Helen Huang

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EDUCATION

Brown University, *Sc.B in Computer Science*, 3.92/4.00 GPA — Providence, RI | **Expected Graduation May 2024**
Relevant Courses: Deep Learning, Machine Learning, Computer Vision, Advanced Computer Graphics, Operating Systems, User Interface and Experience, Linear Algebra, Discrete Structures and Probability
Current Courses: Computer Networks, Computational Linguistics, Computational Photography

TECHNICAL SKILLS

Languages: C, C++, Python, Swift, Go, Java, Javascript, HTML/CSS, SQL
Frameworks/APIs: PyTorch, Tensorflow, React, Next.js, MongoDB, OpenGL, Metal, Pandas, scikit-learn, ChatGPT API

EXPERIENCE

Computer Graphics TA, *Brown University* — **June 2022 - Jan 2023, June 2023 - Present**
- Helped write the projects and labs for Brown's Computer Graphics course during the summer
- Holding weekly office hours and grading student assignments during the fall

Project Manager Intern, *Cocobolo Group* — **June 2023 – August 2023**
- Led a team of 6 in designing, developing, and QA testing an iOS app and website for servers and customers at restaurants
- Held daily standups with engineers to discuss high-level software decisions in Swift and prioritized tasks using Jira
- Helped hire a QA tester and web developer to improve app stability and website development efficiency

Research Assistant, *Brown University Interactive 3D Vision & Learning Lab* — **June 2022 – December 2023**
- Won a summer research grant to research neural radiance fields for photorealistic novel view synthesis under Prof. Sridhar
- Tested scene data from our synthetic capture stage on various NeRF models to ensure quality of data for long scene modeling and hand-object interaction. Results can be found at https://helen-huang9.github.io/projects/

PROJECTS

Most of the following projects' results can be found on my project page: https://helen-huang9.github.io/projects/

ChatAI Website, *Personal Project* — **June 2023 - Present**
- Designed and implemented a full-stack website that allows users to chat with AI-generated celebrities and famous characters (https://chat-ai-helen-huang9.vercel.app)
- Implemented the front-end of the website in Javascript using React, Next.js 13, and Tailwind CSS
- Implemented the back-end of the website using ChatGPT's Chat Completions API and MongoDB to dynamically generate realistic chat responses and store celebrity profiles

Reddit Depression Detector, *Computational Linguistics Course* — **November 2023 - November 2023**
- Implemented the paper, *Detecting Symptoms of Depression on Reddit*, which uses RoBERTa and LDA embeddings from Reddit posts to detect and predict specific depression-related symptoms in contrast to control posts by the same Reddit users
- Used Pandas for dataset preprocessing, LdaMulticore to generate topic embeddings for each post, RobertaModel to generate post embeddings for each post, and RandomForestClassifier to classify whether a post is depression-related or not
- Achieved mean UAC scores within 2% of expected results using 5-fold cross-validation

IP / TCP Network Stack, *Computer Networks Course* — **October 2023 - November 2023**
- Implemented a virtual IP stack in Go that implements the link layer, IP forwarding, and routing using the RIP protocol.
- Implemented a virtual TCP stack in Go that is RFC9293-compliant which implements the TCP state machine, sliding window protocol, retransmissions, and connection termination

Music Streaming Service, *Computer Networks Course* — **September 2023 - September 2023**
- Designed and implemented a server and client music streaming application using TCP connections for client-server communication and UDP connections for streaming music from the server to the client in Go

Physics-based Simulator and Renderer, *Computer Graphics course* — **January 2023 – May 2023**
- Implemented a pathtracer that supports diffuse, glossy, mirror, and refractive BRDF materials with anti-aliasing techniques like stratified sampling and importance sampling in C++
- Implemented the paper, *Real-time Ink Simulation Using a Grid-Particle Method,* which is a physics-based ink-in-water simulation to render realistic videos of ink drops diffusing in water using C++. Later optimized performance to be in real-time by reimplementing it in Swift and Metal

POSIX-like Threading Package, *Operating Systems course* — **January 2023 - May 2023**
- Implemented a POSIX-like user-level threading package that is multiprocessor-safe and supports thread creation, deletion, joining, mutexes, condition variables, and priority-based scheduling in C

Signature Forgery Detector, *Deep Learning course* — **September 2022 - December 2022**
- Tested the performance of a CNN, Vision Transformer, Siamese CNN, and Siamese Vision Transformer using LIME to analyze and interpret how each model learned to classify real and forged signatures in Python and PyTorch
- Used this research to develop our final signature forgery detector with 86% precision and 93% recall using a Siamese CNN

Cat Ninja iOS Game, *Personal Project* **June 2022 - August 2022**

- Designed and developed an iOS app that allows the user to play as a cat and swipe toys and avoid water balloons. Implemented in Swift using the SwiftUI and SpriteKit frameworks. Soon to be available on the App Store

Computer Systems Projects, *Computer Systems course* **April 2021 – May 2022**

- Implemented a Venmo-like banking service in C++ where users may withdraw, deposit, and check their balance as well as pay and charge other clients. Used synchronized data structures and multithreading to ensure fast and secure transactions
- Implemented a FaceBook-like distributed system in C++ to handle server and client connections using RPCs and sharding

3D Reconstruction from Images, *Computer Vision course* **April 2021 – May 2022**

- Produced a 3D voxel model of my Computer Vision professor in Python for my final project using photogrammetry techniques on self-captured images and camera poses

Iron Man Helmet, *Design Engineering course* **March 2021 – April 2021**

- Led a group of 4 people to design and create a voice-activated Iron Man helmet using a Raspberry Pi for our final project
- Researched, designed, and engineered the mechanism that opens and closes the mask using servos, prototyping materials like cardboard, and laser cutters

LEADERSHIP AND CLUB EXPERIENCE

Asian Student Alliance (ASA), *Head* **St. Mark's School | September 2018 – May 2020**

- Led the 100+ student Asian affinity group in weekly meetings, school-wide events, and festivals

St. Mark's Varsity Girls Ice Hockey, *Player* **St. Mark's School | September 2016 – May 2020**

- Won the Frey Prize for best contribution to the team for sportsmanship and teamwork