Yifei Chen

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EDUCATION:

- The Branch of the High School Affiliated to Renmin University of China

  Sep 2018-Jul 2021
- The Experimental High School Attached to Beijing Normal University

  Sep 2021-Jul 2024
- University of California, San Diego

  Sep 2024-Now

WORK EXPERIENCE

- **HDSI Lab Fellow, UC San Diego**
- Developed hardware prototypes with Arduino, Raspberry Pi, and integrated sensors to support ongoing research projects.
- Designed and fabricated custom components with CAD modeling and 3D printing for experimental device assemblies.
- Implemented microcontroller programming, circuit setup, and system testing to ensure reliable data capture and device performance.

Internship, Zhongdiantongtu Technology.,LTD, Wuhan, China

- Worked under the guidance of Mr. Lei Cheng (CTO)
- Joined the digital twin technology team in the field of transportation and assisted with gathering data to create computer simulations that can predict potential accidents.
- Conducted a literature review of 10+ related papers.
- Used the app “EarthMaker” to simulate a tunnel’s traffic flow, signage, and air circulation.

RESEARCH EXPERIENCE

Research on x-y plotter

- Conducted research under the guidance of Professor Michael Littman, Princeton University, on designing and building an x-y plotter.
- Researched other x-y plotter designs including one made by Makeblock and a DIY plotter with stepper motors from Instructables.
- Modeled the design using LeoCAD, built the design using LEGO Technique and servo and stepper motors, and programmed the x-y plotter using Arduino IDE.
- Read 15+ related papers including “Theory and Design of CNC Systems” by Suk-Hwan Suh, et al., and “Instrument Engineers' Handbook: Process Control and Optimization” by Bela G. Liptak.
- Tested the plotter and successfully wrote out sentences and plotted computer data.
- Wrote a 15-page paper.

PROJECT DEVELOPMENT

DS3 Project: Geisel Library Occupancy Tracker

- Developed a real-time IoT occupancy-tracking system using ESP32 Bluetooth-scanning sensors and a Firebase Realtime Daatabase.
- Built a React-based website that auto-updates through live database listeners and deployed it on Vercel for public access.
- Collaborated in a four-person team on hardware setup, data structure design, and system integration.
- Created realistic, floor-plan-based visualizations to display occupancy levels and improve interpretability for users.
- Project won second place in Dino Cage.

Mechanical Subteam Member, TritonBots RoboCup SSL Team

- Designed and prototyped robotic mechanisms like the dribbler damping system of the team's robot.
- Conducted CAD modeling, material selection, and iterative refinement based on testing feedback.
- Collaborated with electrical and software subteams to integrate mechanical components into the full assembly of the robot.

Multimedia Processing and Classification System

- Designed an image and audio processing framework with Python that can make alterations such as different filters like negate, rotate, grayscale, and brightness adjustment; some more advanced effects like edge detection, pixelation, clipping, and reverb; and a few audio transformations like reversing, speeding, and slowing.
- Created tiered processing classes with integrated cost-tracking and coupon-based systems, thus simulating free and paid service models.
- Created a K-Nearest Neighbors (KNN) classifier that implemented voting system, testing with labeled data, and distance metrics to achieve image classification.

Analysis on Music Popularity with Data of TikTok and Spotify

- Cleaned and standardized vast music datasets (Spotify Tracks DB and TikTok Popular Songs 2022) and analyzed them using Python and Panda.
- Performed EDA and data visualization like histograms, bar plots, and scatterplots to analyze correlations between different musical attributes and track popularity.
- Developed and evaluated a linear regression model (MSE, R2) and constructed A/B testing framework to test effect of features.
- Discussed ethical considerations like dataset bias, limitations to used algorithms, and results transparency.

Taylor Swift Music Data Analysis

- Used Python and Pandas to clean and analyze lyric datasets (200+ songs).
- Implemented data visualizations to unravel trends in song features and popularity.
- Created a song recommending tool leveraging lyric similarity and a lyric search tool for keyword retrieval.
- Created a keyword cloud generator for the *Lover* album.

***Friends* TV Show Data Analysis**

- Used Python and Pandas to clean and analyze datasets on *Friends* episodes.
- Implemented data visualizations to explore trends in gender balance in dialogues, viewership, and emotions of characters.
- Used functions to compare and analyze directors and writers, calculate contributions, and identify best directors across episodes.
- Used script and sentiment analysis to create emotion distributions for different characters and generated new episode titles based on the past titles.
- Used statistical analysis to unravel correlations between attributes like ratings and emotions to the success of different episodes.

Team Program Developer for International Space Settlement Design Competition

- Led the 3D modeling in three out of four departments (Human Factor Department, Automation Department, and Operation Department).
- Helped the teams from different countries communicate on window composition, radiation protection, construction machinery, commodities & provision, utilities & transportation routings, and energy generation & storage.
- Presented the project to the ISSDC committee; won the International Finals.
- 3D printed the main model, set up a project booth and presented the project at the Award Ceremony of 2023 UNESCO (United Nations Educational Scientific and Cultural Organization) Prize for Girls' and Women's Education.

Mechanical Engineer of VEX Robotics Team

- Designed, prototyped, and assembled mechanical structures like drivetrain, intake, and lift mechanisms for VEX robots.
- Worked with another mechanical engineer of the team to develop efficient and reliable designs under strict time and performance constraints.
- Used CAD tools for 3D modeling and part optimization, also integrated feedback from testing to improve robot performance.
- Contributed to team's overall strategy and documentation for regional competitions to ensure mechanical consistency and team coordination.

LEADERSHIP

Founder, Bibliolater Club, Beijing

- Started a reading club that now has 40+ members from schools including The High School Affiliated to Renmin University of China, Beijing National Day School, and Beijing Jingshan School.
- Defined the club mission as reading together and sparking ideas through mind collision; organized 120+ online meetings; read and discussed 40 books together, sharing reading experiences and interpretations.

Additional Skills

Languages: Mandarin, English, Spanish

Programming Languages: Python, Java, JavaScript, Arduino, MATLAB

Technical Skills: Microsoft Office (Word, Excel, PowerPoint), SolidWorks, CAD, MATLAB, 3DMAX, C4D, Blender, SketchUp

Other Skills: 3D printing, carpentry, soldering