Ke Xueyi

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Education

Nanyang Technological University 08/2023 - Present

GPA: 4.5/5.0 | M.Sc in Computer Control and Automation *Singapore*

- Courses: Machine Vision (A+), Machine Learning (A), Video Signal Processing (A), Robotics & Sensors (A)

Wuhan University 09/2019 - 06/2023

B.Eng in Electrical Engineering and Automation *Wuhan, China*

- Courses: Embedded Microprocessor System (A), Electric Circuits (A-), C Programming Language (A)

Publications

- **Xueyi Ke**, Satoshi Tsutsui, Yayun Zhang, and Bihan Wen. (2025). Discovering Hidden Visual Concepts Beyond Linguistic Input in Infant Learning. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. Accepted.
- Winnie Pang, **Xueyi Ke**, Satoshi Tsutsui, and Bihan Wen. (2024). Integrating Clinical Knowledge into Concept Bottleneck Models. *Medical Image Computing and Computer Assisted Intervention (MICCAI)*. Accepted.

Research Experience

Explainable Computer Vision in Medical & Cognitive 10/2023 - Present

Nanyang Technological University *Advisor: Prof. Wen Bihan*

- Interpreting CLIP-like multi-modal models by decomposing each neuron's function, explaining neurons using 'dissection' techniques.
- Enhanced model explainability by integrating medical domain knowledge into concept bottleneck models (CBM).
- Achieved a 12%+ improvement in accuracy by applying data augmentation techniques like GANs and rectifying imbalance issues.

Autonomous Driving Multi-modal Perception 05/2023 - 08/2023

Tsinghua University *Advisor: Dr. Xinyu Zhang*

- Collaborated on the publication 'Object Perception for Autonomous Driving', focusing on single/multi-modal perception.
- Implemented YOLO on a TX2-based mini-unmanned vehicle, achieving over 88% accuracy in campus scene object detection.
- Contributed to constructing the 'Dual Radar' dataset tailored to monitor extreme weather conditions through data analysis techniques.

Projects

PassGPT - RAG-Enhanced GPT Educator for Passing Every Course 03/2024 - 06/2024

Nanyang Technological University *Advisor: Dr. Simon Liu*

- Conceptualized and structured the workflow, defining the project's goals and AI application needs as the principal innovator and leader.
- Managed data collection, processing, and structuring to ensure the chatbot was equipped with accurate educational content.
- Led the scripting, built the agent interacting with MySQL and AWS S3 database to realize retrieval-augmented generation (RAG).

Deep Reinforcement Learning Model for Dota Auto Chess 01/2022 - 03/2022

University of Cambridge *Advisor: Prof. Pietro Liò*

- Implemented a visual detection algorithm for a gaming interface and chessboard, resulting in a 7% improvement over previous SOTA.
- Developed a conservative reward to optimize the model, enabling consistent improvements and securing a top 4 ranking in gameplay.
- Coordinated with team members to integrate model components and won the top group award for project excellence.

Industry Experience

Data Science Intern 05/2024 - 08/2024

TE Connectivity Ltd. AI Hub, Singapore

- Led the project on AI-driven PCB design, developing a DRL algorithm to optimize component placement under EMI constraints.
- Implemented YOLO detection and segmentation for electric wire images, improving metrics by 20% by addressing class imbalance.
- Designed and implemented a relational database for socket warpage manufacturing process, improving retrieval efficiency by 40%.

Patent

- Minxuan Peng, **Xueyi Ke**, Yuchen Li, Jianjun Sun, and Xiaoming Zha. (2022). Bootstrap Compensation Three-Port Converter and Control Method and System Thereof. *Chinese Patent CN114696630A*.

Skills

- **Programming Languages:** Python (PyTorch), C/C++, Shell, SQL, Dart
- **Languages:** English (Advanced), Chinese (Native)