Shuning Jiang

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I am interested in human-AI collaboration in interdisciplinary science. My current work focuses on analyzing user behaviors and utilizing AI to solve brain connectivity annotation issues.

Education

- **The Ohio State University, Computer Science and Engineering** *08/2019 - current*
  - Research Assistant: Interactive Visual Computing Lab
  - Teaching Assistant: Virtual Reality, Introduction to Artificial Intelligence
  - Advisor: Dr. Jian Chen
- **B.S., University of Electronic Science and Technology of China, Software Engineering** *09/2015 - 07/2019*
  - Thesis: Automatic Vehicle Detection and License Plate Recognition System
  - Advisors: Dr. Wei Jiang and Dr. Yi Ding
- **Exchange scholar, University of California, San Diego, Computer Science** *03/2018 - 06/2018*

Publications

Work in progress:

- (Under review) Shunning Jiang, Veronica Thai, Wei-Lun Chao, Meng Ling, Jian Chen "Analyzing and Visualizing Pathologists' Eye Gaze for Enhanced Diagnostic Assistance" Neural Information Processing Systems, 2023
  - We examined pathologists' eye gaze paterns while diagnosing cases in a public dataset (CAMELYON17). By leveraging these gaze data, we aim to generate pseudo-labels that can subsequently be employed to refine algorithms, thereby improving decision-making support for pathologists.
- (Under review) Shunning Jiang, Wei-Lun Chao, Jian Chen, Daniel Haehn, Meng Ling, Ce Shang, and Hanspeter Pfister. "Are CNNs More Effective than Humans for Ratio Estimate Tasks?" IEEE Transactions on Visualization and Computer Graphics, 2023
  - Be the first to compare humans and AI on graphical reading tasks. We demonstrated that CNNs behaved differently from humans but can still achieve super-human accuracy with the sample space been covered by the training data.
- (on-going) Shunning Jiang, Jian Chen, Wei-Lun Chao, Lijuan Liu, Yimin Wang, Hanchuan Peng. "VR or Desktop? Quantifying the Effect of Display on Brain Connectome Annotation Methods." Virtual Reality Software and Technology, 2022
  - Be the first to understand annotators' behavior in desktop and VR environments. We expect that VR environment is the solution for hard cases; for easy cases, desktop is sufficient. We correlate image characteristics to in the future recommend data to be annotated in VR.
- (on-going) Shunning Jiang, Jian Chen, Wei-Lun Chao, Lijuan Liu, Yimin Wang, Hanchuan Peng. "VR or Desktop? Quantifying the Effect of Display on Brain Connectome Annotation Methods." Virtual Reality Software and Technology, 2022
  - Be the first to understand annotators' behavior in desktop and VR environments. We expect that VR environment is the solution for hard cases; for easy cases, desktop is sufficient. We correlate image characteristics to in the future recommend data to be annotated in VR.
- (on-going) Shunning Jiang, Wei-Lun Chao, Jian Chen, Daniel Haehn, Meng Ling, Ce Shang, and Hanspeter Pfister. "Quantifying the Sampling Regime for CNNs' Visualization Tasks." IEEE Transactions on Visualization and Computer Graphics, 2022

- Be the first to unify the evaluation of data input optimization methods on CNNs accuracy for AI's chart understanding. We found that besides diversity, sampling extreme values is equally important. Published:

- Shunning Jiang, Wei-Lun Chao, Jian Chen, Daniel Haehn, Meng Ling, Ce Shang, and Hanspeter Pfister. "Are CNNs More Effective than Humans for Ratio Estimate Tasks?" Vision Sciences Society, poster presentation, Jun, 2022. url: https://www.visionsciences.org/presentation/?id=3784
- Shaoying Ma, Shuning Jiang, Meng Ling, Jian Chen, Ce Shang. "Price Promotions of E-liquid Products Sold in Online Stores." International Journal of Environmental Research and Public Health. 2022
  - We automatically scraped and cleaned online e-liquid pricing and excise taxes activities. We found the e-liquid products sold online were priced low and stricter enforcement of e-cigarette excise tax is needed.
- Shaoying Ma, Shuning Jiang, Meng Ling, Bo Lu, Jian Chen, Ce Shang. "Excise Taxes and Pricing Activities of E-liquid Products Sold in Online Vape Shops." Tobacco Control. 2022. doi: 10.1136/tobaccocontrol-2021-057033.
  - We automatically scraped and cleaned online e-liquid pricing and excise taxes activities. We found 92.36% of the e-liquid products were on sales and the effect of excise tax may be offset by price promotion activities.
- Shaoying Ma, Shuning Jiang, Meng Ling, Bo Lu, Jian Chen, Ce Shang. "Excise Taxes and Pricing Activities of E-liquid Products Sold in Online Vape Shops." International Institute of Public Finance Annual Congress. Aug 2022.

Research Experience

- **Pathologists' gaze visualization and analysis** *09/2022 - current*
  - Collect, analyze, and visualize pathologists' eye gaze when making diagnosis to understand the association between gaze patterns and pathologists' experience level. In cooperation Wexner Medical Center.
- **Brain imaging visualization and annotation analysis** *01/2020 - current*
  - Studied the annotators' behaviors in both desktop and virtual reality environments. Aims to boost annotators' speed and fasten the neuron reconstruction. In cooperation with Allen Institute and Southeast University.
- **Graphical perception with CNNs** *08/2019 – 02/2023*
  - Evaluated convolutional neural networks' performance on graphical perception tasks and compared it to human fairly. Quantified the effect of data sampling on CNNs' accuracy.
- **Similarity-based image retrieval in pathology** *08/2020 - 02/2022*
  - Benchmarked multiple image feature extraction algorithms and retrieved similar images in the database.
- **Online vape shop analysis** *02/2021 - 12/2021*
  - Automatically scraped and mined vape product information from online vape shops.
- **Automatic vehicles detection and recognition system** *01/2019 - 04/2019*
  - Used convolutional neural networks to automatically detecting and re-identifying vehicles based on license plate, vehicle model, and color.
- **Tencent FPGA-assisted log processing system** *04/2017 - 01/2018*
  - Boosted the filter action speed of the log system by embedding FPGA chips into storage nodes and separating data from computing resources. In collaboration with City University of Hong Kong and Tencent.

Skills

- **Programming Languages:** C/C++/C#, Python, Java, JavaScript, MATLAB, Scala
- **Framework/Tools:** Unity, OpenGL, Keras, TensorFlow, PyTorch, OpenCV, MySQL, Apache Spark, Hadoop; experienced using Oculus Rift/Quest. Learning to use HoloLens 2.