

# Yining CAO

(Rima)

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## OBJECTIVE

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To apply for a PhD in **Human-Computer Interaction** and **Applied Machine Learning/Deep Learning** for the entry of 2021 Fall Semester

## RESEARCH INTEREST

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My research interest lies in the intersection of Human-Computer Interaction, Computer Vision and Data Mining. I am interested in building intelligent interactive system and data-driven modeling.

## EDUCATION

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### University of Michigan, Ann Arbor

Master of Information Science, Big Data Analysis

GPA: 4.0/4.0

Core courses: Machine Learning(A); Natural Language Processing(A+); Data Manipulation and Analysis(A+)

Ann Arbor, MI, USA

Sept. 2019 – Jun. 2021

### Tsinghua University

B.E. in Environmental Science and Engineering

Minor in Computer Science and Technology

GPA: 3.7/4.0

Core courses: Artificial Intelligence (A); Software Engineering (A)

Beijing, China

Sept. 2015 – Jun. 2019

## WORKING PAPER & PUBLICATION

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- [Working paper] **Yining Cao**, Hariharan Subramnyam, Eytan Adar. VideoStickers: A Tool for Active Visual Note-taking and Annotation.
- [Under Review] **Yining Cao\***, Xiyue Jia\*, Deyi Hou, David O'Connor, Jin Zhu, Daniel Tsang, Bin Zou. Mapping soil pollution by using drone image recognition and machine learning at an arsenic-contaminated agricultural field. Environmental Pollution. (\* Equally contributed)

## RESEARCH EXPERIENCE

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Supervisor: Eytan Adar, Datamaze Lab, University of Michigan

Feb. 2020 – Present

**VideoStickers: A Tool for Active Visual Note-taking and Annotation**

*Zero-shot object detection | Video processing | Interactive system design*

[\[Project Link\]](#) [\[pdf\]](#)

- Proposed and developed a web-based tool for extracting expressive content from videos as ‘motion stickers’, linking objects to transcribed narration, and supports expressive queries to generate stickers across space, time, and events of interest
- Implemented zero-shot salient object detection and unsupervised clustering algorithm to automatically extract and track multiple objects from video streams

Supervisor: Xi Jessie Yang, **Interaction & Collaboration Research Lab**, University of Michigan

Feb. 2020 – Present

**Identifying Standard Metrics for Measuring Takeover Performance**

*Literature review | Data mining*

- Conducted literature review for 113 papers following meta-analysis approach, proposed a framework for a standard set of takeover performance metrics and wrote literature review paper
- Conducted data-driven analysis for subjective takeover performance metrics with identified contextual factors
- Constructed a model for predicting Time-to-Collision using Linear mixed model and AdaBoost

Supervisor: Deyi Hou, School of Environment, Tsinghua University

Nov. 2018 – May. 2020

**Mapping soil pollution by using drone image recognition and machine learning at an arsenic-contaminated agricultural field**

*Machine learning | Feature extraction | Image processing*

- Built a risk danger classification model for agricultural field with random forest, achieved a competitive accuracy of 0.87, outperforming traditional interpolation methods
- Extracted and constructed visual features from drone images and conducted statistical analysis to select a set of significant features

## PROJECT EXPERIENCE

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**Team Project, EECS545-Machine Learning Course Project, University of Michigan** Feb. 2020 – May 2020  
**Super Musician: Zero-shot Music Style Transfer Based on AutoEncoder**  
[\[Project Link\]](#) [\[pdf\]](#)

- Trained a style encoder net for extracting unique timbres of different instruments with Long short-term memory recurrent neural network and Generalized end-to-end loss
- Performed collaborative network design, development and training, achieved an ideal performance of style transfer between flute and violin

**Independent Project, SI630-Natural Language Processing Course Project, University of Michigan** Feb. 2020 – May 2020  
**Auto-highlighter: Extractive Text Summarization with Intra-Attentional Sequence-to-Sequence Model**  
[\[Project Link\]](#) [\[pdf\]](#)

- Developed a sequence-to-sequence model with intra-attention mechanism for representative text extraction in text; Boost the model performance by 1.3 ROUGE-L score from the baseline model
- Proposed a solution of controlling summary verbosity by users

**Independent Project, CHIMPS Lab, Carnegie Mellon University** May 2018 – Sept. 2018  
**MoTurk: A Personal Data Transaction Platform under Privacy Protection Mechanism**  
[\[Project Link\]](#) [\[pdf\]](#)

- Proposed a three-level hierarchical taxonomy of personal sensing data based on a functional programming model for mobile sensing data ([PrivacyStreams](#)) and a large-scale literature review for 101 papers
- Designed and conducted iterative prototyping of the ‘MoTurk’ system that allow transactions of mobile sourced personal data between the general public and researchers through a Mechanical Turk mechanism.

## INTERN EXPERIENCE

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**Machine Learning Intern, Filty Inc., Ann Arbor, MI, USA** May 2020 – Present  
[\[Slides\]](#)

- Generated synthesis dataset with Google OpenImages dataset and user-case sceneries
- Conducted food labels clustering and semantical relabeling for more than 600 labels based on confusion matrix
- Implemented KNN and few-shot learning algorithm to build a personalized model based on user preference and history, boost top1 model accuracy from 78.9% to 93.3% with user correction

**User Research Intern, Asian Development Bank, Beijing, China** Mar. 2019 – Aug. 2019

- Conducted user research and iterative design of official website for Regional Knowledge Sharing Institute

**Front-end development Intern, NetEase Inc., Beijing, China** Mar. 2018 – Jun. 2018

- Front-end development using jQuery and Vue.js

## SELECTED AWARDS AND HONORS

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First Prize, 2017 National Mathematical Modeling Contest	2017
Third Prize, Microsoft AI Hackathon Competition	2017
Third Prize, Beijing College Physics Competition	2016
Outstanding Student Leader of Tsinghua University	2016
Scholarship for Comprehensive Excellence of Tsinghua University	2018, 2017, 2016
Scholarship for Academic Excellence of Tsinghua University	2018, 2017, 2016
Outstanding Graduates Award	2019

## OUTREACH

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- Reviewer for ICIS 2020 May 2020
- ‘Jumping Fun’: A Web-based 3D game design and development [\[Play it here\]](#) Oct. 2019-Dec. 2019
- President of Rural International Student Exchange (RISE) Association May 2017 – Jan. 2018
- Host the 2nd Model Climate Change Conference in Tsinghua Oct. 2017
- Held Green Talk Forum with TED in Tsinghua Nov. 2017
- Three-year Tsinghua University Aerobics team champion 2016 & 2017 & 2018

## PROFESSIONAL SKILLS

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- **Programming Language:** Python, R, SQL, JavaScript, HTML, Bash
- **Platform / Framework:** PyTorch, TensorFlow, Hadoop MapReduce
- **Software:** Sketch, Photoshop, Cinema4D, After Effects
- **Language:** English (Fluent), Mandarin (Native)