Yu Liu

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No. 1, Xiangshan Zhinong, Xihu District, Hangzhou, Zhejiang, China

EDUCATION

University of Chinese Academy of Sciences *Sep. 2023 – Jun. 2026 (expected)*
M.S. in Artificial Intelligence, Hangzhou Institute for Advanced Study *GPA:* 3.76 / 4.00

Civil Aviation University of China *Sep. 2015 – Jun. 2019*
B.S. in Transportation *GPA:* 3.36 / 4.00

RESEARCH & ENGINEERING PROJECTS

Multimodal Empathetic Dialogue System for Social-AI Interaction *2024 – Present*

- Designed & developed a **persona-aware multimodal agent** integrating vision, audio, and text to address the limitations of text-only LLMs in social-AI interaction; the agent can instantiate vivid, controllable virtual dialogue avatars for social scenarios. Rigorously benchmarked against SOTA (GPT-4, Gemini, DeepSeek, Qwen) via human studies, achieving **superior perceived empathy**.
- Deployed the **multimodal emotion-recognition** module as the primary function of a separate fatigue-detection system.
- Led the **visual-processing and vision–text-fusion pipelines**, implementing cross-modal alignment and dynamic emotion modeling; extended from frame-level dynamics to **multimodal ERC** (*Emotion Recognition in Conversation*) via local–global fusion and **emotion-hotspot centering**; designed multimodal fusion strategies for **expressive talking-head generation**.
- Culminated in: (i) multimodal emotion recognition—an *IEEE Transactions on Affective Computing* submission and a granted patent; (ii) talking-head generation—a *Pattern Recognition* submission and a granted patent; and (iii) a *conference paper on ERC* under review.

Zhejiang Vanguard Project: Digital Therapeutics for Depression Detection *2024 – Present*

- Developed a **visual biomarker extraction** system for depression detection **in low-resource settings**, integrating vision models with LLM-augmented questionnaire data to enhance visual–text synergy.
- Led the **multimodal fusion design**, creating the HOPE hierarchical framework to extend prior cross-modal alignment methods for more robust visual–language integration.
- Achieved **1st Place (94.51% accuracy)** in the ACM MM 2025 Multimodal Personality-aware Depression Detection Grand Challenge (Young Adult Track), outperforming the 2nd place by 1.4% and the baseline by 49.14%. Served as lead author of the *Grand Challenge Track* paper accepted to *ACM MM 2025*.

Data-Driven Aviation Analytics and Risk Modeling *2020 – 2023*

- Developed & published a **complex network risk propagation model** (Spearman correlation + SIR dynamics) for flight operation risk propagation, resulting in a student first-author *EI-indexed journal publication*, later recognized as a *Frontrunner 5000 Top Article (2023)*.
- Built & deployed a Django+SQL automation platform for flight delay/fault analytics, achieving an **85% reduction** in report generation time and enabling **multi-department adoption** at China Southern Airlines.
- Led end-to-end development of data-driven solutions for aviation safety & operations, demonstrating adaptability in transitioning from aviation to advanced analytics.

PUBLICATIONS

*Co-first Author, †Advisor,

1. Hanlei Shi*, **Yu Liu***, et al. *HOPE: Hierarchical Fusion for Optimized and Personality-Aware Estimation of Depression.* In Proceedings of the 33rd ACM International Conference on Multimedia *(ACM MM '25)* — Grand Challenge Track. DOI: 10.1145/3746027.3762063. Paper Link, Github Link.
2. Taihao Li†, Leyuan Qu†, **Yu Liu**, et al. *A Dynamic Facial Expression Recognition Method, Electronic Device, and Computer-Readable Storage Medium.* Chinese Patent No. CN119206837B.
3. Taihao Li†, Leyuan Qu†, Hanlei Shi, **Yu Liu**, et al. *Facial Component-based Expression Editing Method, Electronic Device, and Computer-Readable Storage Medium.* Chinese Patent No. CN119152082B.
4. Yantao Wang†, **Yu Liu**. *Flight Operation Risk Propagation Analysis based on Complex Networks.* Journal of Transportation Systems Engineering and Information Technology, 2020, 20(1): 198-205. Paper Link.

5. **Yu Liu**, et al. *From Coarse to Nuanced: Cross-Modal Alignment of Fine-Grained Linguistic Cues and Visual Salient Regions for Dynamic Emotion Recognition.* IEEE Transactions on Affective Computing, under review, 2025. arXiv:2507.11892.
6. **Yu Liu**, et al. *Centering Emotion Hotspots: Multimodal Local-Global Fusion and Cross-Modal Alignment for Emotion Recognition in Conversations.* Under review, 2026. arXiv:2510.08606.
7. Haoxun Li, **Yu Liu**, et al. *EMORL-TTS: Reinforcement Learning for Fine-Grained Emotion Control in LLM-based TTS.* Under review, 2026. arXiv:2510.05758.
8. Hanlei Shi, Leyuan Qu†, **Yu Liu**, et al. *Think-Before-Draw: Decomposing Emotion Semantics for Fine-Grained Controllable Generation of Expressive Talking Heads.* Pattern Recognition, under review, 2025. arXiv:2507.12761.
9. Haoxun Li,Yuqing Sun, Hanlei Shi, **Yu Liu**, et al. *MSF-SER: Enriching Acoustic Modeling with Multi-Granularity Semantics for Speech Emotion Recognition.* Under review, 2026. arXiv:2510.05749.

ACADEMIC SERVICES

Reviewer, *Pattern Recognition* (Elsevier), 2025-present

PROFESSIONAL EXPERIENCE

Data Analyst, Airlines Operations Center, China Southern Airlines *Sep. 2019 – May 2023*
• Analyzed flight operation data and developed internal analytics tools with Python/MySQL, enabling real-time operational monitoring.
• Led dashboard automation using Tableau/QuickBI, reducing manual reporting time by over 70%. Initiated multiple engineering projects, including data integration platforms and automated scheduling tools, resulting in measurable improvements in operational efficiency.

Lab Coordinator & Administrator, Hangzhou Institute for Advanced Study, UCAS *Sep. 2024 – Present*
• Oversaw daily operations of the research lab, including member onboarding, activity organization, and GPU server resource management.
• Managed equipment procurement, research budget tracking, and reimbursement procedures, ensuring smooth project execution.

SKILLS SUMMARY

Core Research Skills: LLM/VLM fine-tuning (LoRA, adapter tuning), multimodal alignment (Video-LLaVA, CLIP), Chain-of-Thought reasoning, prompt engineering, affective computing, conversational agent design, model design for low-resource settings.
Programming & Frameworks: Python, PyTorch, HuggingFace Transformers, SQL, C++.
Engineering & Deployment: API integration, Django, scalable inference, full-stack pipelines, model serving, Tableau, QuickBI.
Languages: English (fluent, TOEIC:770, CET-6:507), Mandarin (native)

HONORS & AWARDS

Frontrunner 5000: Top Articles in Outstanding S&T Journals of China (2023) — "Flight Operation Risk Propagation Analysis Based on Complex Networks" *Sep. 2024*
Institute of Scientific and Technical Information of China (ISTIC)

Merit Student *2025*
Hangzhou Institute for Advanced Study, UCAS

First-Class Scholarship (University Level) *2024 – 2025*
Hangzhou Institute for Advanced Study, UCAS

Second-Class Scholarship (University Level) *2023 – 2024*
Hangzhou Institute for Advanced Study, UCAS

Excellent Award, 2nd China Southern Airlines Innovation Challenge *Sep. 2021*
China Southern Airlines

Outstanding Young Innovator (2020), Airlines Operations Center *Feb. 2021*
China Southern Airlines

Outstanding Newcomer (Cohort 2019), Airlines Operations Center *Aug. 2020*
China Southern Airlines

Third-Class Scholarship (University Level) *2016 – 2017*
Civil Aviation University of China