

Heyuan Liu

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EDUCATION

École Polytechnique

Paris, France

Master of Science and Technology in Artificial Intelligence and Advanced Visual Computing

Sep. 2023 - Present

- Coursework: Machine and Deep Learning, Image Analysis and Computer Vision, Constraints programming, Computer Animation, Advanced Machine Learning.
- Scholarship: SEMG Scholarship.

École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Exchange Master Student in IPESE Lab

Mar. 2024 - Sep. 2024

- Coursework: ME602 - Modelling, Optimization, Design and Analysis of Integrated Energy Systems.
- Research Title: Identify optimal configuration with a machine learning method in multi-criteria decision analysis.
- Supervisor: Prof. François Maréchal.

Macau University of Science and Technology

Macao SAR, China

Bachelor of Science in Software Engineering

Sep. 2019 - Aug. 2023

- Coursework: OOP in Java, Algorithms, Mobile Application Development, Data Science, Artificial Intelligence, Data Structures, Software Engineering, Numerical Computation.
- Supervisor: Prof. Rubing Huang.

PUBLICATIONS

Conference Proceedings

- H. Liu, Y. Zhao and F. Maréchal. "On the role of Artificial Intelligence in Feature oriented Multi-Criteria Decision Analysis." 35th European Symposium on Computer Aided Process Engineering (ESCAPE-35), 2025.

RESEARCH AND WORK EXPERIENCE

OVGU MathOpt Group

Magdeburg, Germany

Research Intern (Doctoral Studies Financing)

Apr. 2025 - Sep. 2025

- Supervisor: Prof. Dr. rer.nat. habil. Sebastian Sager (MPI-Magdeburg)
- Exploring mathematical optimization methods to simplify ReLU networks after training to reduce MILP solver complexity.
- Reviewing recent methods for function-preserving and approximate transformations without retraining.
- Focused on structure-preserving transformations to improve optimization performance.

École Polytechnique & IDEMIA, France

Paris, France

Transverse Industry Project - 3D Luggage Detection with IDEMIA

Sep. 2024 - Mar. 2025

- Reconstructed 3D geometry of luggage from multi-view images captured at airport conveyor systems.
- Addressed the challenges in feature extraction and multi-view matching with robust geometric reasoning.
- Worked in collaboration with IDEMIA, a leading company in biometric security and identity verification.
- Project Report: https://github.com/MisFit5/Reports/blob/main/3DLuggageDetection_IDEMIA.pdf

EPFL IPESE Lab

Sion, Switzerland

Research Intern - Identify Optimal Configuration with Machine Learning in MCDA

Mar. 2024 - Sep. 2024

- Publication: ESCAPE 35, 2025.
- Applied advanced clustering and dimensionality reduction algorithms to preprocess datasets.
- Designed ML models and deployed a self-iterative LLM to extract optimal solutions.
- Analyzed data-driven results and offered decision-making support with LLM explanation tools.
- Project GitHub Link: <https://github.com/MisFit5/IPESEinternship>

Roland Berger (Remote)

Beijing, China

Chatbot Engineer (PTA Intern)

Feb. 2024 - Apr. 2024

- Developed specialized sales/service chatbots using Coze and Dify platforms.
- Designed, tested and maintained 3 agents: Sales, After-Sales, and Service.
- Improved response accuracy and reduced hallucinations.

Volkswagen-Mobvoi Info. Tech.

Beijing, China

Software Quality Intern Engineer

Jun. 2022 - Aug. 2022

- Participated in internal review and quality system upgrade (v2.0 to 3.0).
- Solved 36 software quality issues in Volkswagen ID6 and Audi A6 projects.

Chinese Academy of Science Software Center

Beijing, China

AI + Autonomous Driving Researcher

Jun. 2020 - Aug. 2020

- Participated in CAS Summer Research Camp on Self-driving.
- Improved Artificial Potential Field method for path planning.
- Awarded Best Performance in optimization.

SELECTED PROJECTS

Generative Image Editing via Inversion (DDIM/Null-Text)

Feb. 2025 – Mar. 2025

CSC_53449-EP Course Project at École Polytechnique

- Report Link: https://github.com/MiSFiT5/Reports/blob/main/Diffusion_Inversion_Report.pdf
- Modified source images using DDIM and Null-Text inversion based on target prompts.
- Preserved key features of the original image while integrating semantic edits from prompts.

3D Simulation of Population and Animal Animation in EcoSystem

Sep. 2024 – Dec. 2024

CSC_53433-EP Course Project at École Polytechnique

- Demo Video : https://drive.google.com/file/d/1gOjvvbWmTL18TTcY3dBOND7Sk6uTLlcN/view?usp=drive_link
- Constructed a dynamic 3D ecosystem scene in Unity from a flat terrain.
- Created tools and scripts for terrain editing, object animation, and crowd simulation.

Navi-UAV: Deep RL for Dynamic Path Planning

Jan. 2024 – Mar. 2024

INF581 Course Project at École Polytechnique

- GitHub Link: github.com/172698691/INF581-Project
- Implemented DDPG-based reinforcement learning to train UAVs navigating dynamic obstacle environments.
- Simulated multi-agent behavior under uncertainty and evaluated policy robustness.

Extractive Summarization with Discourse Graphs

Oct. 2023 – Dec. 2023

INF554 Course Project at École Polytechnique

- GitHub Link: http://github.com/MiSFiT5/INF554_Project
- Built a summarization model based on graph neural networks leveraging discourse structure.
- Implemented and compared GCN, GAT, GraphSAGE, and LSTM for multi-turn conversation extraction.

VTuber-Genshin: Real-Time Face Tracking Avatar

Oct. 2023 – Dec. 2023

INF573 Course Project at École Polytechnique

- GitHub Link: github.com/172698691/VTuber-Genshin
- Integrated Unity and MediaPipe to create a real-time face-tracking virtual character system.
- Supported multiple facial expressions and streaming avatar response in real time.

Dynamic Detection of Oscillating Loss in Deep Neural Nets

Sep. 2022 – May. 2023

Final Year Project at Macau University of Science and Technology

- GitHub Link: github.com/MiSFiT5/Dynamic-AUTOTRAINER
- Developed AUTOTRAINER, a system for automatic detection and repair of oscillating loss bugs during DNN training.
- Achieved 50%+ reduction in training time and debugging cost. Rated A+ by faculty review.

SCHOLARSHIP & AWARDS

Finanzierung des Promotionsstudiums (Financing of Doctoral studies) provided by OVGU

Apr. 2025

Erasmus Scholarship Honored by École Polytechnique

Mar. 2025

SEMG Scholarship Honored by EPFL

Mar. 2024

National College Students E-commerce Innovation, Creativity, and Entrepreneurship Challenge (Provincial Second Price)

May 2022

SKILLS

- **Programming:** Python, R, Java, C/C++, MATLAB, SQL, Bash
- **Data Science / ML fields:** NLP, CV, Vision, Multi-modal, Reinforcement Learning, LLM,...
- **Tools & Others:** Git, LaTeX, Unity, Blender, Docker, Google Colab, VS Code
- **Languages:** Chinese (native), English (fluent), French (Beginner), German (Beginner)