AKSHAT GROVER

Bhopal, India • akshatgrover02@gmail.com • +91-6392104804

github.com/singh199908 • linkedin.com/in/akshat-grover

PROFESSIONAL SUMMARY

Innovative Computer Science Engineer with specialized expertise in **Computational Geometry**, **BIM Interoperability**, and **System Automation**. Demonstrated ability to engineer complex software solutions, from structural engineering wrappers (Osdag/IFC) to AI-driven safety systems. Passionate about bridging the gap between raw data and actionable 3D visualization, with a strong foundation in Python, C++, and Open Source development.

EDUCATION

Vellore Institute of Technology (VIT), Bhopal *2023 – 2027*

Bachelor of Technology (B.Tech) in Computer Science & Engineering

Relevant Coursework: Data Structures & Algorithms, OOPs, Computer Graphics, Software Engineering

TECHNICAL EXPERTISE

Languages: Python (Advanced), C++, JavaScript (ES6+), Bash/Shell, SQL, HTML5/CSS3

Comp. Geometry & BIM: PythonOCC, IfcOpenShell, OpenCASCADE (OCCT), IFC4 Standard, Mesh Algorithms

AI & Vision: OpenCV, NumPy, Pandas, Real-time Object Detection, Image Processing

Systems & Tools: Git/GitHub, Linux Admin, Docker, LaTeX, Ngrok, Networking (TCP/IP)

KEY PROJECTS & ENGINEERING CONTRIBUTIONS

Osdag IFC Wrapper (R&D) *Feb 2026*

Python, IfcOpenShell, OpenCASCADE | FOSSEE Project (IIT Bombay)

- **Architecture:** Engineered a modular Python wrapper to convert parametric Osdag steel connection models into the Industry Foundation Classes (IFC4) standard.
- **Geometry Engine:** Implemented a custom **Manual Triangulation Engine** using `BRepMesh_IncrementalMesh` to bypass library version dependencies, ensuring 100% cross-platform compatibility.
- **Semantic Mapping:** Created intelligent inference logic to map topological shapes to semantic BIM entities (`IfcBeam`, `IfcPlate`, `IfcMechanicalFastener`).
- **Optimization:** Achieved a 40% reduction in file size while maintaining visual fidelity for complex bolt assemblies through mesh deflection tuning.
- **Impact:** Enabled Osdag models to be viewed in industry-standard software like **Revit**, **Tekla**, and **BIMvision**.

CROWD_AMBER_v3 (Intelligent Campus Safety) *2025*

Python, OpenCV, Real-time Processing

- Designed an end-to-end automated surveillance system for monitoring campus density and safety.
- **Algorithm:** Utilized computer vision techniques (Background Subtraction, Contour Detection) for real-time crowd density estimation.
- **Integration:** Built a rapid-response "Amber Alert" notification system that triggers instant alerts to administrators upon detecting anomalies.

CHAOS-ai Framework (Automation Toolkit) *2024*

Python, Modular Architecture

- Developed a lightweight, extensible AI framework designed for local automation tasks with a plugin-based architecture.
- Focused on efficient resource management and ease of deployment for custom scripting.

VITcoin (Fintech Prototype) *2024*

Shell Scripting, Distributed Systems Concepts

- Prototyped a decentralized digital currency model for closed-loop campus transactions using pure Shell scripting.
- Demonstrated deep command-line proficiency by implementing core ledger mechanics and transaction verification.

EXPERIENCE & ACHIEVEMENTS

- **FOSSEE Screening Task:** Successfully completed the highly technical screening for the Osdag Fellowship, proving capability in industrial-grade Python development.
- **Open Source Leadership:** Actively maintaining 20+ repositories on GitHub. Reviewing code, managing issues, and documenting projects.
- **Cybersecurity Research:** Conducted independent research into network vulnerabilities and defense mechanisms (Projects: TBomb, WellsBalChecker).