

Zixuan (Arya) Wu

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EDUCATION

Wellesley College

B.S. in Computer Science, Architecture | GPA: 3.96/4.0

May 2025

Relevant Courses: Data Structure, Algorithms, Databases with Web Interfaces, Mobile App Development, Distributed Computing, Computer System

Cross Registration at MIT | GPA: 5.0/5.0

Relevant Courses: Machine Learning, Computer Vision, Natural Language Processing(Grad), Computer Graphics, Advanced Interaction Studio

TECHNICAL SKILLS

Programming Languages: Python(Advanced), Java(Advanced), JS/TS, C++, C, Go, MATLAB, R, Racket.

Development Frameworks: HTML/CSS, React, React Native, Node.js, MySQL, MongoDB, Pytorch, Sklearn, AWS EC2

Design: (<https://aryawu.cargo.site>) Digital Fabrication & Physical Prototyping, Rhino CAD, UI/UX, Arduino, GIS, P5.js

EXPERIENCE

Research Assistant | Code LLM Interpretability | Northeastern Khoury PRL

Summer 2024

- Research on aligning CodeLLM(starcoder, llama3-8b, gpt2) by understanding representation of code functions
- Code Circuit Discovery, Tuned Lens, Attribution Patching to interpret function applications, variables, and binding.
- Engineer batching pipeline to efficiently conduct experiments, extending the NNSight library.

Research Assistant | Text-Vision Benchmark on [Glyph](#) | Wellesley EASEL Lab

Jan 2024 - Present

- Design a text-image dataset, formulating rules in glyphs as a pattern recognition task of compositionality reasoning.
- Code data processing NLP pipeline and perform prompt engineering of problem wording to obtain unbiased results.
- Evaluate dataset on Vision-Language Models(CLIP, Flamingo, LLaVA, Idefics2, etc), with finetune/training variation.

Software Engineer Intern | Latent Lab: Knowledge Exploration | MIT Media Lab

Jan 2024 - Present

- Extended UMAP dimension reduction to compress high dimensional embeddings of MultiMedia data into 2D space.
- Developed a knowledge graph generator, with simulated LLM-based agents for profile-specific exploration
- Implement API routes for dataset scraping, loading, and KG construction on App Server using Python and FastAPI.
- Created visualizations of data topics and knowledge graphs as topological maps using deck.gl layers, on a frontend developed with React, Next.js, and TypeScript, and deployed on Vercel.

Research Assistant | Crowdsourced food delivery | Wellesley CrowdNets Lab

Sep 2023 - Present

- Design an ML pipeline of customized clustering algorithms on crowdsourced spatial-temporal food delivery data.
- Engineer a Ride Simulator for agent-based event simulation of order batch and match using offline approximation.
- Develop a Greedy Insertion VRP algo for customer fairness, and a Bipartite Matching algo for courier fairness.
- Conduct Algorithm evaluation and optimization using feedback loop parameter fine-tuning and data visualization.

UX Researcher | Augmented Reality App for Learning | MIT CSAIL [HCI Engineering](#)

Spring 2023

- Design research paper experiments aim to support novices in learning hands-on creative maker skills.
- Implement feedback & control system with smart sensors and Arduino to generate prompts and detect actions.
- Code in Unity3D linking to Hololens app & MRTK, with interface that prompts users to learn through self-reflection.

Data Researcher | User Centered Design using AI | [MIT Ideation Lab](#)

Spring 2023

- Run over 20 social experiments in Grasshopper on Generative Design Tools in multi-objective optimization design.
- Design and Implement experiment setup to research the carrying of aesthetic preferences using conjoint analysis.
- Perform statistical analysis tests in R, produce data visualizations and conclusions for [paper](#) writing.

PROJECT

OnlineOrder: A food ordering web app based on Spring Boot, ReactJS, AntDesign | CrowdNets Lab, 2024

- Developed CRUD REST APIs with Spring Controllers, support registration, menu searching, ordering, checkout.
- Utilized Spring Data JDBC for PostgreSQL database hosted on AWS RDS, handling menus, restaurants data.
- Implemented Spring Security for session-based authentication.
- Built frontend using React and Ant Design, providing users with the ability to add shopping cart and place orders.
- Containerized the build and pushed image to AWS ECR, successfully deployed it to AWS App Runner.

Next AI: Full-Stack Web-Based Q&A AI Agent for PDF Document Queries by React,Ant Design| 2024

- Created an interactive conversational UI enabling users to upload and interact with PDF documents in real-time.
- Implemented RESTful APIs via Express and Node.js and optimized for high-performance request handling.
- Utilized an in-memory vector store to cache generated embeddings for efficient retrieval.
- Integrated OpenAI GPT-3.5 Turbo API and Langchain for document loading, splitting, storage, retrieval, and output.

Around: A Cloud and React based Social Network | CS343 Distributed Comp, 2024

- Implemented a social network web application using Go, where users can create, browse, and search posts.
- Improved the authentication using JWT token based registration/login/logout flow with React Router v4.
- Used ElasticSearch as a NoSQL database, with inverted index for messages to provide quick keyword-based search.
- Used GCS to store all media files, with links stored as metadata in ElasticSearch.

WAVE: a student centered event web application by Node.js and Express | CS304 Web Database, Spring 2024

- Designed User interface using Figma, coded the frontend with JS and Ajax for seamless interactions.
- Developed CRUD operations for events creation, registration, filtering, user accounts, and friend connections
- Leveraged MongoDB database with collection for posts and users data, configured Multer for file upload.
- Built Express Middleware and Node script for requests and responses, and Cookie-session-based authentication.

Humoment: A Large-Language Object that captures day with music | 4.043 Interactive Intelligence, Spring 2024

- Built a Software Python code pipeline for music creation, leveraging Microsoft's MusicGen and AudioGen, fine-tuned on the user's playlist for humming tune continuation.
- Built a conversational chatbot using GPT4 whisper, with emotion analysis to synthesize information.
- Designed the product using 3D Modeling, powder printing, house Arduino and Xiao electronic components.

DayEscape: A mobile app for day trip planning based on React Native, Firebase | CS317 Mobile Dev, Fall 2023

- Support user login/out, place pinning, trip creation, saving, and sharing, note taking with images, and GPS tracking.
- Implement algorithms on spatial routing and interval scheduling for trip planning, with user specified places, time constraints, and travel modes, support real-time route and traffic display using Google Map and Google Search API.
- Implement users, places, and trips databases using Firebase cloud storage, with queries for data retrieval and display.

Photon mapping with kd-tree acceleration to render global illumination | 6.4400 Graphics, Fall 2023

- Implement a standard two pass ray tracer in C++, support global illumination and specular reflection for materials.
- Generates global and caustic photon map in 3D point cloud, leveraged k-d tree and OpenMP parallel programming.

Soundscape: Creative Tracklist Generation from Metaphoric Album names | 6.8610 NLP, Fall 2023

- Coded a NLP pipeline for song title generations, including dataset generation, pre-processing and post-processing using regex.
- Prompt Engineering for GPT-2 and T5, leveraging the models' narrative capabilities for symbolic text generation.

VMetaphor: Automatic Generation of Advertisement Visual Metaphors || 6.8301 Computer Vision, Spring 2024

- Collect hybrid visual metaphor datasets and finetune Stable Diffusion Model towards an advertisement design tool.
- Code a generative pipeline including parts segmentation, masking, image inpainting edits using pyTorch.
- Conduct Ablation study across models and components, with qualitative and quantitative analysis for report writing.

LEADERSHIP EXPERIENCE

- NCAA Division III Student Athlete and Academic All-Conference | Wellesley Varsity Swimming Team Sep 2021-Present
- Teaching Assistant | Wellesley Mathematics, Computer Science Department Jan 2022-Present
- Volunteering Program Manager | Wellesley Robogals Global 2022 - 2023
- Slade Summer Fellowship awardee| Tanner Conference Speaker | Wellesley Art Department 2022 - 2023