

# Weikai (Vica) Yang

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## Education and Research Experience

- 2024–present **Assistant Professor**, *Hong Kong University of Science and Technology (Guangzhou)*, Guangdong.
- 2019–2024 **PhD, Software Engineering**, *Tsinghua University*, Beijing.  
Advisor: Prof. Shixia Liu
- 2015–2019 **Bachelor of Engineering, Software Engineering**, *Tsinghua University*, Beijing.  
Minor in Statistics

## Publications

### Books

- [1] Shixia Liu, **Weikai Yang**, Junpeng Wang, Jun Yuan. Visualization for Artificial Intelligence (in press). *Springer Nature*

### VA4AI-related papers

- [13] Jiashu Chen\*, **Weikai Yang\***, Zelin Jia, Lanxi Xiao, and Shixia Liu. Dynamic Color Assignment for Hierarchical Data. *IEEE Transactions on Visualization and Computer Graphics*, 2024. (**honorable mention**, co-first author, IEEE VIS 2024, CCF A).
- [12] Changjian Chen, Jiashu Chen, **Weikai Yang**, Haoze Wang, Johannes Knittel, Xibin Zhao, Steffen Koch, Thomas Ertl, and Shixia Liu. Enhancing single-frame supervision for better temporal action localization. *IEEE Transactions on Visualization and Computer Graphics*, 2024. (CCF A)
- [11] **Weikai Yang**, Mengchen Liu, Zheng Wang, and Shixia Liu. Foundation models meet visualizations: Challenges and opportunities. *Computational Visual Media*, 2024. (**spotlight paper**, JCR Q1)
- [10] **Weikai Yang**, Yukai Guo, Jing Wu, Zheng Wang, Lan-Zhe Guo, Yu-Feng Li, and Shixia Liu. Interactive reweighting for mitigating label quality issues. *IEEE Transactions on Visualization and Computer Graphics*, volume 30, pages 1837-1852, 2024. (CCF A)
- [9] Changjian Chen, Yukai Guo, Fengyuan Tian, Shilong Liu, **Weikai Yang**, Zhaowei Wang, Jing Wu, Hang Su, Hanspeter Pfister, and Shixia Liu. A unified interactive model evaluation for classification, object detection, and instance segmentation in computer vision. *IEEE Transactions on Visualization and Computer Graphics*, volume 30, pages 76–86, 2024. (CCF A)
- [8] Yuxing Zhou\*, **Weikai Yang\***, Jiashu Chen, Changjian Chen, Zhiyang Shen, Xiaonan Luo, Lingyun Yu, and Shixia Liu. Cluster-aware grid layout. *IEEE Transactions on Visualization and Computer Graphics*, volume 30, pages 240–250, 2024. (co-first author, CCF A).
- [7] **Weikai Yang**, Changjian Chen, Jiangning Zhu, Lei Li, Peng Liu, and Shixia Liu. Visual analytics research for improving training data quality (in chinese). *CCF Journal of Computer-Aided Design & Computer Graphics*, volume 35, pages 1629-1642, 2023.

- [6] Zhen Li, Xiting Wang, **Weikai Yang**, Jing Wu, Zhengyan Zhang, Zhiyuan Liu, Maosong Sun, Hui Zhang, and Shixia Liu. A unified understanding of deep NLP models for text classification. *IEEE Transactions on Visualization and Computer Graphics*, volume 28, pages 4980–4994, 2022. (CCF A)
- [5] Xingxing Zhang, Zhizhe Liu, **Weikai Yang**, Liyuan Wang, and Jun Zhu. The more, the better? active silencing of non-positive transfer for efficient multi-domain few-shot classification. *In Proceedings of ACM International Conference on Multimedia*, pages 1993–2001, 2022. (CCF A)
- [4] **Weikai Yang**, Xi Ye, Xingxing Zhang, Lanxi Xiao, Jiazhi Xia, Zhongyuan Wang, Jun Zhu, Hanspeter Pfister, and Shixia Liu. Diagnosing ensemble few-shot classifiers. *IEEE Transactions on Visualization and Computer Graphics*, volume 28, pages 3292–3306, 2022. (CCF A)
- [3] **Weikai Yang**, Xiting Wang, Jie Lu, Wenwen Dou, and Shixia Liu. Interactive steering of hierarchical clustering. *IEEE Transactions on Visualization and Computer Graphics*, volume 27, pages 3953–3967, 2021. (CCF A)
- [2] Jun Yuan, Changjian Chen, **Weikai Yang**, Mengchen Liu, Jiazhi Xia, and Shixia Liu. A survey of visual analytics techniques for machine learning. *Computational Visual Media*, volume 7, pages 3–36, 2021. (JCR Q1)
- [1] **Weikai Yang**, Zhen Li, Mengchen Liu, Yafeng Lu, Kelei Cao, Ross Maciejewski, and Shixia Liu. Diagnosing concept drift with visual analytics. *In Proceedings of IEEE VIS (VAST)*, pages 12–23, 2020. (CCF A)

## VA4Art-related papers

- [2] Lanxi Xiao, **Weikai Yang**, Haoze Wang, Shixia Liu, and Qiong Wu. Why AI fails: Shortcut. *In ACM Creativity and Cognition workshop on explainable AI for the Arts (XAIxArts)*, 2023.
- [1] Lanxi Xiao, **Weikai Yang**, Haoze Wang, Shixia Liu, and Qiong Wu. Why AI fails: Parallax. *In ACM Creativity and Cognition workshop on explainable AI for the Arts (XAIxArts)*, 2023.

## Awards

- 2024 Distinguished Doctoral Dissertation Award of Tsinghua University (10%), Tsinghua University
- 2024 Outstanding Graduate of Tsinghua University (5%), Tsinghua University
- 2024 Outstanding Graduate of Beijing (10%), Beijing Municipal Education Commission
- 2023 First Class Outstanding Student Scholarship, Tsinghua University
- 2022 Outstanding Teaching Assistant Award, Tsinghua University
- 2022 First Class Outstanding Student Scholarship, Tsinghua University
- 2021 First Class Outstanding Student Scholarship, Tsinghua University
- 2020 First Class Outstanding Student Scholarship, Tsinghua University
- 2019 Outstanding Undergraduate of Tsinghua University (2%), Tsinghua University
- 2019 Outstanding Undergraduate of Beijing (5%), Beijing Municipal Education Commission
- 2017 Qualcomm Scholarship, Qualcomm Incorporated
- 2017 National Scholarship (1%), Ministry of Education

## Projects

### VA4AI-related

- 2020–2023 **Data Governance System and Sharing Platform for Smart City Services (National Key Research and Development Program of China 2020YFB2104100).**

**Description:** Studied the key theories and techniques for smart city services.

**My work:** Took part in the development of data services and model services.

**Research Contribution:** Developed a data selection service and a model ensemble service, both of which have been successfully integrated into the grid digital management platform of Shanghai Data Exchange Co., Ltd. These developed services have helped detect 665,276 cheating cases and enhanced both the quality and efficiency of case processing.

2022–2023 **Visual Analytics Methods for Improving the Quality of Training Data (National Nature Science Foundation of China 61936002).**

**Description:** Studied the key theories and techniques for improving the quality of training data with visual analytics.

**My work:** In charge of the design and implementation of the visual analysis system for improving the quality of annotated samples in few-shot learning.

**Research Contribution:** Developed a subset selection algorithm to recommend high-quality models and annotated samples. Built a visual analysis system to interactively examine and adjust the selection of models and annotated samples, which improved the accuracy of classification models by 12% - 21%.

2021–2023 **Data Annotation Quality Improvement (Kuaishou).**

**Description:** Developed visual analysis systems to improve data annotation quality.

**My work:** Supervised the whole working phase of the project, including requirement analysis, design, implementation, and integration.

**Research Contribution:** Built a visual analysis system to facilitate the examination and correction of annotations. The developed system helps improve the accuracy of short video classification by 2.67% and the accuracy of multi-modality model by 1.1%.

2022–2023 **Construct Datasets for Intelligent Sensing Tasks (China Aerospace Science & Industry Corporation).**

**Description:** Evaluated the quality of training samples and adaptively selected high-quality ones to construct datasets.

**My work:** Supervised the whole working phase of the project, including requirement analysis, design, implementation, and integration.

**Research Contribution:** Built a set of metrics to evaluate the cleanliness, representativeness, and balancedness of the datasets. Developed a visual analysis system to interactively construct datasets based on the different targets. The developed system reduces the number of training samples by 20% and still achieves comparable performance.

## VA4Art-related

2022-2023 **“Why AI Fails” Series Installations, [\[Video\]](#).**

**Description:** Developed interactive installations to open the black box and help ordinary people understand why machine learning models make mistakes.

**My Work:** Participated in the discussion of the design. Provided necessary information (e.g., images, saliency map, confidence) to visualize.

Note: This project is accepted by the ACM Creativity and Cognition workshop on explainable AI for the Arts.

2021-2022 **Gala Video Projection Show at the Beijing 2022 Winter Olympics, [\[Demo Link\]](#).**

**Description:** Created a two-minute video projection show at the halftime of Gala show.

**My Work:** Participated in the discussion of the design in video. Implemented a visual analysis system to help artists examine and compare multiple skating track clips and select the better ones for video creation.

2020-2021 **Human': Ethical Reflection on Future Cyberworld Identity, [\[Demo Link\]](#).**

**Description:** Developed an interactive installation to discuss the potential ethical issues caused by digital humans.

**My Work:** Implemented critical features, such as capturing facial images and performing face swaps in videos, along with developing a chatbot within a WeChat mini program.

Note: This project was presented at the Beijing 2020 International Design Week, the Beijing 2021 Science and Technology Week, and won the **special prize** in Beijing 2022 Industrial Innovation Competition.

## Patents

- [1] Visual Analysis System and Method for Unified Model Evaluation for Various Computer Vision Tasks, CN202310987029.2, published
- [2] Visual Analysis System and Method for Samples Reweighting, CN202310840644.0, published
- [3] Method and System for Sample Visualization, CN202310633032.4, published
- [4] Method and System for Sample Selection for Temporal Action Localization Models, CN202310002699.4, published
- [5] Visual Analysis System and Method for Generating Ensemble Few-Shot Classifiers, CN202110542475.3, published
- [6] Method and System for Acquiring Concept Drift Measure of Data Distribution, CN202010452947.1, issued
- [7] Method and System for Hierarchical Clustering, ZL201910978112.7, issued

## Invited Talks

- May 2023 Data-Centric Visual Analytics for Machine Learning. *GAMES Webinar*
- May 2023 Data-Centric Visual Analytics for Machine Learning. *HKUST*
- April 2023 Data-Centric Visual Analytics for Machine Learning. *HKUST-GZ*
- Nov 2023 Sample Representativeness-based Visual Analytics for Analyzing and Improving Model Performance. *The China-R Conference*

## Service

- PC Member AAAI (2023-2024)
- Journal Reviewer TVCG (2022-), Visual Informatics (2022-), Computational Visual Media (2023-), Information Visualization (2024-), Journal of Graphics (2024-)
- Conference Reviewer VIS (2021-2024), IUI(2024), PacificVis (2022-2024), ChinaVis (2020-2023)
- Volunteer VIS (2020, 2022, 2023)

## Teaching Assistantships

- 2020–present Information Visualization and Visual Analytics (Fall semester)
- 2019–present Discrete Mathematics: Mathematical Logic, Set Theory (Fall semester)
- 2019–present Discrete Mathematics: Abstract Algebra, and Graph Theory (Spring semester)
- 2015–present Volunteer of Drop-in Tutoring for STEM Courses in Tsinghua University
- 2016 Teach weekly calculus exercise classes for students from Hong Kong, Macao, and Taiwan