

# Swapnil Kakade

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## Profile

Software and game engineer with experience building desktop applications, gameplay systems, and graphics features. Skilled in designing clean architectures and real-time logic for interactive projects.

## Education

**Indian Institute Of Information Technology Nagpur** 2023–Present  
B.Tech in Computer Science — **CGPA: 7.75**  
**Kamladevi Junior College** 2021–2023  
Higher Secondary Certificate (HSC)

## Experience

### Technex Game Jam Winner — IIT BHU (2024)

- Built a complete RTS game in 48 hours with AI, pathfinding, animation systems, and UI logic.
- Designed resource systems, combat logic, and event-driven gameplay architecture for scalable interactions.
- Optimized game loops and ensured stable real-time performance under time-constrained development.

### Overnight Coding Finalist — IIT Kharagpur (2024)

- Solved system-level and algorithmic problems using highly optimized C++ and memory-efficient logic.
- Improved runtimes through multi-stage pruning, memoization, pattern reduction, and bitwise optimization techniques.

## Projects

### SQL Injection Detector (Python) [GitHub]

- Built a desktop security tool using Tkinter with CFG-based SQL parsing and DFA-driven payload detection.
- Added SQL file scanning, multi-pass parsing, and a weighted risk-scoring engine for high-accuracy detection.
- Detects UNION chains, stacked queries, tautologies, blind/time-based payloads, and encoded injection patterns.

### AI-Driven Shorts Automation Pipeline (Python, FFmpeg, Whisper) [GitHub]

- Built an automated pipeline to generate short-form videos from long content.
- Used ML-based speech recognition (Whisper) for transcription and filtering.
- Applied audio peak detection and visual motion analysis for clip selection.
- Rendered GPU-accelerated videos with subtitles, music ducking, and scheduling.

### Cross-InGame Items Digital Marketplace Platform (Full-Stack) [GitHub]

- Built a full-stack marketplace for secure trading of in-game items across multiple games.
- Developed real-time chat, forums, and anti-fraud systems using WebSockets and PostgreSQL.

### Procedural City Layout Generator (C++ & OpenGL) [GitHub]

- Built an engine-first, grammar-driven procedural system to generate deterministic city road and block layouts.
- Implemented block-level grammars (dense, sparse, park) with seeded randomness for reproducible variation.
- Developed an OpenGL pipeline that visualizes data-driven city structures while keeping generation logic decoupled.

## Skills

**Languages:** C++, Python, C, Java, C#

**Desktop & Systems:** wxWidgets, CMake, Multithreading, File I/O, OS Concepts

**Graphics/Game Dev:** AR/VR, OpenGL, GLSL, Unity, Unreal Engine, Shader Programming

**Full-Stack:** ,React, REST APIs, Express, PostgreSQL, Node.js (basic), Jwt ,NextJs,NestJs

**Tools:** Git, GitHub, Blender, Maya, Regex, Lark

**Core CS:** DSA, OOP, System Design, Rendering Pipelines, Game Physics

## Certifications

- **Process Design and Development: Game Development Using AR / VR** — Trendsetters Infoservices  
Developed marker-based and markerless AR/VR applications with hands-on experience in game, AR, and VR development workflows.