Nguyen Minh Duc

Education

VNUHCM-University of Science — Ho Chi Minh City, VN
Bachelors of Science – Honor Program in Physics — *Sep. 2024 – June 2028*

Experience

Vật Lý Chill — Sep. 2022 – Present
Coder — *Python, Manim, NumPy*

- Use NumPy to parse 1.7GB of output from a multiphysics simulation into structured arrays to analyze the large output into optimal formats for Physics visualization video.
- Leveraged Manim library in Python to define abstract concepts in Math and Physics and their real-world implications through animations and visualizations targeting high school students in Vietnam.
- Achieved a 26% increase in STEM viewership as measured by video views on YouTube within the first 30 days with over 50,000 aggregate views on an educational nonprofit's channel.

Projects

Train GPT-2 with TPU Project — Aug. 2024
Pytorch, GPU, TPU

- Reproduced the GPT-2 124M based on GPT-2 and GPT-3 paper on Kaggle.
- Implemented gradient accumulation, distributed data parallel (GPU and TPU), half-precision, and flash attention.
- Sped up training by 33 times compared to GPU T4 x2 using TPU, BF16, and some other TPU optimization.
- Surpassed GPT-2 result with validation loss 3.2754 over 3.2924 and HellaSwag evaluation 0.2962 over 0.294463.

Confined Quantum Random Walk Project — July 2024
MaSSP - Math and Science Summer Program — *Math, Physics, Python*

- Explored quantum random walks (QRWs) using the Creutz ladder model, a quantum lattice structure with localization properties.
- Conducted numerical simulations that confirmed the analytical results, showing zero probability of the particle moving beyond the confined range.
- Visualized the QRW on the Creutz ladder, observing recurring patterns in particle location probability over time.

Extracurricular Activities

Informatics Club — Oct. 2022 – July 2023
President, Lead Coder — *Dong Nai ,VN*

- Lead a team in coding a Metroidvania game implemented scrum methodology with 1-week sprints focused on discrete goals.
- Increased career opportunities in IT by 63% as measured by post-training participation in competitive programming by teaching introductory C++ programming to 11 high school students in an after-school program.

Awards

Top 2% of users on Kattis Problem Archive — Feb. 2024

- Solved numerous advanced algorithmic challenges across domain including data structures, dynamic programming and graph theory.

Sacombank Scholarship — Sep. 2023

- Award presented to students with outstanding achievements in academics, leadership, and community service.

Fourth place - Young Informatics Contest of Dong Nai Province - Informatics Olympiad — June 2023

Third place - Dong Nai Province Olympiad in Informatics - Informatics Olympiad — Feb. 2022

Skills & Interests

Programming: C, C++, Python, SQL

Libraries: Pytorch (GPU, TPU), Numpy

Languages: English, Vietnamese

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