Ding **Xia**

Doctoral Student

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Research Interests

Human-Computer Interaction	External Human-Machine Interface (eHMI), Fabrication, Interactive System Design, Trust Evaluation
Language & Vision Models	LLMs, VLMs, Fine-tuning, Prompt Engineering
Computer Vision	Image Registration, Neural Radiance Fields (NeRF), Gaussian Splatting, VGGT
Other Fields	Diffusion Models, Brain-Computer Interface, Object Detection, User Studies

Education

The University of Tokyo

Tokyo, Japan

PhD in Creative Informatics, Department of Creative informatics, IST

Apr. 2022 - Present (expected Sept. 2026)

- Research focus on Large Language Models (LLMs) and Vision-Language Models (VLMs) applications for external Human-Machine Interface (eHMI) in autonomous vehicles and robotics, supervised by Prof. Takeo Igarashi
- Developed novel framework using LLMs as eHMI control action designers to solve adaptation challenges in complex real-world scenarios, implemented using Python and Blender with state-of-the-art language and vision models
- Pioneered the introduction of LLMs to eHMI research domain, facilitating practical deployment of eHMI systems in real-world applications with ongoing publication submission to EMNLP 2025
- Collaborated closely with Xinyue Gui, Xi Yang, and Tsukada Lab for interdisciplinary research in LLM usage, evaluation, and fine-tuning

South China University of Technology

Guangzhou, China

Master of Engineering, School of Automation Science and Engineering

Sept. 2017 - Jun. 2020

- Graduation Thesis: Semi-supervised Classification of Brain Signals Based on VAE Framework, supervised by Prof. Zhenghui Gu
- Enhanced VAE framework with novel loss function for P300 signal classification in brain-computer interface applications, implemented using Python and TensorFlow
- Achieved improved performance over baseline by addressing limited labeled data challenges through semi-supervised learning approach
- Key Courses: Digital Signal Processing, Pattern Recognition, Computer Vision, Convex Optimization

South China University of Technology

Guangzhou, China

Bachelor's Degree of Engineering, School of Automation Science and Engineering

Sept. 2013 - Jun. 2017

- GPA: 3.65/4.0 (ranking 2/17), Outstanding Defense Award for graduation thesis
- Graduation Thesis: Research on Single Image Depth Estimation Algorithm Based on Probability Graph Model, supervised by Prof. Zhuliang Yu, implemented using MATLAB with superpixel segmentation and regression analysis
- Served as department leader in Student Union, developing leadership and organizational skills
- Key Courses: Calculus, C++, Signal Processing and Analysis

Work Experience

CyberAgent AI Lab

Tokyo, Japan

Research Intern

March 2024 - Oct. 2025

- Conducted research on color design systems for vector graphic documents under the supervision of Dr. Naoto Inoue
- Implemented and accelerated internal tools for palette-based photo recoloring (based on ACM SIGGRAPH 2015 paper) using Python, with tools later utilized in subsequent research papers and product development
- Developed "ColorGPT" framework using LangChain, advanced prompt engineering techniques, and explored fine-tuning approaches for LLM-based color recommendation systems
- Achieved superior performance with experimental results demonstrating that the LLM-based pipeline outperformed existing methods in color suggestion accuracy and color palette completion tasks
- Published research findings at ICDAR 2025 (poster presentation), demonstrating the effectiveness of LLM-based approaches for color recommendation in design workflows

Corpy & Co.

Tokyo, Japan

Software Engineering Intern

Sept. 2023 - Feb. 2024

- Collaborated with Shuangshuang Alice Rao on Standardization of Work Through Task Analysis Project, developing annotation tools, conducting model training, and implementing research paper methodologies
- Developed custom eye gaze tracking annotation tools by modifying Labelme using Python
- Performed extensive data annotation for task-specific industrial parts and eye gaze patterns of factory workers, supporting computer vision applications in object recognition, mask segmentation, and gaze tracking
- Delivered factory task analysis system prototype to customers as project outcome

The University of Tokyo *Tokyo, Japan*

Research Assistant *Nov. 2020 - Mar. 2023*

- Conducted medical image registration and computer graphics research under Prof. Takeo Igarashi and collaborated with Prof. Kin Taichi
- Developed patch-based preregistration method for multi-modality 3D medical images (CT and 3DRA) using Python/PyTorch, achieving improved accuracy compared to existing methods by addressing varying image sizes through standardized patch processing
- Created end-to-end DICOM processing pipeline facilitating clinical image registration workflows
- Published research findings at MICCAI 2022, demonstrating reliable preregistration solutions for clinical applications
- Designed interactive desktop application using Unity/C# for ongoing research on deformable registration between 2D intraoperative images and 3D brain models, with PyTorch-based ML components and Unity-based visualization

Scholarships & Awards

2022-2025 **SPRING GX Fellowship**, Fostering Advanced Human Resources to Lead Green Transformation (GX)

2017 **Outstanding Defense Award**, Bachelor's Graduation Thesis Defense

2016 **First Prize (top 8%)**, China Undergraduate Mathematical Contest in Modeling

Professional Service

2025 **Program Committee**, AAAI Conference on Artificial Intelligence

2025 **Reviewer**, Pacific Graphics

2024 **Reviewer**, Winter Conference on Applications of Computer Vision (WACV)

Publications

ColorGPT: Leveraging Large Language Models for Multimodal Color Recommendation
ICDAR2025 (accepted), arXiv preprint arXiv:2508.08987
Xia D, Inoue N, Qiu Q, Kikuchi K
2025

Automating eHMI Action Design with LLMs for Automated Vehicle Communication
arXiv preprint arXiv:2505.20711
Xia D, Gui X, Gao F, Li D, Colley M, Igarashi T
2025

HealthGenie: Empowering Users with Healthy Dietary Guidance through Knowledge Graph and Large Language Models
CIKM2025 Demo Track (accepted), arXiv preprint arXiv:2504.14594
Gao F, Zhao X, **Xia D**, Zhou Z, Yang R, Lu J, Jiang H, Park C, Li I
2025

Draw2Cut: Direct On-Material Annotations for CNC Milling
Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems
Gui X*, **Xia D***, Gao W, Dogan MD, Larsson M, Igarashi T (*co-first authors)
2025: 1-17

PairingNet: A Learning-based Pair-searching and-matching Network for Image Fragments
European Conference on Computer Vision
Zhou R, **Xia D**, Zhang Y, Pang H, Yang X, Li C
2024: 234-251

SpaceEditing: A Latent Space Editing Interface for Integrating Human Knowledge into Deep Neural Networks
Proceedings of the 29th International Conference on Intelligent User Interfaces
Wei J, **Xia D**, Xie H, Chang CM, Li C, Yang X
2024: 489-503

A Two-Step Surface-Based 3D Deep Learning Pipeline for Segmentation of Intracranial Aneurysms
Computational Visual Media
Xia D, Yang X, Van Kaick O, Kin T, Igarashi T
2023, 9(1): 57-69

Data-Driven Multi-modal Partial Medical Image Preregistration by Template Space Patch Mapping
International Conference on Medical Image Computing and Computer-Assisted Intervention
Xia D, Yang X, Van Kaick O, Kin T, Igarashi T
2022: 259-268

Intra: 3D Intracranial Aneurysm Dataset for Deep Learning

Yang X, **Xia D**, Kin T, Igarashi T

Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition

2020: 2656-2666 (Oral)