

Yuechen Zhang

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Education

Shanghai Jiao Tong University

09/2020 – 06/2024 (expected)

Bachelor of Engineering in Software Engineering

Shanghai, China

- **Relevant Coursework:** Advanced Data Structure (97), Introduction to Computer Systems (88), Internet Product Design and Development (93), Game Design and Development (98), Computer Vision (95)
- **Awards:** 2020-2021 & 2021-2022 Outstanding Undergraduate Excellence Scholarship (top 15% of students)

Research Experience

Neural Representation of Particle-Based Implicit Surface

06/2023 – present

Supervisor: Prof. Bo Zhu, Georgia Tech's School of Interactive Computing

- Developed a neural representation of implicit surfaces using particle Signed Distance Field, employing redistribution techniques for optimal model refinement.
- Enhanced dynamic scene representation through neural approaches, demonstrating superior performance with particle-based SPH.

NLP for Biomedical Knowledge Graph

01/2023 – 02/2023

- Innovated with Byte Pair Encoding (BPE) to uniquely separate words, enhancing biomedical data parsing accuracy; improved accuracy by 20% through this approach.
- Utilized N-Gram, Skip-Gram, and MLM algorithms to provide richer word contextual representations to facilitate enhanced understanding of texts.
- Established a comprehensive biomedical NER and created a biomedical knowledge graph focused on COVID-19 in Neo4j, offering in-depth and visual insights into pandemic-related data.
- Received the Best NLP Project award at Imperial College Data Science Winter School.

Projects

Character Animation based on FABRIK

05/2023 – 06/2023

Conceptualized and developed a first-person shooter (FPS) game using Unity3D, featuring intricate character motions enabled by FABRIK (Forward And Backward Reaching Inverse Kinematics) and other IK techniques.

- Integrated FABRIK, Two-Bone IK, and CCDIK algorithms with an advanced animation state machine and masks, achieving lively character movements and smooth transitions; further developed this into a realistic rag-doll physics system that accurately mirrors bone articulations using inverse dynamics.
- Designed an adaptive enemy AI system based on Finite-State Machine principles, ensuring dynamic enemy behaviors through foundational actions, sensory processing, and autonomous decision-making.
- Tailored rendering strategies for diverse light sources to achieve optimal illumination; employed baked occlusion culling for static environments and distance-based methods for dynamic elements, guaranteeing a consistent 60Hz game performance.

Thyroid Ultrasound Diagnostic System

05/2023 – 06/2023

Developed a medical image processing application capable of ingesting thyroid ultrasound imagery, detecting lesion nodules, and subsequently producing a comprehensive diagnostic report.

- Deployed nn-UNet for precise extraction of lesion nodule Regions of Interest (ROI) and their subsequent segmentation within thyroid ultrasound scans.
- Assessed and delineated nodule peripheries and internal features, discerning the presence and exact positioning of crystals or calcifications.
- Automatically generated radiographic diagnostic reports, detailing nodule dimensions, contours, intrinsic properties, and associating them with the Chinese Thyroid Imaging Reporting and Data Systems (C-TIRADS) classification.

Real-Time Ray Tracing in OpenGL

12/2022 – 01/2023

Created a detailed room scene using OpenGL, showcasing real-time rendering capabilities.

- Incorporated the incorporation of the global ray tracing algorithm within the shader to simulate intricate lighting interactions, thereby enhancing depth and realism in the rendered scene.
- Integrated myriad materials with diverse properties such as reflection and refraction to elevate the visual realism.
- Employed Bezier curve drawing, texture mapping, and viewpoint-driven surface subdivision to dynamically refined 3D models based on the viewer's perspective, optimizing rendering quality and performance.

Map-based Housing App

06/2022 – 09/2022

Developed a multi-platform mobile application for visualizing housing on a map, enabling users to conveniently find rental properties.

- Utilized React-Native and Springboot with frontend-backend separation, Huawei Cloud for version control and development, and Docker for backend deployment to achieve clustering and load balancing; conducted unit testing and performance optimization.
- Designed a user-based housing recommendation algorithm.
- Implemented housing filters, associative searches, subway-based time circle visualization, and other features.

Skills

Programming Languages: C++, C, C#, Python, Java, JavaScript, GLSL, HLSL, Go, HTML/CSS

Tools & Frameworks: Spring Boot, React, React-native, SQL, OpenGL, Unity, PyTorch