Yikai Tang

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Education

Shanghai Jiao Tong University(SJTU) *Sep 2022 – Present*
B.E. in Computer Science and Technology(IEEE Honor Class) **GPA: 3.8/4.3**(*Rank 20/94*)

- Core Courses:
  - Principles and Methods of Program Design: 98/100
  - Discrete Mathematics: 94/100
  - Data Structure: 93/100
  - Design and Analysis of Algorithms: 92/100
  - Probability and Statistics: 95/100
  - Linear Algebra: 100/100
- GRE: Verbal-160(TOP 16%), Quantitative-168(TOP 17%), Analytical Writing-3.5
- TOEFL: Total 110 (Reading 29, Listening 30, Speaking 24, Writing 27)

Research Experiences

Yunbo Lab, SJTU *Oct 2023 – Sep 2024*
Intuitive Physics Learning of Real-World Fluids from Multi-View Visual Observations *(github page)*

Advisor: Yunbo Wang, Associate Professor at Artificial Intelligence Institute, School of EIEE, SJTU

- Extracted surface mesh and sampled fluid particles of real-world fluid images with VolSDF and predicted particle movement with Lagrangian Fluid Simulation.
- Created a video dataset of multi-view real-world fluid scenes with more than 200 scenes with 100+ frames of different fluid dynamic and color, supporting major dataset formats(LLFF, DTU, etc.).

Yunbo Lab, SJTU *Sep 2024 – Present*
Deformable SDF *(github page)*

Advisor: Yunbo Wang, Associate Professor at Artificial Intelligence Institute, School of EIEE, SJTU

- Extracted dynamic surface mesh from monocular video of highly deformable objects.
- Proposed improvements to better estimate the dynamic procedure of surface mesh using predicted motion of extracted surface point clouds with Transformers.

Projects

Game Design with olcPixelGameEngine *June 2023 – July 2023*
Tech Stack: c++

- Designed and implemented a Simulation Game(SLG) with modern UI and diverse gameplay.
- Designed 20+ units for both the player and the computer, implemented unit actions like firing, moving and hitting into each other.
- Designed special effects, explosion, weapon attack, terrain hitting, to name just a few, for all unit actions mentioned above from scratch only with pixel-level functions provided by olcPixelGameEngine.

News Crawler and Search Engine for Categorized News *(github page)* *Dec 2023 – Jan 2024*
Tech Stack: Flask, BeautifulSoup, Face_Recognition

- Designed and implemented a multi-threaded web crawler to collect over 10,000 news articles and images from sports websites.
- Developed a Flask-based web application with a responsive interface using Bootstrap for advanced search functionality.
- Integrated Lucene to enable full-text search and implemented keyword-based ranking for news articles.
- Utilized Face_Recognition library to build an image search feature based on facial recognition.
- Enabled search results to be sorted by relevance, publication date, and other attributes for a better user experience.

Structured Macro Support for WhileDB Language *(github page)* *Dec 2024 – Jan 2025*
Tech Stack: Flex, Bison, c#

- Extended the WhileDB language to support function calls and structured macros while preserving syntax tree integrity.
- Implemented lexical and syntactic analysis to parse structured macros as dedicated syntax elements.
- Designed and developed macro expansion capabilities to transform macros into concrete syntax tree elements for execution.

Correctness Proof for Binary Heap and its Operations *(github page)* *Jan 2025 – Present*
Tech Stack: Coq

- Defined and verified the correctness of binary heap operations by implementing node upward and downward movement and proving set invariance and heap property validity.
- Implemented insertion and minimum element deletion for binary heaps while ensuring heap property and the completeness of the binary tree structure.
- Formalized the definition of "complete binary tree" and proved that all operations preserved this structural property.

Honors and Awards

- Merit-based Scholarship for Academic Excellence (Category C) *2023*
- Class Student Leader in Academics *2022*

Leadership and Activities

Debate team, School of EIEE, SJTU | Debater *Sep 2022 – Present*

- Participated in 30+ debate competitions facing opponent teams from different schools and universities.
- Responsible for training and teaching team applicants. Have taught 20+ new-comers and half of them have been enrolled into the debate team.

Technical Skills

- **Programming Languages**: Python, C++, Coq
- **Frameworks & Tools**: Pytorch, Transformers, Open3D, Git
- **Other**: Linux