# ZHENG NING

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## RESEARCH INTEREST

Human-computer Interaction (HCI), Human-AI Interaction, Multi-Modal Interaction, Accessibility, and Mixed Reality (MR).

## EDUCATION

**University of Notre Dame** 09/2021 - Present
Ph.D. of Computer Science Notre Dame, USA
- Advisor: Prof. Toby Jia-Jun Li

**University of Electronic Science & Technology of China (UESTC)** 09/2016 - 06/2020
Bachelor of Electrical and Electronic Engineering Chengdu, China
- Joint education program with University of Glasgow, UK
- Graduated with First-Class honor degree

## PUBLICATIONS

- **MIMOSA: Human-AI Co-Creation of Computational Spatial Audio Effects on Videos**
  **Zheng Ning***, Zheng Zhang*, Jerrick Ban, Kaiwen Jiang, Ruohong Gan, Yapeng Tian, and Toby Jia-Jun Li
  *In submission to the ACM Conference on Human Factors in Computing Systems (CHI'23)*
- **PEANUT: A Human-AI Collaborative Tool for Annotating Audio-Visual Data**
  Zheng Zhang*, **Zheng Ning***, Chenliang Xu, Yapeng Tian, and Toby Jia-Jun Li
  *In submission to the ACM Conference on Human Factors in Computing Systems (CHI'23)*
- **An Empirical Study of Model Errors & User Error Discovery and Repair Strategies in Natural Language Database Queries**
  **Zheng Ning***, Zheng Zhang*, Tianyi Sun, Tian Yuan, Tianyi Zhang, and Toby Jia-Jun Li
  *In submission to the 26th International Conference on Intelligent User Interfaces (IUI'23)*
- **Human-in-the-Loop Generation of Spatial Audio from Videos with Monaural Audio [Paper][Demo]**
  **Zheng Ning***, Zheng Zhang*, Jerrick Ban, Kaiwen Jiang, Ruohong Gan, Yapeng Tian, and Toby Jia-Jun Li
  *ECCV 2022 Workshop on Visual Learning of Sounds in Spaces (ECCV-AV4D)*
- **On the Relationship Between Counterfactual Explainer and Recommender [Paper]**
  Gang Liu, Zhihan Zhang, **Zheng Ning**, and Meng Jiang
  *KDD 2022 Workshop on Data Science and Artificial Intelligence for Responsible Recommendations (KDD-DS4RRS)*

## RESEARCH PROJECTS

**Multimodal exploration of video content for Blind and Visual Impairment (BVI) populations** 07/2022 - Present
*Leading student researcher*, Collaborators: Prof. Yuhang Zhao and Prof. Yapeng Tian
- Developing an accessible tool with various interaction strategies (mouse-keyboard exploration, touch exploration, and mid-air gesture) for BVI populations to explore video content and increase immersion (System built on React & Flask)
- Leveraging state-of-the-art visual-language models to automatically detect key frames, generate associated audio descriptions (ADs), and object-level ADs. (Using Python & Pytorch)
- Conducting formative studies and usability tests to investigate the effectiveness of the system and compare the disparities among different interaction strategies

**Human-AI co-creation tool for generating and manipulating spatial audio effects for videos** 01/2022 - 09/2022
*Leading student researcher*, Collaborators: Zheng Zhang, Jerrick Ban, and Prof. Yapeng Tian
- Designed and developed a video creation tool that enables amateur users to interactively generate and manipulate 3D spatial audio effects in videos that only had monaural or stereo audio originally (System built based on React)

- Developed an Adobe Premiere Pro (Pr) plugin that connects the software with the proposed interactive system. (Plugin built with Adobe Common Extensibility Platform (CEP) and ExtendScript)
- Designed and conducted a controlled user study of the system, demonstrating its capability to generate immersive and realistic spatial effects as well as effective support to pos-hoc effect editing for amateur video content creators

**Human-in-the-loop data annotation tool for localizing sounding objects in videos** 07/2021 - 10/2022
*Co-leading student researcher*, Collaborators: Zheng Zhang and Prof. Yapeng Tian

- Implemented interaction strategies for incorporating partial automation from single-modal AI models into a human-AI collaborative annotation workflow to reduce user efforts in annotating the location of sounding objects in videos
- Conducted a within-subjects user study with 20 participants, showing the effectiveness of the tool in improving the efficiency in the annotation of audio-visual data while also achieving high data accuracy

**Empirical study on error types and error handling mechanisms in NL2SQL models** 09/2021 - 10/2022
*Co-leading student researcher*, Collaborators: Zheng Zhang, Tianyi Sun, Yuan Tian and Prof. Tianyi Zhang

- Adopted grounded theory approach to code the error types of the state-of-the-art NL2SQL models and developed an error taxonomy that summarizes 48 error types and reveals their distribution patterns
- Conducted a within-subjects user study with 26 participants to investigate the effectiveness of the three representative interactive mechanisms for error discovery and repair in NL2SQL models
- Applied statistical tests (t-test, ANOVA and Pearson Correlation Coefficient) and visualization approaches (Tableau) to analyze the data from users using the tested error-handling mechanisms

## GRANTS & HONORS

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| NVIDIA Academic Hardware Grant ($4,650 in equipment) | 2022 |
| Outstanding final year project of Glasgow College, UESTC (Top 10%) | 2020 |
| Outstanding Student Scholarship (Top 10%), UESTC | 2017 - 2019 |

## LANGUAGES & SKILLS

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| **Program Languages:** | Python, Pytorch, React, Flask, Javascript, HTML, SQL, Tensorflow, Matlab |
| **UX Skills:** | Qualitative Research, Quantitative Research, Experiment Design |
| **Softwares:** | Tableau, Adobe PS, Adobe Premiere Pro, Adobe Audition, Figma, SPSS |
| **Languages:** | English – Fluent, Chinese (Mandarin) – Native |