

# Zhongqian Duan

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## Education

### University of Michigan

M.S.E. in Computer Science (GPA: 4.0 / 4.0)

Ann Arbor, MI

Dec. 2023 (Expected)

- *Relevant Coursework:* Web Systems, Computer Networks, Parallel Computing, Natural Language Processing

### University of Michigan

B.S.E. in Computer Science (GPA: 3.9 / 4.0)

Ann Arbor, MI

May. 2022

- *Relevant Coursework:* Operating Systems, Database Systems, Data Structures & Algorithms, Machine Learning, Computer Vision, Computer Game Development, Computer Security, Parallel Programming with GPUs

### Shanghai Jiao Tong University

B.S.E. in Electrical and Computer Engineering (GPA: 3.7 / 4.0)

Shanghai, China

Aug. 2022

## Internship Experience

### Apple Inc.


Incoming Machine Learning Engineer intern

### Rec Room

Software Engineer Intern

Seattle, WA

Jan. 2023 – Apr. 2023

- Developed over 20 chips using **C#** and **Git** version control for Rec Room's CircuitV2 System , including Synced Delay Chip and Player Gaze Chip.
- Created a tool prefab named "Motion Trail," which utilized **Protobuf** for Serialization and **Photon** Unity Networking (PUN) for Synchronization. The purpose of this tool was to enhance the visual appeal of moving objects.
- Deploy builds on Steam using **Jenkins**, and collaborated with a team of developers and designers to playtest new features in both screen and VR mode.

### NIO

Machine Learning Engineer Intern

Shanghai, China

May. 2021 – Aug. 2021

- Improved the 3D object tracking network for autonomous vehicles with **Python**, resulting in a 4% increase in precision.
- Proposed a lightweight CNN to predict lens distortion parameters in **OpenCV** for removal.
- Applied pre-trained vision models, such as MaskRCNN, with different backbones to detect vehicles and lane lines, testing on over 2000 on-screen videos for autonomous driving systems.

## Project Experience

### Instagram Website Simulator

- Developed an Instagram clone with client-side dynamic pages using **React**, **Flask** app and **SQLite** database.
- Implemented real Instagram features, including login, post, comment, like, and follow, using **REST API**.


### Computer Network


- Implemented a video content distribution network(CDN) with adaptive bitrate selection and DNS load balancing.
- Built a reliable transport protocol on top of UDP, providing inorder delivery in the presence of packet loss.
- Built a router configured with a static routing table, which can forward IP and handle ARP packages.

### Operating System

- Implemented Linux thread library including thread, mutex, cv in **C++**. Tested it by writing multi-thread programs.
- Designed a pager to manage application processes' virtual address spaces using copy-on-write and LRU cache.

### Text-Image Pair Generation via Pre-trained Vision-Language Models

 NLP project

- Utilized **chatGPT** and **Midjourney** to generate the first AI Dataset with 100 text-image pairs for Image Caption .
- Finetuned some popular state-of-the-art vision language models, such as *mPLUG* and *OFA* to the generated Dataset in **Python**, increasing the value of CIDEr from 133.4 to 135.1.


## Skills

**Programming:** C/C++, C#, Python, Java, JavaScript, Matlab, HTML, CSS, React.js, Node.js, Flask, MySQL, MongoDB


**Tools and Frameworks:** Git, , CUDA, OpenMP, MPI, Pytorch, OpenCV, Scikit-learn, Unity3D, Linux, Django, AWS

## Honors and Additional Experience

**Honors:** James B. Angell Scholar, 4 Term University Honors and Dean's List, Undergraduate Excellent Scholarship of SJTU

**Full Stack Development:** AR game with integrated NLP model and localization API , Shanghai Jiao Tong University

**Teaching Assistant:** EECS445, Machine Learning, University of Michigan

**Research Assistant:** Full High Definition Demoiréing , Shanghai Jiao Tong University