Aayush Raju Bade

B.Tech in Computer Science and Engineering, IIT Jodhpur (2023–2027)
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GitHub — Portfolio — LinkedIn

Research Interests

Computer Graphics, Real-Time Rendering, Physics-Based Simulation, Animation Systems, Game Engine Architecture, Virtual Reality

Technical Skills

Languages: C, C++, GLSL, Python, JavaScript, HTML/CSS, HLSL (Basics)
Graphics Programming: OpenGL, WebGL, CUDA, Vulkan (Basics), Shader Programming, GPU Skinning, Lighting, Framebuffers, ECS Architecture, Nvidia PhysX
Math & Algorithms: Linear Algebra, 3D Math, Projection Matrices, Frustum Culling, Collision Detection, Physics Simulation
Tools: RenderDoc, Nvidia Nsight, Godot, Git, VS Code, CMake, GDB, Linux/Windows
Interests: Low-Level Graphics Systems, Real-Time Physics, Cross-Platform Engine Design

Experience

Undergraduate Researcher — 3DVisLab, IIT Jodhpur Aug 2025 – Present
3DVisLab: Computer Vision & Graphics Research Group

- Conducting research in computer graphics and physics-based simulations under faculty supervision.
- Working on **virtual draping and cloth simulation** for realistic garment behavior in 3D environments.
- Exploring **illumination estimation from videos** for real-time relighting and material analysis.
- Integrating simulation results into custom OpenGL-based rendering frameworks.

Graphics Programming Freelancer (Self-Employed) Jan 2025 – Present
Worked on multiple graphics and simulation projects in OpenGL, C++, and GLSL.

- Designed real-time rendering pipelines with GPU skinning, lighting, and shadow mapping.
- Developed custom framebuffers, shader systems, and cloth/physics simulations.
- Built visual debugging tools and optimized GPU–CPU data flow.

Projects

Crochet Game Engine (2025.01 – Present)
Cross-platform 2D/3D rendering engine from scratch using OpenGL and C++.

- Implemented GPU skinning, instancing, lighting, and ECS-based transform hierarchies.
- Designed modular rendering pipeline with scripting and framebuffer systems.

Virtual Draping & Cloth Simulation (2025.08 – Present)
Real-time cloth simulation integrated into custom OpenGL engine.

- Built particle-based cloth solver with spring-mass physics.
- Simulates cloth dynamics and character interactions using C++ and GLSL.

Newton2D Physics Library (2025.08)
Lightweight 2D physics engine for integration in graphics projects.

- Implemented rigidbody physics, particle systems, and collision detection.
- Integrated within Crochet Engine for real-time physics simulation.

Shader Playground (2025.08)
WebGL-based real-time GLSL shader visualization tool.

Education

Indian Institute of Technology Jodhpur (IITJ) 2023 – 2027 (Expected)
B.Tech in Computer Science and Engineering
CGPA: First Year – 9.33/10 Second Year – 7.76/10
Relevant Courses: Data Structures and Algorithms, Computer Graphics (Self-Study), Digital Image Processing, Linear Algebra, Differential Equations