Bao L. Q. Nguyen

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EDUCATION

Le Hong Phong High School for the Gifted
English-Specialized Class & Informatics Olympiad Team Member *2021.09-2024.07*

SKILLS

Engineering

- **Languages** - Python, C/C++/C#, Java (Android), JavaScript
- **Deep Learning** - TensorFlow, Pytorch, Jax, Triton GPU, Caffe2, Cuda Programming
- **AI Deployment** - ONNX, TensorRT, OpenVino, Cloud AWS, Nvidia Triton, Kaolin
- **Web development** - HTML/CSS, Boostrap, JavaScript, Flask/Django, Nodejs, Nextjs/React
- **Software System** - CMake, Git/Github, Qt, ImGUI, Docker, Linux/Ubuntu
- **Computer Graphics** - OpenGL, Vulkan, GLSL, Blender, Unity, Open3D
- **Robotics Simulation** - MuJoCo, IsaacSim, Omniverse, Drake, PyBullet
- **Graphic Design** - Adobe Photoshop, Illustrator, After Effect, XD, Figma

RESEARCH

- **Current research**
  - **Computer Graphics with Computer Vision**
    - Build my own 3D Graphics Engine - Vortex to simulate advanced physical properties e.g., blood flow, heartbeats, and neuron activation. This can be applied to robotics training simulations & synthetic data generation, aligning with trends like NVIDIA Omniverse.
  - **Other Interest:** Vision Language, 3D Point Clouds, Image Generation, Camouflage, Graph Neural Network, Protein/Molecule structure simulation.
- **Conference papers**
  - RotCAtt-TransUNet++: Novel Deep Neural Network for Sophisticated Cardiac Segmentation.
- **Preprints**
  - Multimodal Contextualized Support for Enhancing Video Retrieval System.
  - Novel 3D Binary Indexed Tree for Volume Computation of 3D Reconstructed Models.

ACHIVEMENTS & HONORS

- The Third-class Labor Medal of Honor awarded by the President, recorded in Hall of Fame, 2024.
- 2nd Prize & Special Award (ACM), International Science and Engineering Fair (ISEF), 2024.
- 1st Prize, Vietnam Science & Engineering Fair (VISEF), Software System field, 2023–2024.
- 3rd Prize, HCM City Informatics Olympiad, Competitive Programming Competition, 2024.
- 1st Prize "Hacker Award" & 1st Prize "User Experience Award" at a National Hackathon, 2023.
- Top 10 team at final round of AI Innovation competition (by VinAI x VinUni), 2023.
- 2nd Prize, HCM City English Language Olympiad Competition, 2021.

PROJECTS

Recent personal projects

- **Modern-Chess-3d**: Simulated 3d Chess Game with Agnostic Renderer Backends (OpenGL, Vulkan), integrated with AI algorithm (Minimax) and Deep Reinforcement Learning (future).
- **Fast-Vision-cpp**: Computer vision in C++ with Opencv and accelerated performance backends e.g., Onnx, TensorRT, Openvino, etc.

- **Custom-Operations**: Implementation of both most popular and cutom operations of Deep Learning in C++ (for cpu) and CUDA programming (for gpu).
- **Nvidia-Triton**: Triton inference Server with Different Deep Learning inference backends for AI product serving and deployment.

Previous team projects

- **VasculAR**: Medical-aided software for 3D cardiovascular reconstruction via Deep Learning.
  - ***Time***: Sep.2023–May.2024
  - ***Technologies***: Cython, Python, C, C#, Unity, PyTorch, TensorFlow, Firebase.
  - ***Team leader. Responsibilities***:
    Design, implement novel segmentation model and experiment with SOTA methods.
    Implement, optimize and evaluate the 3D reconstruction algorithm.
    Research and implement the algorithm for 3D volume computation.
    Mainly develop the software and the Virtual Reality surgical simulated environment.
    Gather practical feedback from experts in clinical settings.
    Design posters and write/publish research papers.

- **TedUp**: Website equipped with AI-backend for assisting students with ill mental health.
  - ***Time***: Jul.2023–Sep.2023
  - ***Technologies***: Flask/Django, Python, MySQL, Streamlit. Bootstrap.
  - ***Team leader. Responsibilities***:
    Experiment RNN, BiLSTM and BERT for 12 emotional classification.
    Develop hybrid recommender system (neighborhood collaborative & content-based filtering).
    Devise Q-value formula and Q-system for numerically evaluating user's mental quality.
    Design and develop a clean minimal and friendly user interface.

ACTIVITIES

Internship at VinRobotics

- **Time**: 20th December 2024 to August 2025 (expected)
- **Role/position**: Robot Simulation Engineer & foundation model AI researcher
- **Responsibilities**:
  - Upgrade my Vortex engine to better simulate contact-rich environments in sim-to-real tasks.
  - Generating synthetic datasets for robotic use-case specific learning tasks.
  - Research on foundation models for locomotion/manipulation with easy zero-shot transfer.

Internship at CoTAI Startup Studio

- **Time**: June to December 2024
- **Role/position**: Apprentice AI Engineer/Researcher
- **Responsibilities**:
  - Solidify advanced Math foundation and its application in ML, Probabilistic Deep Learning and Generative AI (e.g. diffusion-based models).
  - Research on computer vision, from historical models (e.g., MobileNet, ResNet) to modern advancements like SAM, DINOv2, and GANs.
  - Built/deployed a retrieval system using multimodal models on local servers & AWS.
  - Engineered efficient workflows with Docker, deploying ONNX models on backends like TensorRT and OpenVINO, using Triton Inference Server and FastAPI.

Mentee/Volunteer at PIMA (Projects in Mathematics and Applications)

- Studied Calculus, Linear Algebra, and Linear Programming, etc
- Conducted a project on Graph Combinatorics, focusing on Integer Linear Programming (ILP), the domatic number problem, and properties of the hypercube.
- Volunteer at the puzzle-solving game at Math Open Day.

Mentor of Le Hong Phong Scientific Research Club (LHP-SRC)

- Organize slides and share knowledge and teach the mentee foundational topics, utilizing resources and courses from U.S. universities.
  - CS236: Deep Generative Models, Standford University
  - Modern Robotics: Mechanics, Planning, and Control
  - Physically-based modeling, Carnegie Mellon University
  - 6.S980: Machine Learning for Inverse Graphics, MIT

Captain Basketball Team at LHP High School

- Former captain, now Technical Skills Trainer. MVP in every match, led team to City-Level Quarterfinals (2021-2022).
- Silver Medalist at District-Level (2022-2024); Gold (District) and Silver (City) Medals (2023-2024).
- Organized the annual charity basketball league, collaborating with Sprout non-profit organization.
- Served as an organizer, designer, and referee at the Le Hong Phong Basketball League (LBL) in 2023 and 2024. Earned Gold and Silver Medals at the LBL in 2023.