ZHOU ZHOU

+1 626 560 6945 | zzzhou652@gmail.com | LinkedIn | GitHub | Google Scholar | New York City, United States

Education

New York University — New York City, New York State
*M.Sc. in Computer Science;**GPA: 3.67/4.00*** — *January 2023 – December 2024*
Graduate School of Arts and Science

Relevant coursework: Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Protein Design, Technologies for finance, Operating Systems, Programming Languages and Cloud computing

University at Buffalo, The State University of New York — Buffalo, New York State
B.Sc. in Computer Science — *January 2020 – December 2022*
*Minor in Mathematics;**GPA: 3.89/4.00***

Relevant coursework: Data structures, Web Application, Algorithm, Computer Security, System Security, Network Theory, Distributed System and Software Engineering

Skills

Languages: C/C++, Java, Python, JavaScript, SQL, Scala, MATLAB

Technologies: Flask, Django, Node.js, React.js, MySQL, MongoDB, Git, Google Cloud, IBM Cloud, Docker, AWS, Kubernetes, GCP, OpenCV, PyTorch, TensorFlow, Jupyter

Methodologies: OOP, Functional Programming, DevOps

Experience

University at Buffalo Media Forensic Lab — Buffalo, New York State
Computer Vision Research Assistant — *May 2022 – May 2023, Internship*

* Design a semi-auto tool to process the ImageNet dataset and collaborate to annotate over 50,000 image masks.
* Built caption-image pair detection and classification models using Python, Spacy, CLIP and Detectron2.
* Recognized inconsistent caption-image pairs based on a 3.2 million real caption-image News dataset, with over 70% success rate in identifying fake caption-image pairs

Projects

Car recommendation system based on P2P | *GitHub*
* Implement a P2P system with real-time consummation between users and get a real-time car model recommendation system based on machine learning.
* Deploy a machine learning server and P2P communication servers on AWS to process high-volume data.
* DIY personal car model to get the best match recommendation and rank the high score car model to other users preference.

Quiz Hub | *GitHub*
* Achieved a website for professors to build up a quiz and students can access quiz through verifying username, password, and unique quiz passcode
* Constructed functionality such as authentication, automatic/manual scoring system, grade book, and email notification to quiz website

Raft Distributed System | *GitHub*
* Deployed 7 servers in the Docker and automatically select one server as a leader, and other servers will become candidate status to backup data
* Implemented leader selection model so one best status candidate server will automatically become leader status and always maintain real-time data even if previous leader server got suddenly attacked or down

Publication

Autosplice: A text-prompt manipulated image dataset for media forensics: Published on the 2023 Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition *Link*

Exposing text-image inconsistency using diffusion models: Published on the 2024 International Conference on Learning Representations *Link*

Text To Image Generation In DCGAN and Stable Diffusion Model: Research Gate *Link*

Recursion algorithm with node centrality in social networks: Research Gate *Link*

Grayscale Image Colorization In Machine Learning: Research Gate *Link*

Awards & Achievements

Cum Laude in the University at Buffalo: Awarded to Bachelor students who have graduated with a GPA greater than or equal to 3.50. (December 2022)

International Scholarship: Awarded to international students who can maintain an overall 3.0 GPA in the University at Buffalo. (January 2020 – December 2022)

Dean's Honor List: Awarded to students who can maintain an overall at least 3.5 GPA each year. (Fall 2018 – Fall 2019)

Machine Learning Certificate: Machine Learning by Stanford University and DeepLearning.AI on Coursera. (Certificate earned at October 2023)

Personal Statement

When I first picked up the controller of NES console to play *Contra* in my childhood, I was captivated by the action of shooting and dodging bullets in a fast-paced battle between players and enemies. This early gaming experience motivates me to create some easy games through programming. It also driven my academic computer science journey. As a first-generation student and an asylee in the United States, I navigate the multiple challenges of adapting to a new country while pursuing higher education.

I pursued a CS bachelor and mathematics minor at the University at Buffalo. I focus on algorithms, machine learning, computer security, web applications and distributed systems. These courses not only enhanced my programming skills but also provided me with a comprehensive understanding of different computer science areas. Furthermore, I designed my first computer vision project to classify medical images. I also joined the Media Forensic Lab at UB as a research assistant under director Lyu Siwei. I work with a CS Ph.D. candidate to explore how to identify inconsistencies between images and captions. I designed and implemented the annotation platform with Dall-E 2 access API and it is the most important part of generating the AutoSplice dataset. The first paper, *Autosplice: A Text-Prompt Manipulated Image Dataset* for Media Forensics was published at the 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops. We proposed a new approach that leverages the Dall-E 2 model to automatically generate and splice masked regions guided by text prompts. Our experiments demonstrated that existing media forensic models struggle to detect AutoSplice as an unseen manipulation. The

second paper, *Exposing Text-Image Inconsistency Using Diffusion Models* published at the 2024 International Conference on Learning Representations (ICLR). We introduced D-TIIL (Diffusion-based Text-Image Inconsistency Localization), a new method that utilizes text-to-image diffusion models to localize semantic inconsistencies between text and image pairs. This model can filter irrelevant information and identify inconsistencies with background knowledge.

I continued my CS graduate education at New York University. My first paper at NYU, *Grayscale Image Colorization in Machine Learning*, demonstrates the compare between GAN and some traditional machine learning methods in this task. The result indicates the traditional machine learning approaches are insufficient for predicting appropriate colors from greyscale images. The GAN model can provide more realistic color images. *Text to Image Generation in DCGAN and Stable Diffusion Models* paper introduces the performance between DCGAN and stable diffusion models in text-to-image generation task. I also evaluate their efficiency and image quality based on textual input. *Video Frame Prediction with ViViT and U-Net* focus on video frame prediction challenge task. I proposed a new approach of combining U-Net for semantic segmentation with another model to predict future video frames. This project focused on temporal dynamics and object movement tracking. These projects help me to gain valuable experience in handling large-scale datasets, designing model architectures and evaluating model performance. In my final semester, my courses include protein design, natural language processing and fair machine learning. I plan to write three papers exploring story generation, fairness regulation in machine learning, and de novo protein design techniques. These papers help me to expand my research

portfolio and contribute to the scientific community.

Columbia University is the ideal place for me to pursue my CS Ph.D. I am excited about the opportunity to work with Professor Shih-Fu Chang, who is the top scientist in computer vision. Columbia University is renowned for its pioneering work in machine learning and computer vision. In this case, I am very eager to contribute to the AI community and learn cutting-edge knowledge from the dynamic research environment. After completing PhD, I aspire to become a professor and leading own research lab to solve the challenging tasks in AI with other researchers.

Zhou Zhou