

PATT PHURTIVILAI

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EDUCATION

THE UNIVERSITY OF HONG KONG (HKU) - FULL SCHOLAR

Expect May 2026

Bachelor of Engineering Majoring in Computer Science Minor in Statistics

EXPERIENCE

FULL-TIME SUMMER AI RESEARCH ASSISTANT

May 2024 - Aug 2024

Inno Wing, innovation academy, HKU

- Conducted individual research in computer graphics and 3D reconstruction, focusing on Gaussian Splatting for real-time rendering using Lidar, depth sensors, and SLAM technologies.
- Developed a Multimodal Retrieval-Augmented Generation system by researching LLMs, OCR, and layout detection models, utilizing GPT-4.
- Collaborated with UBC and Tsinghua University on research projects and hosted workshops on computer graphics, computer vision, and retrieval-augmented generation.

PART-TIME AI RESEARCH ASSISTANT

Aug 2023 - Now

Inno Wing, innovation academy, HKU

- Computer vision and graphics research team, exploring cutting-edge technologies in AI. Collaboration on a real work with MTR corporation, scanning tunnel and create digital twins for them.
- Hosted workshops on computer vision, computer graphics, and large language models for participants from Hong Kong University.
- Conducted research on large language models and retrieval-augmented generation (RAG), developing a local chatbot for university.

FOUNDER AND CEO OF AZAI

Feb 2022 - Feb 2024

Cyberport cupp micro fund

- Founded and served as CEO of AZAI, a fintech startup awarded a 100k HKD grant from Cyberport for innovative solutions.
- Developed an Android application and website to help landlords in Thailand create contracts, manage payments, and oversee property management.
- Designed AZAI as a CRM application utilizing payment APIs, providing data analytics services to facilitate interactions between landlords and residents.

SOFTWARE ENGINEERING & DATA ANALYST SUMMER INTERNSHIP

Jun 2023 - Aug 2023

Risksis technology limited

- Engaged in data retrieval, preprocessing, and model training using Keras, OpenCV, and Scikit-learn during a summer internship at Risksis Technology Limited.
- Developed a web application utilizing frontend frameworks, including an interface for 3D visualization with Unity.
- Wrote scripts in C# and Python to meet project requirements and enhance functionality.

RESEARCH

DENSIFYBEFOREHAND:

Aug 2024 - Now

LIDAR-ASSISTED CONTENT-AWARE DENSIFICATION FOR EFFICIENT AND QUALITY 3D GAUSSIAN SPLATTING

In process of submission

- Developed a novel "densify beforehand" approach for 3D Gaussian Splatting that integrates sparse LiDAR data with monocular depth estimation, enhancing scene initialization and visual fidelity.
- Introduced a region-of-interest (ROI) aware sampling scheme that optimizes point cloud density, leading to reduced resource consumption and improved computational efficiency in 3D rendering.
- Conducted extensive comparisons and ablation studies on four newly collected datasets, demonstrating the effectiveness of the proposed method in preserving important features in complex 3D scenes while minimizing training time.

Paper: [Download here](#), Project Page: [DensifyBeforehand](#)

MULTIMODAL AI ASSISTANT: RAG SYSTEM FOR BOTH IMAGE AND TEXT

May 2024 - Aug 2024

- Developed a multimodal Retrieval-Augmented Generation (RAG) system capable of processing and generating both text and images, enhancing user interaction with diverse data formats.
- Implemented a data preprocessing pipeline utilizing layout detection and Azure Intelligent OCR to extract and caption images and text from user-input documents.
- Designed a retrieval mechanism and prompt engineering strategies to output interleaved text and images, enabling traceability to original sources and improving information accessibility.

GROUNDING-DINO: ZERO SHOT TRAINING WITH REAL TIME CAMREA FEED

Jan 2024 - Apr 2024

participate in HKU innoshow2024

- Developed a real-time object detection and tracking system utilizing the Grounding DINO model and live camera feed.
- Implemented keyword-based detection, enabling continuous tracking of specified objects as the camera moves.
- Demonstrated advanced real-time computer vision techniques, enhancing dynamic interaction capabilities in mobile environments.

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PROJECTS/ COMPETITIONS

AZAI SOLUTION - CRM + PAYMENT API APPLICATION

Feb 2022 - Feb 2024

Winning the 1st prize for Cyberport CUPP 2023 micro funding

- Developed AZAI, a smart CRM application for landlords in Thailand, utilizing React Native and TypeScript for an intuitive user experience on both Android and web platforms.
- Integrated payment APIs and Google Firebase to streamline contract creation, payment management, and property oversight, enhancing operational efficiency for landlords.
- Employed Next.js for backend development, implementing data analytics features to improve interactions between landlords and residents, supported by external APIs such as SlipOK and LINE.

HELLO MEMORIES - VR PROJECT

Dec 2023 - Feb 2024

Merit Award - HKTechathon 2023/24

- Led the Hello Memory project, utilizing NeRF AI and Luma API to create a VR application that aids dementia patients by visualizing reconstructed 3D scenes from old images.
- Developed a robust pipeline for processing old images, which included preprocessing, 3D scene reconstruction, and integration into Unity for immersive VR experiences.
- Demonstrated innovative use of AI in computer graphics, enhancing memory recall and emotional connection for users, while driving team collaboration and project management.

FARMGPT

Feb 2024 - Apr 2024

Participate in HKAES2024

- Represented Hong Kong University in a competition focused on developing AI-powered solutions to address global climate change challenges, leading the creation of FarmGPT.
- Developed a federated learning model combined with a data hub and chatbot assistant, enabling farmers to share and analyze data collaboratively while accessing real-time, updated agricultural knowledge.
- Enhanced community farming practices by providing a platform that facilitates data-driven insights and support, ultimately benefiting farmers through improved decision-making and resource management.

MEDICYCLE

Sep 2024 - Oct 2024

First Runner up GENAI Hackathon 2024

- Developed a Retrieval-Augmented Generation (RAG) system to reduce medicine wastage by providing information on donation options.
- Created a user-friendly chatbot that consolidates knowledge from organizations and hospitals for easy access to donation guidelines.
- Promoted community engagement in medical donations, facilitating responsible medicine usage and minimizing waste.

INNOGROW

Oct 2024 - Jan 2025

Winning regional round Hong Kong, Silver Medal National round @ Beijing CP Cup 2025

- Developed INNOGROW, a non-toxic laser weed control solution for sustainable farming in Asia.
- Trained a weed detection model using a custom dataset and integrated it with a Raspberry Pi for an affordable, compact design.
- Provided a cost-effective alternative to traditional machines, enhancing accessibility for small-scale farmers while minimizing environmental impact.

TECHNICAL SKILLS

- **Language:** Python, Java, JavaScript, C++, C#
- **Technologies:** TensorFlow, PyTorch, React.js, Node.js, SQL, Git, Blender, Unity
- **Concept:** Computer Vision, Computer Graphic, Artificial Intelligence, Machine Learning, Neural Networks, Operating System, API, Finetuning, Large Language Model, Mobile/Web App Development, Agile Development

EXTRACURRICULAR

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| • Vice President of Association of Thai Student in Hong Kong and Macau | Sep 2022 - Dec 2023 |
| • HKU Student Ambassador | Sep 2022 - Now |
| • College Student Committee | Sep 2022 - May 2024 |
| • College Photo & Media team | Sep 2022 - May 2024 |

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