

# Xiaomeng Yang

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## EDUCATION

**University of Chinese Academy of Sciences (UCAS)**

*M.S. Computer Application Technology*

Beijing, China

*Sep. 2021 – June 2024 (Expected)*

**Zhejiang University (ZJU)**

*B.E. Electronic and Computer Engineering*

Zhejiang, China

*Sep. 2017 – June 2021*

**University of Illinois at Urbana-Champaign (UIUC)**

*B.S. Computer Engineering with Honors*

Champaign, IL

*Sep. 2017 – May 2021*

## PUBLICATIONS AND MANUSCRIPTS

- **Xiaomeng Yang**, Zhi Qiao, Yu Zhou, Weiping Wang. IPAD: A Parallel, Iterative and Diffusion-Based Network for Scene Text Recognition. In Preparation.
- **Xiaomeng Yang**, Zhi Qiao, Jin Wei, Dongbao Yang, Yu Zhou. Masked and Permuted Implicit Context Learning for Scene Text Recognition. Under Review.
- **Xiaomeng Yang**, Dongbao Yang, Zhi Qiao, Yu Zhou. Accurate and Robust Scene Text Recognition via Adversarial Training. Accepted by ICASSP, 2024.
- Gangyan Zeng, Yuan Zhang, Yu Zhou, **Xiaomeng Yang**, Ning Jiang, Guoqing Zhao, Weiping Wang, Xu-Cheng Yin. Beyond OCR+VQA: Towards End-to-End Reading and Reasoning for Robust and Accurate TextVQA. In Pattern Recognition, Volume 138, 2023.
- Gangyan Zeng, Yuan Zhang, Yu Zhou, **Xiaomeng Yang**. Beyond OCR+VQA: Involving OCR into the Flow for Robust and Accurate TextVQA. In ACM MM, 2021. (Oral Presentation)
- Gangyan Zeng, Yuan Zhang, Yu Zhou, **Xiaomeng Yang**. A Cost-Efficient Framework for Scene Text Detection in the Wild. In PRICAI, 2021.
- Yucheng Jin, **Xiaomeng Yang**, Chengting Yu, Liangjing Yang. Educational Data Mining: Discovering Principal Factors for Better Academic Performance. In BDET, 2021.

## RESEARCH EXPERIENCE

**Linguistic Information Enhanced Scene Text Recognition**

June 2022 – Present

UCAS | *Research Assistant, Supervisor: Prof. Yu Zhou*

*Tomorrow Advancing Life | Internship, Advisor: Zhi Qiao*

- Explored the relationship between the visual features and text information in scene text recognition.
- Proposed a framework for autoregressive decoding using masked and permuted implicit context learning under additional length supervision. Enhanced model robustness against length prediction errors through perturbation training. Our approach outperformed previous work with a significant margin on challenging benchmarks, resulting in a top-tier journal submission.
- Explored non-autoregressive decoding in scene text recognition as image-based conditional text generation. Utilized discrete diffusion with a small transformer decoder and easy-first decoding for enhanced bidirectional context awareness. The manuscript is in preparation.

**Involving OCR into the Flow of TextVQA**

Oct. 2020 – Sep. 2022

UCAS | *Research Assistant, Advisor: Prof. Yu Zhou*

- Developed two accurate TextVQA models by integrating OCR into the process.
- Designed a reading modification module for adaptive answer selection based on context. Visually enhanced text embedding and semantically oriented object embedding were used to enhance the feature representations. This approach is more robust to the OCR errors, leading to a paper published by ACM MM 2021.
- Devised an efficient end-to-end network integrating text reading and reasoning, where the downstream VQA signal contributes to the optimization of text reading. The approach outperformed existing alternatives in accuracy and robustness, resulting in a publication in Pattern Recognition 2023.

**Adversarial Training for Scene Text Recognition**

Apr. 2021 – Aug. 2021

UCAS | *Summer Internship, Advisor: Prof. Yu Zhou*

- Investigated the impact of adversarial training on various scene text recognition models.

- Implemented adversarial attacks on extensively used CTC-based and attention-based methods. Utilized adversarial training as a model-dependent augmentation with a regularization norm. The model gained robustness and improved performance, especially on challenging images. This work led to a paper accepted by ICASSP 2024.

## Cost-Efficient Scene Text Detection

Mar. 2021 – June 2021

UCAS | *Summer Internship, Advisor: Prof. Yu Zhou*

- Explored unsupervised domain adaptation and active learning for cost-efficient data usage on scene text detection.
- Proposed a two-stage framework that uses unsupervised domain adaptation with global transfer and text region transfer for pre-training, and actively annotated and pseudo-labeled real samples for fine-tuning. The framework significantly outperforms the baseline. This work resulted in a paper published by PRICAI 2021.

## Educational Data Mining

Oct. 2019 – Aug. 2020

ZJU | *SRTP Program, Advisor: Prof. Liangjing Yang*

- Studied educational data mining methods and analyzed knowledge from education-oriented databases.
- Utilized linear regression, regression tree, random forest, neural network, etc., to investigate the principal factors that influence Chinese junior high school students' academic performance based on the China Education Panel Survey dataset. This work resulted in a publication in BDET 2021.

## Waterway Segmentation and Transfer Learning of Building Segmentation

Sep. 2019 – Dec. 2019

UIUC | *Individual Study, Advisor: Prof. Volodymyr Kindratenko*

- Started with the baseline segmentation model for building segmentation and then transferred to the waterway.
- Optimized the UNet model on specific DEM datasets, adjusting settings like overlapping rate and derivatives, and integrated a new loss function for building and waterway segmentation, which enhances the baseline accuracy. Completed the course report with an "A" grade.

## ENGINEERING PROJECTS

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### Information Extraction System for Express Delivery Slip

Aug. 2023 – Present

- Aiming to develop an information extraction system capable of processing diverse formats of express delivery slips from different countries.
- The system initially identifies key information areas, recognizes texts in multiple languages, and subsequently employs a visual information extraction model to parse and retrieve essential details from the text recognition results.

### Seal Recognition and General Character Recognition System

July 2022 – Apr. 2023

- Created a universal character recognition system for financial documents, including seal recognition and handwritten text recognition. Tailored it for financial business applications.
- Delivered a universal character recognition system utilizing a ViT-based backbone and a CTC-based decoder.

### Scene Text Detection and Recognition Engine

Jan. 2022 – Oct. 2022

- Developed a scene text recognition engine for the Chinese National Radio and Television Administration.
- Enhanced the CTC-based recognition network with an image rectification pre-processing module and an NLP post-processor for initial results refinement. The engine supports both traditional and simplified Chinese recognition, achieving about 95% accuracy in practical use.

## HONORS AND AWARDS

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Excellent Graduate of Zhejiang University, June 2021

Graduate of UIUC with Honors, May 2021

Academic Excellence Scholarship, ZJU-UIUC Institute, 2018-2019

Title of Outstanding Academic Pacesetter, Zhejiang University, Sep. 2019

Title of Public Service Pacesetter, Zhejiang University, Sep. 2018

## SKILLS

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**Language skills:** English: Advanced, Chinese: Native

**Programming languages:** Python, C/C++, Java, JavaScript, HTML/CSS

**Other Library and Tools:** PyTorch, TensorFlow, Numpy, Scipy, Linux, Git, Arduino, Unity3D