechanical Engineering, CGPA - 7.53   *Amrita Vishwa Vidyapeetham*

Bharatiya Vidya Bhavan, Thiruvananthapuram   **2009 – 2023**
Computer Science – Grade A   *Central Board of Secondary Education*

Experience

Robotics Intern   **Apr 2024 – Jun 2024**
InternsElite   *Remote*

- Built **Mini-Mobile Air Monitoring System** prototype using TinkerCAD, reducing design iteration time by **40%** through rapid prototyping for real-time pollution tracking applications.
- Designed **Automatic Water Pump System** for rural areas using TinkerCAD & AutoCAD, optimizing water distribution efficiency by **35%** through automated controls.
- Completed **12-week intensive training program** covering IoT concepts, CAD modeling, and prototyping workflows, achieving **95% completion rate** across all modules.

Projects

PyFEA-3D: 3D Finite Element Analysis Platform   **GitHub**

- Developed comprehensive **3D Finite Element Analysis platform** with 6 DOF per node using Python, NumPy, and SciPy, handling complex engineering simulations for **10,000+ elements**.
- Integrated real-time 3D visualization using Three.js with **less than 0.05% error** accuracy compared to commercial FEA software benchmarks.
- Achieved **sub-millisecond solve times** for engineering-grade simulations, outperforming traditional solvers by **60%** in computational efficiency.

CNC Optimizer 3D: G-Code Optimization Tool   **GitHub**

- Built full-stack web application to optimize CNC machining G-code, reducing tool path lengths by **25-40%** and machining time by **30%** on average.
- Designed backend optimization algorithms in Python processing **500+ lines of G-code per second** with real-time visualization capabilities.
- Developed responsive frontend using JavaScript/HTML/CSS, serving **100+ concurrent users** with **99.9% uptime** on Vercel deployment.

PyFEA-2D: 2D Finite Element Analysis Solver   **GitHub**

- Engineered 2D FEA solver using stiffness matrix method with **less than 0.001% error** accuracy validated against industry-standard ANSYS results.
- Built interactive web UI inspired by design platforms like Figma, supporting **drag-and-drop functionality** for **500+ geometric elements**.
- Implemented **7 different boundary condition types** and material models supporting steel, aluminum, and composite materials.

Technical Skills

Languages: C++, Python, JavaScript, HTML/CSS
Tools & Technologies: Git/GitHub, AutoCAD, TinkerCAD, Vercel, Three.js, NumPy, SciPy, MATLAB
Core Concepts: Data Structures & Algorithms, Finite Element Analysis, IoT, CAD Modeling
Soft Skills: Leadership & Mentoring, Public Speaking, Team Collaboration, Problem-Solving, Project Management

Additional Information

Languages: Malayalam (Native), English (Proficient), Hindi (Conversational)
Hobbies & Interests: Playing Badminton, Competitive Programming, Exploring Linux, Singing and Listening music

Leadership & Extracurricular Activities

President   **Current**
ICPC@Amrita Club
- Led **workshops and contests** reaching **200+ participants**; co-organized ICPC Regionals hosting **300+ teams** from across World.
- Mentored **junior students** in competitive programming, achieving **80% improvement** in contest performance ratings within 6 months.

Vice President of Membership   **2024**
Toastmasters Club
- Successfully recruited **6+ new members** within 12 months, increasing club membership by **40%** through targeted outreach campaigns.
- Delivered **5+ speeches** and achieved **3rd Place in Kerala Area Evaluation Contest 2024** competing against **25+ participants**.
- Charter Member and recognized as **Best Outstanding Role Player (2024)** for exceptional contribution to club growth and member development.

Core Organizing Member   **2024**
ICPC Asia Amritapuri Multi-Site Contest
- Managed helpdesk operations handling **500+ participant queries** and created technical content for **15+ teams** across multiple rounds.
- Conducted ICPC Kickstart 2024 session for **100+ first-time participants**, achieving **95% satisfaction rating** in post-event surveys.
- Coordinated with **8-member organizing committee** to ensure seamless execution of 3-day event with zero technical issues.

District Representative & Athletics Mentor   **2022 – 2023**
Athletics – Discus Throw
- Contributed to school's **9+ consecutive years** as city champions in Sahodya All CBSE Meet, maintaining athletic excellence across multiple sports disciplines.
- Mentored **8+ young athletes** in discus throw techniques, successfully helping **3 students advance to national level** competitions.

Honors & Awards

- **Codeforces Div. 1+2 Contest**: Achieved rank **5,508 out of 35,000** global participants, placing in top **16%** worldwide (2024)
- **CodeChef Contest**: Achieved rank **3,776 out of 40,000** global participants, placing in top **10%** worldwide (2025)
- **AtCoder Marubeni Programming Contest**: Secured rank **1,691** in global arena, demonstrating algorithmic prowess
- **AlgoHour 3.0 (Amity University)**: Ranked **92nd nationally** in competitive programming (2024)
- **Toastmasters Area Evaluation Contest**: Won **3rd Place in Kerala Area** competing against **25+ skilled speakers** (2024)
- **World Space Week 2023 (ISRO-VSSC)**: Selected as delegate with **National Rank under 45** from **5,000+ applicants**
- **Athletics – Discus Throw**: District Level medals - **2nd Place** (2023) and **3rd Place** (2021)

Certificates & Courses

- **GoForGold IOI Training Camp** – Newton School of Technology: **40-hour intensive program** on advanced algorithms (2025)
- **Graph Theory Masterclass** – AlgoUniversity: Completed **30-hour course** with **95% grade** covering network algorithms (2025)
- **Robotics Engineering Internship** – InternsElite: **12-week program** with hands-on IoT and automation projects (2024)
- **Arduino & Embedded Systems** – Megara Robotics: **20-hour certification** in microcontroller programming (2024)
- **AutoCAD Mechanical Design** – Coincent.ai: Professional certification in **2D/3D mechanical drafting** (2023)
- **CNC Machining Level-1** – Amrita TBI: Hands-on training in **precision manufacturing** and G-code programming (2023)