

T Varatharajan

Graphics Engineer — WebGL, WebGPU, Real-Time 3D Rendering

Chennai, Tamil Nadu, India · +91 9659309280 · ciazvanish2000@gmail.com

linkedin.com/in/t-varatharajan · github.com/Varatharajan1808 · varatharajan - portfolio

Professional Summary

Graphics Engineer with 2+ years of experience building high-performance, real-time 3D web applications using WebGL and WebGPU. Specialized in custom rendering engines, GLSL/WGSL shader development, Physically Based Rendering (PBR), and GLTF/GLB asset pipelines. Strong focus on GPU optimization, scalable architecture, and delivering smooth 60 FPS interactive graphics in modern browsers.

Technical Skills

Programming Languages: JavaScript (ES6+), TypeScript, GLSL, WGSL, HTML5, CSS3

Graphics APIs: WebGL, WebGPU

3D Rendering Concepts: Real-Time Rendering, Physically Based Rendering (PBR), Lighting Models, Shader Development, HDRI Environment Mapping, Scene Graphs

Frameworks Libraries: Three.js

Asset Pipelines: GLTF 2.0, GLB, PBR Materials, Texture Optimization

Tools Build Systems: Git, GitHub, Webpack, Vite, NPM, VS Code, Chrome DevTools, Jira

Professional Experience

Software Developer (Graphics Engineer – WebGL/WebGPU)

Dec 2023 – Present

Hexr Factory Immersive Tech Pvt Ltd — Chennai, Tamil Nadu, India

- Architected and improved a production-grade custom 3D rendering engine for real-time web graphics using TypeScript, WebGL, and WebGPU.
- Designed modular shader systems in GLSL and WGSL supporting multiple light types, Physically Based Rendering (PBR), and optimized GPU data flow, reducing draw calls by 30%.
- Built a complete GLTF/GLB asset pipeline with PBR material support, reducing scene load time by 40% through asset compression and lazy loading.
- Engineered real-time lighting systems, camera controls, and interactive scene navigation for complex 3D web applications.
- Maintained consistent 60 FPS performance through GPU optimization, efficient buffer management, and render-loop profiling.
- Collaborated with designers, frontend engineers, and product teams to deliver scalable and performance-focused 3D web graphics solutions.

Key Projects

Custom Web-Based 3D Editor

Personal Project

github.com/Varatharajan1808/3D-WebEngine /Live Demo

- Architected and enhanced a unified **web-based 3D rendering engine** from scratch using **JavaScript and TypeScript**, supporting **WebGL**-based rendering pipelines.
- Executed a full **Physically Based Rendering (PBR)** pipeline using the metallic–roughness workflow, including tangent-space normal mapping, emissive materials, and multi-light support (directional, point, and spot).
- Built a complete **GLTF 2.0 asset pipeline** supporting meshes, PBR materials, textures, normal maps, and hierarchical scene structures with parent–child relationships.
- Designed and applied a **hierarchical scene graph system** to manage transforms, cameras, meshes, lights, and materials, incorporating efficient frustum culling and bounding volume calculations.
- Expanded professional-grade **editor tooling**, including scene hierarchy management, multi-axis transform gizmos, real-time material editing, and runtime texture streaming for complex scenes.

Education

Bachelor of Science in Mathematics

Jul 2017 – Apr 2020

Kamaraj College, Manonmaniam Sundaranar University — Thoothukudi, Tamil Nadu, India

MBA in Human Resource Management (HRM)

Dec 2021 – May 2023

Alagappa University — Thoothukudi, Tamil Nadu, India

Certifications

- **Full Stack Web Development** – QSpiders Institute, Chennai

Apr 2023

- **Software Developer Trainee** – Hexr Factory Immersive Tech Pvt Ltd

Sep 2023