

# DHRUV RAJVANSH

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## EXPERIENCE

### Software Engineer | USC Institute for Creative Technologies, Los Angeles, CA

July 2025 - Present

- **Geospatial Application Development:** Developed interactive military planning tool with Unity, C#, and WebGL integrating Cesium heightmaps to generate high-fidelity operational environments with optimized UI and browser accessibility
- **Virtual Human Modernization:** Led VITA (Virtual Interactive Training Agent) migration from desktop to Meta Quest 3 using C# and Meta All-in-One SDK, implementing passthrough, room-scale locomotion with ground detection, and a dual-window desktop-VR pipeline communicating over MQTT to drive real-time bidirectional agent communication to user actions.
- **Dynamic AI System:** Engineered AI personality framework with 3-character dispositions (neutral, angry, soft), reducing virtual human initialization delay through optimized prefab container architecture and dynamic cutscene generation

### Software Engineer Intern | IDZ Digital Private Limited, India

January 2024 - July 2024

- **Rapid Prototyping & Iterative Development:** Demonstrated quick ideation and execution skills prototyping 13 interactive mobile applications, such as Planet, Car Stacking Snake, and Mandala design, meeting all project deadlines despite strict time constraints.
- **Performance Tuning:** Boosted frame rate by 45% and improved responsiveness by deploying Unity memory management strategies, streamlining asset workflows, and reducing CPU bottlenecks through architectural improvements.

### Software Engineer Intern | Vyorius Drone Private Limited, India

June 2023 - August 2023

- **Multiplayer Infrastructure:** Orchestrated and coded real-time communication layers with C#, enabling precise state tracking and real-time multi-user synchronization for a low-latency remote operation across distributed systems.
- **User Experience Enhancement:** Improved and Merged UI elements including lobby panels and score tracking systems. Engineered efficient networking protocols and state synchronization, reducing network latency by 40% via state sync protocol redesign.
- **System Integration:** Utilized Mirror API to synchronize distributed state synchronization events, establishing session instancing, secure authority handling, and reliable remote interaction for scalable multiplayer environments.

## TECHNICAL PROJECTS & RESEARCH

### Interactive WebXR Visualization Platform – Three.js, WebGL, HTML5, JavaScript (ES6+), GLSL Shaders.

- **System Architecture:** Designed a modular "World Manager" system in JavaScript, enabling dynamic loading and isolation of 3D environments, improving code maintainability and scalability for future content.
- **Performance Optimization:** Implemented efficient video texture wrapping on spherical geometry for 360° panoramic playback, optimizing memory usage and rendering loop for smooth 60 FPS performance in web browsers.
- **Procedural Generation:** Developed algorithms for dynamic object instantiation (floating shapes), utilizing object pooling patterns to minimize garbage collection overhead and maintain stable frame rates.

### Real-Time Graphics Engine Development: PrimeEngine – C++, Lua

- **Discrete Mesh LOD System:** Engineered a distance-based level of detail system for high-polygon industrial assets, dynamically swapping high-fidelity meshes with optimized low-poly proxies to minimize vertex processing overhead and draw calls.
- **Skeletal Animation LOD:** Implemented a temporal optimization technique for character animation that modulates skinning update frequency based on camera distance, utilizing time accumulation to preserve motion synchronization while reducing CPU cycles.
- **Component-Based Architecture:** Architected modular C++ components for the engine's entity-component system, managing spatial state queries and implementing real-time debug visualization to verify performance gains and logic correctness

## SKILLS

**Programming Languages:** C#, C++, Java, Python, JavaScript/TypeScript, SQL (PostgreSQL, MySQL), NoSQL (MongoDB), HTML5, CSS3

**Frameworks & Technologies:** .NET Core, ASP.NET, Unity, Unreal Engine, Three.js, WebXR API, React (familiar), Node.js (familiar), OpenGL, Vulkan, DirectX 11, WebGL

**Cloud, DevOps & Tools:** Docker (basic), CI/CD (GitHub Actions, Jenkins - familiar), Git/GitHub, AWS, Azure, Perforce, Visual Studio, VSCode, Postman

**Software Engineering & System Design:** Object-Oriented Programming, RESTful API Design, Microservices Architecture, Multithreading, Algorithms & Data Structures, System Design, Real-time Systems, Distributed Systems, Performance Optimization

## EDUCATION

### University of Southern California

Los Angeles, CA, US

**Master of Science, Computer Science – 3.56 / 4 GPA**

August 2024 - May 2026

**Courses:** Analysis of Algorithm, 3D Graphics & Rendering, Computer Animation & Simulation, Database System, Engine Development

### Pandit Deendayal Energy University

Gandhinagar, Gujarat, India

**Bachelor of Technology, Computer Engineering – 3.86 / 4 GPA**

June 2020 - April 2024

**Courses:** Operating Systems, Software Engineering, Big Data Analytics, Cloud Computing, Web Development, Computer Vision, ML