

NAR Labs 國家實驗研究院

國家高速網路與計算中心

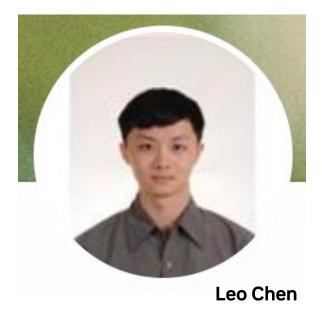
National Center for High-performance Computing

NCHC N-WAY GPU Bootcamp

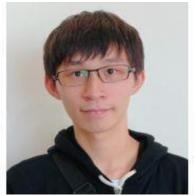
Apr 15-16, 2025

NCHC X OpenACC X NVIDIA

Team Roster









Anthony Chang

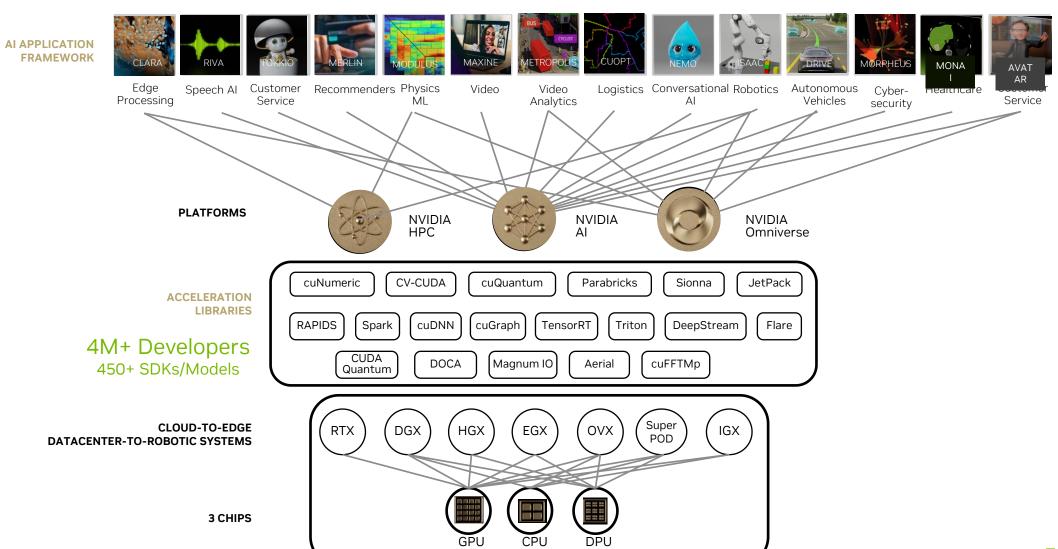
Johnson Sun

Rosie Wu

Instructors

Teaching Assistants

Platforms for Discovery





NVIDIA Developer Program

NVIDIA 開發者計畫

Program Benefits:

Tools

- 550+ exclusive SDKs and models
- GPU-optimized software, model scripts, and containerized apps
- Early access programs

Training

- Research papers, technical documentation, webinars, blogs, and news
- Technical training and certification opportunities
- 1,000s of technical sessions from industry events On-Demand

Community

- NVIDIA developer forums
- Exclusive meetups, hackathons, and events

Special Program (Present to Jan 2024)

Join NVIDIA Developer program now, you will get one NVIDIA Training

Join the Community



NCHC-NVIDIA Joint Lab

https://github.com/ngobu/nvidia/tree/main

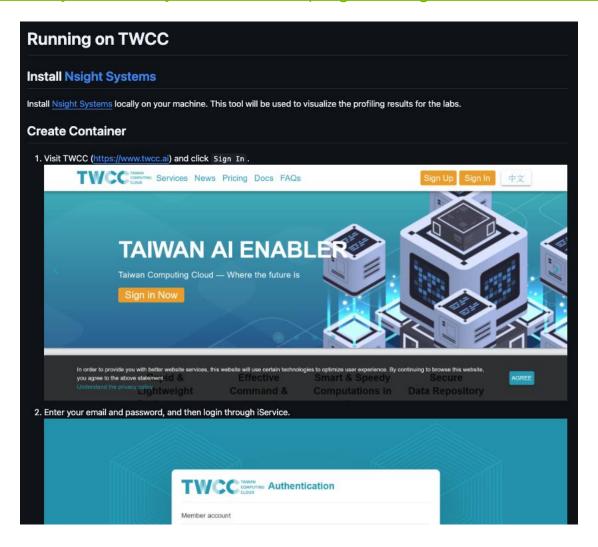
Repository for NCHC-NVIDIA Joint Lab

- · tutorials NVIDIA online courses/tutorials in AI/HPC
- 20210412 NVIDIA Techniques Sharing 2021
- 20210706 NCHC Techniques Sharing 2021
- 20211202 NVIDIA Techniques Update 2021
- 20211221 AI+HPC: 利用 NVIDIA Modulus 實踐 PINN 於物理模擬
- 20220415 NVIDIA Techniques Update 2022
- 20220530 NCHC-NVIDIA Techniques Sharing 2022
- 20220629 PINN 與 NVIDIA Modulus 實作訓練營
- 20221111 Quantum Computing Workshop / 量子計算模擬實作
- 20230413 NVIDIA Techniques Sharing 2023
- 20230517 NVIDIA Techniques Briefing: NVIDIA Federated Learning
- 20230525 Al for Science: NVIDIA Modulus 及 NVIDIA Omniverse 實作
- 20230727 N-Way to GPU Programming Bootcamp / 多 GPU 程式設計訓練課程
- 20230821 NVIDIA Techniques Salon 2023: Programming the NVIDIA Superchip
- 20231207 NCHC Open Hackathon 2023
- 20240410 NCHC Quantum Computing Bootcamp 2024 NVIDIA CUDA-Q and cuQuantum
- 20240506 Al for Science: NVIDIA Modulus, NVIDIA Omniverse, and NVIDIA Earth-2
- 20240508 NCHC Techniques Sharing 2024
- 20240626 NCHC AI for Science Bootcamp 2024 NVIDIA Modulus 物理模擬計算
- 20240806 NCHC End-to-end LLM Bootcamp 2024 NVIDIA NeMo 大型語言模型框架
- 20240924 NCHC N-Way Bootcamp 2024 NVIDIA GPU 加速運算



TWCC Tutorials

https://github.com/j3soon/nways_accelerated_programming/blob/main/README_TWCC.md



OPENACC - CELEBRATING 12 YEARS

Building Community.











Ecosystem Development

Training/Education













































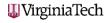




















Open Hackathon Objectives

Connect

Accelerate

Celebrate

Developers & Mentors Apps & Acceleration Speedup Energy Efficient Publication, Co-Paper Blogs and Talks 最新文章 趨勢專題 🔻 全新一週 🔻 TO Highlight 🔻 主題分類 🔻 AI 人工智慧 智慧製造 資安 產業 🔻 AI 治理/公共 人才/職場 🔻 產業分析 🔻

AI 人工智慧

在 3 週內實現高達萬倍的運算效能提升!NCHC、NVIDIA、OpenACC 「NCHC Open Hackathon」黑客松,提供開發者實現 AI 創新最佳平 台

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DVIDIA



2024/11/13-12/04: Open Hackathon (12 teams)

Team	Mentor	Core Area of Focus	Domain	I anduade/ Libe	How much Speedup?	Why acceleration matters?
1-Dream Chaser	Anthony Chang (Engrg- Hardware 1) TW Ying-Ja Chen TW	Protein-small molecule docking	Healthcare Bioinformatics	CUDA	7.8X	Compared to the original AutoDocker-GPU, OmegaDocker supports larger molecular docking simulations. In addition to its high computational intensity, it also demands greater bandwidth.
2-NYCU HPC team2	Shijie Wang CN	Accelerate NVLM 1.0 inference	LLM Multimodal	python/pytorch	41.7X	Multimodal large language models face numerous challenges in inference acceleration, including high computational resource consumption and slow response times. By leveraging the latest inference acceleration technologies, GPU computing power can be fully utilized, effectively reducing inference latency, improving interactive experiences, and expanding application scenarios.
3-氣象署-興大應 數聯隊	<u>Leo Chen (Engrg-</u> <u>Hardware 1) TW</u>	Accelerate physics parameterization in weather forcasting model	Weather	Fortran	70.6X	The global weather forecasting model TCo is divided into the dynamical core (GPU) and physical parameterization (CPU). Computationally intensive and data-independent subroutines are ported to the GPU to effectively utilize its computing power.
4- NTUT_BirdSong	<u>Virginia Chen TW</u> <u>Iven Fu TW</u>	Accelerate audio foundation model pretraining	Audio	<pre>python/transformer _engine</pre>	3.6X	To create a foundation model for bird songs, pre-trainning speed really matters.
5-Parallel Minds	Reese Wang TW	Accelerate firefly algorithm	HPC	CUDA	9X	The Firefly Algorithm has a wide range of applications. It can be applied not only to path prediction (navigation) but also to optimizing renewable energy systems (maximizing solar cell efficiency), gene regulatory network modeling, drug design, image processing, and more.
6- NTHU_LSALAB	Kevin Chen TW Sungta Tsai TW	Acclerate inference process performance	DPU	C/DOCA	1.23X	In current inference and model computations, the CPU is responsible for controlling and transmitting the data to be processed, which limits the GPU's computational power due to data handling speeds. By utilizing DPU I/O to directly access GPU memory, the processing capabilities of inference and models are enhanced.
7-NoLab	Pika Wang TW Ikko Hamamura JP Tian Zheng (Engrg- Hardware 1) CN	Variational quantum eigensolver (VQE)	Quantum Chemistry	CUDA-Q	8282X	The Variational Quantum Eigensolver (VQE) is a promising quantum algorithm for determining the optimal ground-state energy of molecules, a fundamental of chemical reactions and drug discovery. Efficient VQE simulation can help design quantum algorithms, accelerate scientific research, and reducing development cycles.
8-Elsa Robotics	Johnson Sun TW Frank A. Lin (Engrg- Hardware 1) TW	Accelerate robotics navigation pipeline	Robotics	Python/CuPy/Tensor RT	11X	Low latency and high frame rates are critical for a robot's real-time responsiveness and operational precision in dynamic environments. Relying solely on CPU computation makes it difficult to meet real-time processing demands; therefore, GPU assistance is required in specific computational stages to enhance frame rates.
9-GBA-VVM	Min Yu CN Leo Chen (Engrg- Hardware 1) TW	Accelerate advection subroutine	Weather	Fortran/OpenACC	18X	The current atmospheric forecasting accuracy is typically at the kilometer scale, while VVM has improved it to the meter scale. This requires extensive computational resources.
10-smile lab	Ken Liao Yang-Hsien Lin TW	Federated Learning for Pathology	Healthcare Histopathology	Python/cuCIM and Pytorch Lightning	5.5X	Whole Slide Images (WSIs) are massive, making patch extraction computationally intensive. Efficient extraction is key for preprocessing in federated learning, where distributed nodes handle large datasets. Accelerating this process with optimized pipelines (e.g., caching, GPU acceleration) reduces preparation time and avoids I/O-related performance losses.
11-Plantmen	Cliff Chiu TW	Acclerate RAG inference pipeline performance	LLM Multimodal RAG	Python, TensorRT	10X	The extisting pipeline for RAG is too slow for the user to get the response on the LINE chatbot.
12- CYCU_Quantu m	Pika Wang TW Ikko Hamamura JP Anderson Meng TW	Quantum PageRank	Quantum Machine Learning	CuPy	10000X	Quantum PageRank leverages quantum interference to reveal complex relationships between nodes, enhancing rankings in applications for websites and social networks. However, simulating noisy interference is much more complex than typical statevector simulation (2^2n vs. 2^n). Further speedup is required to investigate Quantum PageRank in real-world

Other Publications

- 工商: https://www.ctee.com.tw/news/20250408700939-431204?utm=LINE_share_btn
- 經濟: https://money.udn.com/money/story/5635/8659767

經濟日報 > 商情 > 熱門亮點

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挑戰高效能運算極

- 引新聞: https://innews.com.tw/223620/
- Line: https://today.line.me/tw/v2/article/yzvjnGz





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直擊黑客松競賽 資源 挑戰高效能

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(記者張芸瑄 / 綜合報導) 當 AI 系 人才,國家高速網路與計算中心(「NCHC Open Hackathon」黑客

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追蹤



AI 技術的實作平台。本屆活動共吸引 24 支隊伍報名, 篩選 12 支隊伍晉級決

賽, 並在 3 週內共同探索運算效能的極限,展現驚人技術成果。









