VIRAJ SHIRODKAR

Boston, MA • virajshirodkar09@gmail.com • +1(857)3342522
https://gamesbyviraj.github.io/ • https://www.linkedin.com/in/virajshirodkar/ • https://github.com/voltr0x/

Education

Master of Science, Game Science and Design **May 2023**
Northeastern University, Boston (**GPA 3.93/4.00**)
Related coursework: Computer Graphics, Building Game Engines, Game AI

Experience

Associate Developer **Sept 2022 – Present**
ReGame-XR Lab, Northeastern University, Boston, MA

- Collaborated in the development of a specialized game engine integrating **Lab Streaming Layer (LSL)** using **C++**, **DirectX 11**, and **Python** for collecting sensor and experimental data using streamlined data streams with precise **time-synchronization** and simulation-grade visuals
- Leveraged **HLSL shaders** for graphical fidelity, utilizing **texture sampling and mapping techniques** within the engine to create realistic particle effects and behavior, replicating real-time bicycle physics systems synchronized with exerbike inputs for immersive simulations
- Integrated **FBX loader/parser** to load large model files, accurately recreating the 3D city of New York for precise simulation environments
- Implemented navigation subsystem within the engine, involving real-time geometry analysis, **A* pathfinding**, and motion planning algorithms
- Engineered secure user profile creation, ensuring robust protection for sensitive research data storage via **AWS SDK** and **Amazon Cognito**
- Reformed procedural code to use **object-oriented** programming techniques with abstraction to enhance modularity and scalability
- Built **gameplay HUD** elements and collaborated with audio engineers to program scripts for enhancing patient immersion and decision-making
- Managed team of 5 neurodivergent individuals in developing research-based games in collaboration with University of California, San Diego, and Ubisoft; provided support, technical mentorship, constructive feedback, and career development coaching

Software Engineer Intern **Jun 2022 - Aug 2022**
Age of Learning, Inc, Glendale, CA

- Employed **dependency injection framework** for the app landing page to bundle and deploy all assets to **increase memory performance**
- Implemented spine animation to move UI asset on application's map page by using **C# scripting** on **Unity** game engine
- Programmed sequential animation system for multiple UI buttons by utilizing **asynchronous programming** concepts, **interfaces**, and **events**
- Efficiently comprehended and modified/extended the source code to resolve long-standing backlogged bugs in a non-disruptive way
- Engaged in technical discussions and collaborated with design and quality assurance team to refine live features and get code merge ready
- Participated in **SCRUM** style development using **JIRA** and improved software engineering on-boarding process documentation on Confluence

Research Assistant **Jan 2022 – Jun 2022**
Virtual Reality Lab, Northeastern University, Boston, MA

- Designed and created Unity-based simulation replicating operating theater environment to train in **VR** for **Massachusetts General Hospital**
- Utilized **Nvidia Nsight** for GPU Analysis and implemented **occlusion culling** and **LODs** for performance optimizations to improve framerate
- Developed VR games in both **Unity** and **Unreal** engines using **Meta Quest 2** and **Pico Neo 3** SDKs, including technical documentation
- Explored the art **pipeline** in the Unreal Engine with a focus on **texture**, **lighting**, materials and creating art assets while also utilizing **photogrammetry** tools and technologies to create environments and metahumans in **Unreal Engine 5**
- Used **Sparse Voxel Octrees** to create a navigation system for a 3D flight prototype game in **Unreal Engine 4**

Graduate Teaching Fellowship **Sept 2021 - Dec 2021**
Northeastern University, Boston, MA

- Conducted in-person lectures, mentored, and graded 25 students for an undergraduate course of **HTML** and **CSS**

Projects

2D GAME ENGINE **April 2022**

- Created a 2D game engine using **C++**, **SDL2** with also using **Box2D** (open-source physics simulator)
- Built three games using the engine – Breakout clone, Platformer, and a Dungeon Crawler
- Engine can handle **physics**, **collisions**, **rendering** and **animations** while also having a **level editor** with an UI

CLASH ROYALE CLONE AI **April 2022**

- Developed a modular utility-based **AI** opponent for a clash royale clone using **behavior trees and** randomization with **leaf node**
- Implemented **A* pathfinding algorithm** for the mobs with **steering behaviors** for mobility and collision avoidance

3D OBJECT MODEL PARSER **Nov 2021**

- Parse and render .obj files with vertex, texture, and normal data with help of **3D math** using **C++** and **OpenGL**
- Rendered these models with **vertex** and **fragment shaders** using **GLSL**

Publications

Magic Mirror on the Wall: Reflecting the Realities of Lower Limb Rehabilitation in Virtual Reality
CHI 2022, New Orleans | IEEE ISMAR 2022, Singapore

- Based on medical research-oriented **VR** project for patient engagement with human movement and rehabilitation protocols

Skills

Programming languages: C/C++, C#, Python, Java, HTML/CSS
Technologies: DirectX11/12, OpenGL, SDL2, Unity, Unreal Engine, Blender