Li-Xuan Alex **Peng**

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Summary

Li Xuan Alex Peng received his B.S. from the Interdisciplinary Program of Electrical Engineering and Computer Science at National Central University. Currently, he contributes as a research assistant in the AIIU Lab under the guidance of Principal Investigator Jun-Cheng Chen at the Research Center for Information Technology Innovation (CITI), Academia Sinica. His recent work centers on fortifying securities for diffusion generative models and advancing image intellectual property safeguards. His research interests span computational photography, explainable AI, and CogSci-inspired ML. Alex aspires to pursue a Ph.D., interdisciplinary in computer vision and cognitive neuroscience, dedicated to unveiling the essence of human visual intelligence.

Alex's academic excellence is underscored by his reception of The Dr. Chu Shun-yi Zyxel Scholarship, the most prestigious accolade for undergrads at NCU. Furthermore, he has been honored with The Excellent Student Scholarship, recognizing his distinction in the department of IPEECS. His exceptional leadership and team-building skills shone through during his tenure as director of the Photography Club, culminating in The Excellent Club of the Year Award.

Education

National Central University — *Taoyuan, Taiwan*

B.S. in Interdisciplinary Program of Electrical Engineering & Computer Science (EECS) — *Aug 2020 - June, 2024*

- GPA: 4.1/4.3; Average score: 91/100; Rank: 4/23

Publications

Conference Papers (*equal contribution)

[1] Jia-Wei Liao, Winston Wang*, Tzu-Sian Wang*, **Li-Xuan Peng***, Ju-Hsuan Weng, Cheng-Fu Chou, and Jun-Cheng Chen. *DiffQRCoder: Diffusion-based Aesthetic QR Code Generation with Scanning Robustness Guided Iterative Refinement*. 2024: arXiv: 2409 . 06355. Accepted to WACV 2025.

[2] Chun-Yen Shih*, **Li-Xuan Peng***, Jia-Wei Liao, Ernie Chu, Cheng-Fu Chou, and Jun-Cheng Chen. *Pixel Is Not A Barrier: An Effective Evasion Attack for Pixel-Domain Diffusion Models*. 2024: arXiv: 2408 . 11810. Submitted to AAAI 2025, under review.

[3] Jia-Wei Liao* and **Li-Xuan Peng***. *Energy-Guided Probability Flow ODE-Based Diffusion Model for Aesthetic QR Code Generation*. 2024. TWSIAM Annual Meeting 2024, Best PhD Thesis Award.

Work Experience

Research Center for Information Technology Innovation (CITI), Academia Sinica — *Taipei, Taiwan*

Research Assistant (PI: Dr. Jun-Cheng Chen) — *Nov. 2023 - Sep. 2024*

- Develop an image protection algorithm against maliciously diffusion-model-based mimicking and editing.
- Develop a diffusion-based aesthetic QR code generation algorithm.

Research Center for Information Technology Innovation (CITI), Academia Sinica — *Taipei, Taiwan*

Research Intern (PI: Dr. Jun-Cheng Chen) — *July. 2023 - Nov. 2023*

- Study adversarial attack and defense methods of computer vision algorithms.
- Study conditional diffusion model behaviors under different conditions.
- Design and implement image intellectual property protection algorithms against malicious usage of Diffusion Models.
- Establish experiment workflow integrating with Weight&Bias and Notion project management for our research group.

IPEECS Department Office, National Central University — *Taoyuan, Taiwan*

Network Administrator — *Apr 2021 - Sep 2023 (Part-time)*

- Develop IPEECS graduation automating reviewer via chrome extension using React.js.
- Legacy IPEECS website maintenance. (Joomla, PHP framework)
- Building a new department website using Ubuntu Linux and WordPress.

Development and IT Team, Freshman Website Development Program, Office of Student Affairs, National Central University — *Taoyuan, Taiwan*

Web Developer — *Dec 2020 - Aug 2021 (Contract)*

- Develop NCUTUBE webpage for NCU freshmen orientation website. Using Vue.js, Nuxt.js and MongoDB

Honors & Awards

2023	**Second Place in TSMC Group, 11th Hsinchu X Meichu Hackathon**, Domestic hackathon held by National Yang Ming Chiao Tung University (NYCU) and National Tsing Hua University (NTHU). Created AI and Cloud Native solutions for intelligent X-ray security checking and attendance monitoring systems.	*Hsinchu, Taiwan*
2023	**The Dr. Chu Shun-yi Zyxel Scholarship (Merit-Based)**, The most prestigious academic honor of undergraduates at National Central University. Among 3 awardees in the College of EECS.	*Taoyuan, Taiwan*
2023	**Excellent Students Scholarship (Merit-Based)**, The most prestigious academic honor of the department. Among 2 awardees in the Interdisciplinary Program of Electrical Engineering & Computer Science.	*Taoyuan, Taiwan*
2022	**Excellent Club of the Year**, Given to the best performance club in yearly evaluation. Awarded 2nd place in the academic category during the tenure of club director.	*Taoyuan, Taiwan*

Projects & Courseworks

Brain MRI Tumor Segmentation via Segment Anything Foundation Model

Term Project, BrainHack School 2023, University of Montreal: Adapting and fine-tuning Segment Anything Model(SAM) to BraTS brain tumor segmentation task. Reached average 0.72 DICE Score with 12% improvement compared to the original model even if fine-tuning on a small dataset (3000 image-mask pairs).

(Docker, Nilearn, PyTorch, Seaborn)

RBFNN Self-driving Car Simulation

A self-driving car simulation in 2D field using Radial Basis Function Neural Network (RBFNN). Implemented Gradient Descent Algorithm and Pseudo Inverse to solve the optimization problem.

(Plain Python, Numpy)

Hopfield Network Implementation

A Hopfield network that could restore states corrupted by random noise. Implemented and investigated the relation between input sample quantity and network capacity, supporting the speculations via theories proposed by Geoffrey Hinton.

(Plain Python).

Wild Cat Breeds Classifier

Recognizing common cat breeds in Taiwan, especially being able to identify endangered leopard cats. Using transfer learning, implemented by TensorFlow. Reached 0.88 F1-Score on average.

(TensorFlow, Transfer Learning, EfficientNetV2 pre-trained model)

DOF Simulator

Calculating depth of the field and simulating lens bokeh. Using a pre-trained model to separate out the background, then generate simulated bokeh of background using Gaussian blur parameterized by calculated DOF.

(Java, OpenCV, MODNet pre-trained model)

Skills

Programming	Python, C++, Java, JavaScript, TypeScript
Frameworks&Libraries	PyTorch, TensorFlow, Numpy, OpenCV, Vue.js, Nuxt.js, React.js
Project Management	Weight&Bias, Git, GitHub, GitLab, Notion
Others	MongoDB, Google Cloud Platform

Reference

Jun-Cheng Chen, Associate Research Fellow

Research Center for Information Technology Innovation(CITI), Academia Sinica

Email: pullpull@citi.sinica.edu.tw

Relation: Main advisor of two of my research works and supervisor during my internship and research assistant role at Academia Sinica.

Cheng-Fu Chou, Professor

Department of Computer Science and Information Engineering, National Taiwan University

Email: ccf@csie.ntu.edu.tw

Relation: Co-advisor of two of my research works during my internship and research assistant role at Academia Sinica.

Chih-Wei Huang, Professor & Director

Department of Communication Engineering & Interdisciplinary Program of Electrical Engineering and Computer Science, National Central University

Email: cwhuang@ce.ncu.edu.tw

Relation: Director of my B.S. program and supervisor of my job at the EECS department office.

Jia-Wei Liao, Ph. D. Candidate

Department of Computer Science and Information Engineering, National Taiwan University

Email: d11922016@csie.ntu.edu.tw

Relation: Research project team leader and collaborator during my internship and research assistant role at Academia Sinica.

Chun-Yen Shih, M.S.

MediaTek Inc. & Department of Computer Science and Information Engineering, National Taiwan University

Email: a30515@gmail.com

Relation: Research project team co-leader during my internship and research assistant role at Academia Sinica.

Extracurricular Activity

Google Developer Student Club, NCU *Taoyuan, Taiwan*

Core Team Member *Aug. 2021 - Aug. 2022*

- Responsible for lecturing ML-related topics.
- Host workshops covering NLP, Vertex AI, via qwiklabs cloud training platform.
- Advocate ML Study Jams held by Google Developer Group.

Photography Club, NCU *Taoyuan, Taiwan*

Director *Aug. 2021 - Aug. 2022*

- Give lectures covering technical details of cameras and imaging.
- Invited as the student representative jury of the school photography competition.
- Interviewed by school journalists and published in the school journal.
- Curate photography exhibition in the school.