Jianben HE

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My research interests lie in the intersection of data visualization (VIS), human computer interaction (HCI) and multimodal machine learning. I design and develop AI-powered interactive visual interfaces following human-centered design process to promote human-AI collaboration for multimodal data (e.g., videos) exploration, understanding and analytics. Recently, I have focused on 1) facilitating efficient multimodal video content digestion and analysis for real-world applications such as online education and tax service. 2) support ML practitioners in understanding and steering multimodal machine learning models to align with their knowledge.

EDUCATION

The Hong Kong University of Science and Technology, Hong Kong *2019 - present*
PhD candidate in Computer Science and Engineering
Advisors: Prof. Huamin Qu & Prof. Qian Zhang

Huazhong University of Science and Technology, Wuhan, China *2015 - 2019*
Selected to the Outstanding Engineer Class (top 2%, on basis of outstanding academic performance)
B.Eng (graduated with Deans' Honor) in Electronic and Information Electrical Engineering

Stanford University, California, US *Winter 2017*
Took courses and attended lectures about innovation leadership, AI and entrepreneuoship
Finish the project of writing a business proposal for a technology product
Our team won the first prize in the final presentation evaluated by professors

University of Hong Kong *Summer 2016*
School of Mathematics
Took Mathematical Laboratory and Modelling Course (Grade:4.3/4.3)
Received the Excellent Student Scholarship

PUBLICATIONS

- **VideoPro: A Visual Analytics Approach for Interactive Video Programming**
  Jianben He, Xingbo Wang, Kam Kwai Wong, Xijie Huang, Changjian Chen, Zixin Chen, Fengjie Wang, and Huamin Qu
  Accepted to present at IEEE VIS Conference 2023

- **Engager: A Visual Analytics System for Multi-person and Multimodal Engagement Analysis in Online Teaching Videos**
  Jianben He, Rui Sheng, Xingbo Wang, Kam Kwai Wong, Xinhuan Shu, and Huamin Qu
  Under review of IEEE TVCG journal

- **Anchorage: Visual Analysis of Satisfaction in Customer Service Videos via Anchor Events**
  Kam Kwai Wong, Xingbo Wang, Yong Wang, **Jianben He**, Rong Zhang, and Huamin Qu
  IEEE Transactions on Visualization and Computer Graphics (TVCG) 2023

- **M²Lens: Visualizing and Explaining Multimodal Models for Sentiment Analysis.**
  Xingbo Wang, **Jianben He**, Zhihua Jin, Muqiao Yang, Yong Wang, Huamin Qu
  IEEE Transactions on Visualization and Computer Graphics (TVCG) 2022
  Best Paper Honorable Mention@VIS'21 🏆

- **A Novel Hardware Trojan Detection with Chip ID Based on Relative Time Delays**
  Yijun Yang, Liji Wu, Xiangmin Zhang, **Jianben He**
  IEEE International Conference on Anti-counterfeiting, Security, and Identification (ASID) 2017

SELECTED PROJECTS

AI-Powered Audience Engagement Analysis for Virtual Communication *2021 - 2023*

Collaborator: OwnTheRoom Company - *a global professional speaking training company*

- Proposed a visual analytics approach to support flexible and scalable video programming to exploit model training process with reduced human efforts. The paper is submitted to *IEEE VIS Conference 2023*.
- Worked on multimodal engagement analysis during multi-party virtual communication (e.g., video conferencing). Built models and a visual analytics system to analyze the emotional, behavioral, and speech features of individual students, as well as their engagement dynamics. The paper is currently under review by the *IEEE TVCG journal*.
- Applied ML models for analyzing students' text response content such as sentiment, reply and question-raising frequency.

Jockey Club Self-Directed Learning in STEM   *2020 - 2021*
Collaborator: Prof. Nancy Law - *Faculty of Education, The University of Hong Kong, China*

- Conducted data analytics to support a quick overview of student performance and learning behaviors
- Participated in designing and building the prototype of the visualizations for learning analytics on Moodle (an open-source learning platform)

Data Tracing Based on AI Algorithm   *Jul 2018 - Sep 2018*
Advisor: Prof. Chao Zhang - *Institute for Network Science and Cyberspace, Tsinghua University, China*

- Participated in the project which applied machine learning algorithms to finish malware data classification and clustering
- Implemented several machine learning algorithms, i.e. light GBM, LSTM-based Hierarchical Denoising Network for Android Malware Detection, and compared their recognition results

Hardware Trojan Detection with Chip ID Based on Relative Time Relay   *Jul 2017 - Sep 2017*
Advisor: Prof. Liji Wu - *Department of Microelectronics and Nanoelectronics, Tsinghua University, China*

- Studied papers and materials related to Hardware Trojan in the integrated circuit, accomplished the work of coding and simulation of the TDC module
- Wrote part of the paper and published it to IEEE ASID 2017 conference

SELECTED AWARDS AND HONORS

- **IEEE VIS Doctoral Colloquium, IEEE VIS**   *2023*
- **Best Paper Honorable Mention, IEEE VIS**   *2021*
- Oustanding Graduate of HUST (Top 1%)   *2019*
- Outstanding Undergraduate in Terms of Academic Performance (Top 1%)   *2018*
- China National Scholarship (Top 2%)   *2018*
- Merit Student Honor (Top 2%)   *2018*
- GOODIX Student Scholarship (1/10 National Scholarship Winners)   *2018*
- China National Scholarship (Top 2%)   *2017*
- Merit Student Honor (Top 2%)   *2017*
- Public Service Scholarship (Top 5%)   *2016*
- New Student Scholarship (Top 5%)   *2016*

TEACHING EXPERIENCE

- **Teaching Assistant**, COMP2611 - Computer Organization, HKUST   *Spring 2021, Fall 2021, Fall 2022*
    - An undergraduate-level course with more than 200 students
    - Designing and grading assignments
    - Creating and leading coding labs

TECHNICAL SKILLS

Programming: Python, Javascript, Matlab, C/C++
Machine Learning: PyTorch, Scikit-Learn, TensorFlow/Keras
Web Development: Flask, VueJs, D3Js