# Zhongqian Duan

✉ henry.duan0519@gmail.com | 🌐 zlzq-duanzq.github.io | ⭘ Github | 🔗 Linkedin | 📞 734-546-0202

---

## Education

**University of Michigan**                                                         Ann Arbor, MI
*M.S.E. in Computer Science (GPA: 4.0 / 4.0)*                                Dec. 2023 (Expected)
- *Relevant Coursework:* Web Systems, Computer Networks, Parallel Computing, Natural Language Processing

**University of Michigan**                                                         Ann Arbor, MI
*B.S.E. in Computer Science (GPA: 3.9 / 4.0)*                                            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**                                               Shanghai, China
*B.S.E. in Electrical and Computer Engineering (GPA: 3.7 / 4.0)*                         Aug. 2022

---

## Internship Experience

**Apple**
*Incoming Machine Learning Engineer intern*                                           -NoValue-

**Rec Room**                                                                        Seattle, WA
*Software Engineer Intern*                                                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**                                                                         Shanghai, China
*Machine Learning Engineer Intern*                                        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, LaTeX, 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*