Amirali Ahangari

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Education

Bachelor of Industrial Engineering **Sept 2020 – Sept 2025**
Amirkabir University of Technology (Tehran Polytechnic) – GPA: 3.46/4.00 (16.46/20)

Research Interests

Computer Graphics, Game Programming, HCI, Engine Programming, Software Engineering, Game Design

Research Experience

Thesis: Development of an Educational Game Application for Children with Autism Spectrum Disorder
Amirkabir University of Technology GitHub Page

- Designed and developed a Unity-based educational game for enhancing cognitive, sensory, and social skills in children with ASD.

Publications

Solution Approaches in Disaster Management **In Preparation**
Co-authored with faculty members at Amirkabir University of Technology

- Conducted a comprehensive literature review on optimization models and algorithms in disaster management.
- Analyzed existing solution approaches for logistical challenges during disaster response.

Teaching Experience

Teaching Assistant, Algorithm Design **Sept 2023 – Sept 2024**
Amirkabir University of Technology

- Taught Object-Oriented Programming (OOP) and routing algorithms such as Dijkstra and A*.
- Assisted students in understanding algorithm optimization and design techniques.

Teaching Assistant, Gamification **Sept 2024 – December 2024**
Amirkabir University of Technology

- Conducted discussions on applying gamification techniques to learning and engagement platforms.
- Assisted in designing projects to implement gamification principles.

Professional Experience

Game Developer, Nasir Driving Simulator **Sept 2023 – Present**
Worked with Unreal Engine 5 for driving simulation projects. Nasir Driving Simulator

- Developed an interaction system for soil and excavator bucket using physics-based programming.
- Integrated FMOD for advanced audio control and Voxel Plugin for soil interaction.
- Implemented design patterns such as Singleton and SOLID principles.
- Utilized actor components for dump trucks and excavators for load charging/discharging.
- Created vehicle gauge displays using Unreal UI.
- Improved familiarity with shader programming, materials, and version control using Git.

Unity Developer, Dead Mage **Jan 2025 – Feb 2025**
Worked on the prototype of a 2D tile-based digging game. Dead Mage Steam Page

- Utilized Unity Tile Maps and the Grid System to implement the digging mechanics.
- Developed gameplay features to enhance player interaction and responsiveness.
- Optimized asset usage and tile-based rendering for performance efficiency.

Projects

3D Software Renderer (C & SDL2)
GitHub Page Video Link

- Built a real-time 3D renderer from scratch using C and SDL2, implementing a full rendering pipeline.

- Implemented camera systems, perspective projection, rasterization, and depth buffering manually.
- Developed support for mesh loading, wireframe and filled polygon rendering.
- Focused on low-level optimization and mathematical transformations without relying on external graphics libraries.

2D Physics Engine (C++ & SDL2)
GitHub Page Video Link

- Developed a 2D rigid body engine with circles, polygons, and boxes.
- Implemented collision detection (Circle–Circle, Polygon–Polygon, Polygon–Circle) and resolution with friction and restitution.
- Built joint and penetration constraint solvers with warm-starting.
- Applied forces including gravity, springs, drag, and friction; handled impulses for realistic motion.
- Simulated linear and angular motion using semi-implicit Euler integration with local-to-world transformations.

Fabric Simulation (C++ & OpenGL)
GitHub Page Video Link

- Implemented a real-time cloth simulation using a 2D particle grid and mass–spring model.
- Applied Verlet integration, gravity, and damping for stable physics-based motion.
- Enabled interactive manipulation via mouse and keyboard forces.
- Rendered dynamic triangle mesh with OpenGL 3.3 using Phong shading, textured materials, and custom shaders for realistic lighting and cloth deformation.

VR Table Tennis (Unreal Engine 5)
Video Link

- Built a VR table tennis game in Blueprints using realistic physics materials for table, ball, and rackets.
- Implemented pawn manipulation for natural racket control and ball grabbing.
- Handled ball spawning, game interactions, and VR input.

Skills

- **Game Engines:** Unreal Engine 4/5, Unity
- **Programming Languages:** C++, C, C#, Python, SQL, Blueprint Visual Scripting
- **Graphics Libraries:** OpenGL
- **Machine Learning:** Concepts and implementation
- **Languages:** English (IELTS Academic – Score: 7.0), Persian

Relevant Courses

- Computer Programming
- Software Engineering
- Principles of Database Design
- Linear Algebra
- Algorithm Design Foundations
- Artificial Intelligence
- Data and Information Analysis
- Principles of Simulation
- Optimization I and II
- Numerical Analysis
- Calculus I and II
- Differential Equations
- General Physics I and II

Certifications

- **Information Systems** – Amirkabir University of Technology
- **International Symposium on Artificial Intelligence in Education, Research, Diagnosis and Treatment, Health Products, and Business** – National Institute of Genetic Engineering and Biotechnology
- **Machine Learning Specialization** – Coursera
- **Story and Narrative Development for Video Games** – Coursera
- **Learning How to Learn: Powerful mental tools to help you master tough subjects** – Coursera

Recommendations

- Amin Nikanjam, Research Associate at Polytechnique Montréal (amin.nikanjam@polymtl.ca)
- Ali Nahvi, Assistant Professor at K. N. Toosi University of Technology (nahvi@kntu.ac.ir)
- Marzieh Zarinbal, Assistant Professor at Amirkabir University of Technology (mzarinbal@aut.ac.ir)
- Roghaye Khasha, Assistant Professor at Amirkabir University of Technology (r.khasha@aut.ac.ir)

Activities & Hobbies

- Led the Amirkabir University Cinema Community
- Playing guitar and creating music