Zack Chi

Software Engineer

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LinkedIn

Website

EDUCATION

Master of Computer Science | GPA: 6.35 / 7

2023 – 2025

- The University of Adelaide, Adelaide, Australia
- Member in Competitive Programming Club: Top 10 in 2024 ICPC style competition

Bachelor of Electrical Engineering

2018 – 2021

- National Cheng Kung University, Tainan, Taiwan

EXPERIENCE

Australian Institute for Machine Learning Summer Research

2024 – 2025

- Explore the performance and computational differences between DDPM and DDIM
- Experiment with DDPM face image generation using different noise schedules
- Investigate the impact of the depth of U-Net on generated image quality

Intern at Australian Institute for Machine Learning

2024 – 2024

- Mapping **ECG signals** for **Ensite** data replication, potentially replacing invasive methods in **atrial fibrillation** detection

PROJECTS

Castle Jump (Play Store)

2025

- **Markov process** to sample from a **weighted bimodal truncated gaussian distribution** with **Abramowitz & Stegun Approximation** and **Winitzki Approximation** to implement **constant time** and **constant space** procedural generation.
- Build a **Petri Net (State Machine)** to manage physics system which updates every physics tick and easily run for 120+ fps on mobile devices.
- **Optimize** rendering by replacing the light blooming effect with customize **shader**
- Implement **Lissajous Curve** movement for **single parameter control** and **adjustable** for different screen sizes.
- Utilizes **inverse trigonometric functions** to convert raw accelerometer data into angular measurements.
- **Adaptive Bernoulli Track**, guided by the **convex property** of the exponential function, to manipulate the item spawn mechanism.

Diffusion Super Resolution

2024

- Replaced **SR3**'s stochastic reverse process with a **DDIM**-style implicit reverse process to better suit super-resolution's lower randomness requirements.
- Restricted **attention** to lower **U-Net** levels to reduce computational cost without degrading visual quality.
- Achieved 8× image super-resolution with FID 6.3 and Inception Score 14.2.

Regular Expression Parser

2023

- Implement an **epsilon non-deterministic finite state automaton (ε-NFA)** as the core component with **epsilon transitions** enabling multiple active states, thus recognizing patterns with varying lengths and symbols.
- Utilize **depth first search** algorithm to retrieve all states within the **epsilon closure** of the current state and construct the **transition table** for the input regular expression.
- Incorporate **stack-based** checking to verify **balanced brackets** within the input regular expression in linear time.

Full Stack Website

2025

- **GitHub Actions CI/CD pipeline** to automatically build and deploy to **Firebase** App Hosting.
- Full-stack personal website using the **Next.js** framework.
- Implemented a modular **React** component architecture for a clean, maintainable UI.

SKILLS

- Language: Java, C++, Python, Typescript
- Tools: Git, GitHub, Android Studio, PyTorch, Tensorflow, Unreal Engine, Unity, Godot, React, Firebase